

Medical decision-making, adherence and quality of life in people living with HIV/AIDS

Dissertation

der Fakultät für Informations- und Kognitionswissenschaften der
Eberhard-Karls-Universität Tübingen
zur Erlangung des Grades eines Doktors der Naturwissenschaften
(Dr. rer. nat.)

vorgelegt von

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Tübingen

2004

Tag der mündlichen Qualifikation: 8.6.2005

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Medical Decision-making, Adherence and Quality of Life in People Living with HIV/AIDS

A cross-sectional qualitative and quantitative study

Ph.D. Thesis

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Language of Ph.D. thesis: English

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A cross-sectional qualitative and quantitative study

I. Introduction

The access to Highly Active Antiretroviral Therapy (HAART) transformed the infection with the Human Immune Deficiency Virus (HIV) from being associated with imminent death to living with a chronic illness. The history of HIV treatment is characterized by unexpected twists and turns, reflected in the ongoing changes and revisions in treatment guidelines. The continuous debate on early versus late initiation of therapy clearly reflects the lack of certainty in this area. The short life span of expert slogans like *hit it hard and early* or the premature enthusiasm about *eradication of HIV* is just some examples underlining the statement of an experienced care-provider and co-author of the German HIV-treatment guidelines: „*I am only the expert for the contemporary medical errors. For their disease and their life, patients are the absolute experts, permanently.*“ (Kremer & Bader 2001, *translated by author*). He disclosed his secret of success in the medical decision-making process: „*I can join in any decision they take in the large spectrum. Not that I find it good or that I find it right. This isn't important at all - but is important to make them clear that this is their body, their life, their infection.*”

Treatment guidelines and medical expertise can only offer common recommendations, but are not a substitute for the individual based medical decision. The knowledge and experience held by the patient has for too long been an untapped resource in decision-making about treatment (Department of Health 2001). It is something that could greatly benefit the quality of patients' care and ultimately their quality of life, but which has been largely ignored in the past. The emphasis is beginning to shift with the governmental concept of the expert patient in the United Kingdom (Department of Health 2001).

Regarding HIV-treatment we have more questions than answers. We simply do not know when it is individually the best point to start or stop a therapy. “*People living with HIV don't need to be put on drugs, they need to be involved in shared decision-making*”, resumed Robin Gorma, head of the health promotion at the Terrence Higgins Trust in London. Adherence has been described as the “Achilles heel” of treatment success (Rabkin & Chesney 1998). In particular, patients' participation in medical decision-making and trust in the physician are associated with adherence to medical advice (Golin 2000, Golin et al. 2002).

It is time to have a look at the HIV-patient as an expert in medical decision-making. Little is known about how people living with HIV (PWHAs) make their decision on treatment and why. Listening to the voices of PWHAs, taking PWHAs as an expert and looking at her decision-making will provide critical material for both, HIV-specialists and PWHAs, to enhance the quality of decision-making in HIV-therapy, as research in other chronic diseases suggests.

The Picker Institutes in USA and Europe have specialized in measuring patients' experiences of health care through the eyes of the patient and using this information to improve the provision of health care (Coulter 2001). Results of this research were that most patients wanted more information, many but not all wanted to participate in decisions about their care. But doctors underestimated patients' desire for information and were often unaware of patients preferences for participation in decision-making (Coulter 2002). Shared decision-making programs are not simply about educating or instructing patients about their condition and then measuring success on the basis of patient adherence; they have been designed for empowering patients to use their own skills and knowledge to take effective control over life with a chronic illness (Department of Health 2001).

Medical role models have developed from paternalism into partnership (Büchi et al. 2000, Charles et al. 1997, 1999, Frosch & Kaplan 1999, Towle & Godolphin 1999). We do not yet know which role patients want to play or if doctors are ready for the change. Sophisticated instruments have been developed to assess decisional role preferences, need for decisional support, decisional conflict and the quality of the decision-making process in other chronic diseases. Up to date these methods have not been applied to find out about the decisional role preferences of PWHAs and their needs for decisional support. Further research is needed to provide such baseline knowledge to develop intervention programs tailored to the decisional support needs and decisional preferences of PWHAs in order to improve the quality of decision-making and the quality of life in PWHAs.

1. Theoretical background

1.1. Models of medical decision-making

Over the last decades the patient-doctor relationship has evolved from a paternalistic model to more recent views where medical decision-making is emphasized as a joint negotiation and partnership between patient and doctor. Partners work together to achieve common goals and the key for doctors to successful partnership is to recognize that partners share decision-making and responsibility and that patients are experts too (Coulter 1999). Whereas doctors are the clinical experts, who know best about diagnosis, prognosis, treatment options and outcome-probabilities, patients are the experts for their own illness, life-circumstances, values, preferences and attitudes to risks. The degree of sharing this expertise varies

between the different styles of patient-doctor relationships. The continuum of medical decision-making can range from professional choice to patients choice. Three treatment decision-making models, the paternalistic, the shared, and the informed describe the theoretical spectrum (Charles et al. 1999):

1.1.1. Paternalistic model

In the paternalistic model the patient complies and the doctor decides. The basic assumption is that doctor will make the best treatment decision for the patient and can do so without eliciting personal information from the patient or involving him in the decision-making process. The patient passively acquiesces to professional authority by agreeing to the doctor's choice of treatment. The physician provides the patient only with a minimum of medical information.

1.1.2. Shared decision-making model

The shared decision-making model is characterized by its collaborative nature in that doctors and patients share all of the decision-making process simultaneously. Both doctors and patients exchange their information and reveal treatment preferences and their rationale while trying to build a consensus on the appropriate treatment to implement. The challenge for this model is to create a patient doctor relationship in which the patient feels comfortable expressing his or her treatment preferences (including doing nothing or watchful waiting). Shared decision-making requires that both parties take steps to build a consensus about preferred treatment and that an agreement is reached (Charles et al. 1997). Shared decision-making is best used for problems involving medical uncertainty (Frosch & Kaplan 1999).

1.1.3. Informed choice model

The informed choice model is based on a division of labor. The decision-making step is the sole prerogative of the patient. Information transfer is seen as the key responsibility and only legitimate contribution of the doctor to the decision-making process. Patients are accorded a more active role in both defining the problem for which they want help and in determining appropriate treatment. Assuming patients are accurately informed, they should not be persuaded to change their mind. It is not important if the doctor agrees with the patients' decision or not. The doctor communicates to the patient information on all relevant treatment options and their benefits and risks and sometimes the patient takes other sources of information into account to be able to make an informed choice.

The decision-making process can be broken down into two stages, problem solving and decision-making (Deber & Baumann 1992). Problem solving describes the process of

information exchange and deliberation or discussion of treatment preferences and alternatives. In figure 1 treatment decision-making is broken down into the different processes. Information exchange can be further sub-classified according to flow, direction, type and amount of information exchanged (Charles et al. 1999).

Analytical stages		Paternalistic model	Intermediate approaches	Shared model	Intermediate approaches	Informed model
Information exchange	Flow	One way (largely)		Two way		One way (largely)
	Direction	Doctor ↓ patient		Doctor ↓ ↑ patient		Doctor ↓ patient
	Type	Medical		Medical and personal		Medical
	Minimum amount	Legal requirement		Anything relevant for decision making		Anything relevant for decision making
Deliberation		Doctor alone or with other doctors		Doctor and patient (plus potential others)		Patient (plus potential others)
Who decides what treatment to implement?		Doctors		Doctor and patient		Patient

Figure 1: Models of decision-making about treatment (Charles et al. 1999)

These three models of decision-making about treatment only reflect prototypes, there are many intermediate approaches, so that clinical encounter may not use a pure model, but rather a hybrid of elements of more than one model (Charles et al. 1999).

1.2. The distinction between patients needs for information and their preference of participation in decision-making

How much are patients prepared to be involved in medical decision-making? A study with 1021 breast cancer patients found, that one third of these women wanted to delegate the responsibility of selecting cancer treatment to their physicians, 44% wanted to select their treatment collaboratively and 22 % wanted to select their own cancer treatment. Among women who preferred an active role, only 20% felt they had achieved that role, and among those who preferred a passive role, a small number felt they had been pushed into a more active role (Degner et al. 1997 ii).

Results on the role patients wish to play in treatment decision-making are sometimes contradictory, because the designs of the studies do not differentiate between the analytical stages of medical decision-making (Deber & Baumann 1992). Information exchange requires a certain ability to understand health information. A literature review on research in reading grades of the adult population in the US showed, that about 40% of the population can only read at or below 8th grade level (Barratt et al. 2000, pp.11-12). Further patients' medical decision-making depends on how the information is framed and their choices are often irrational (Tversky & Kahneman 1981). To understand the different success rates between the treatment options requires numeric skills people often do not meet. In a US-study on 470 patients were asked a hypothetical question about which drug they would prefer to be treated with for hypertension; the drugs were in reality equally effective but their effectiveness was presented as a relative and absolute risk reduction. Only 15 % recognized that both drugs were equally effective (Malenka et al. 1993). Patients may not be able or desire to become a medical expert but they remain expert for their own preferences and values and may well prefer to be involved in the discussion about treatment preferences and alternatives and the final decision about the treatment. The ability to understand medical information or the success rates of treatment options might have little to do with the preferences of the patient to participate in decision-making. The decisional role preferences of the patient only become important if they are about to make a decision between the different treatment options (Büchi et al. 2000). As described in the grounded theory of life-death decision-making, the desire for information is quite separate from the desire to assume responsibility for treatment decisions (Degner & Beaton 1987). Other authors have also emphasized the distinction between these constructs (Krantz et al. 1980).

As long as the research does not distinguish between these the different analytical stages of medical decision-making, contradictory statements have to be expected on patients' preferences (Büchi et al. 2000). The criticism of research available on shared decision-making can be reduced to two aspects: (1) the inadequate methodical quality of the individual studies, and (2) that the studies measure just the quality of the provision of information about the illness, its treatment, and prognosis. They take only insufficiently the judging ideas and preferences of the patients into account (Frosch & Kaplan 1999).

1.3. Which role do PWHA want to play in medical-decision-making and how do they perceive their clinical encounter?

Little is known about the desire of PWHA to participate in medical decision-making or the role that they would like providers to play (Golin 2000). Given the fact that medical decision-making is a dynamic complex, preference may change over the time and may depend on the decision they make. Which decisions are associated with stronger preferences for decision

participation and which decisions are associated with weaker ones? A pilot study of 11 PWHA who decided against their doctor's advice not to take HARRT suggested that they may prefer a shared decision-making model in the decision to take medication, but an informed choice model when it comes to the decision not to take medication (Kremer et al. 2002). As it "*takes at least two to tango*", there is often a mismatch between the decision-making approach that the doctor wants to use and the patients' preference. Research on communication difficulties between doctors and patients revealed an alarming prevalence of misunderstandings between presumable well-intended doctors and their patients. All were associated with a lack of patient participation in decision taking in terms of voicing expectations or preferences or voicing responses to their doctors' actions (Barry et al. 2000). Another study revealed that shared decision-making is often not happening in clinical practice, because doctors do not agree with the concept (Raynor et al. 2001).

Degner et al. (1997i) developed the Control Preferences Scale (CPS) as a useful tool to assess the role that patients want to play in decision-making so that we can tailor our support to their needs. The CPS has taken two decades to be developed, measuring a construct that emerged from grounded theory of how treatment decisions are made among people with life-threatening diseases (Degner & Beaton 1987). The control preference construct is defined as "*the degree of control an individual wants to assume when decisions are being made about medical treatment*" (Degner et al. 1997i). Bearing in mind that some people may not want to assume responsibility for treatment decisions, whereas others prefer to make their informed choice alone, congruence between preferred role and actual role may be more important than the actual assumed role (Degner et al. 1997 ii).

The CPS provides a quick and practical approach to elicit individuals preferred as well as the perceived degree of involvement in decision-making. However this instrument raises more questions, than it answers. How do preferences vary among cultural groups, gender, and age or education level in PWHA? Studies using the CPS in other chronic diseases revealed that age was the most important predictor of decision-making preferences with younger people preferring an active role. Women and well educated people also tended to prefer a more active role, but these variables explained only 15% of the variance in patient role preferences (Baratt 1999).

Should support strategies be tailored to the preferences of PWHA or should they try to enhance their participation in decision-making? This question might be answered in looking at a second construct: decisional conflict.

1.4. The decisional conflict- Eliciting support needs of PWHA to enhance their quality of decision-making about treatment

The construct of decisional conflict derived from Janis and Mann (1977) is defined as a state of uncertainty about a course of action. Decisional conflict is more likely when a person is confronted with decisions involving risk or uncertainty of outcomes, when high-stakes choices with significant potential gains and losses are entertained, when there is a need to make value tradeoffs in selecting a course of action, or when anticipated regret over the positive aspects of rejected options is probable (O'Connor 1999). The decision to take or not to take Anti-Retroviral Treatment (ART) may create a high level of uncertainty (Carter 2002).

Although decisional conflict occurs as a consequence of the difficulty inherent in the type of the decision being made, other factors can exacerbate the perceived uncertainty.

Uncertainty is greater when a person:

- 1) feels uninformed about the alternatives, benefits and risks;
- 2) is unclear about personal values;
- 3) feels unsupported in making a choice or pressured to choose a course of action (O'Connor 1999).

As these factors are amenable to decision support interventions, O'Connor (1999) developed the Generic Decisional Conflict Scale (GDSC) to measure a person's perceptions of:

- 1) personal uncertainty in making a choice about health care options
- 2) the above three modifiable factors contributing to uncertainty, and
- 3) the quality of the decision made.

The GDSC has been used to assess baseline needs and to tailor decision-supporting interventions to needs in the Ottawa Decision Support Framework (DSF 1998). For health decisions, there is some empirical support for the relationship between uncertainty and three contributing factors assessed by the GDSC. The correlation between uncertainty and feeling uninformed and unclear about values ranges from 0.49 to 0.53 (O'Connor 1995).

Decision support interventions that address information, values and support problems have been shown to improve patients' perceptions of these contributing factors and to monitor progress during and following interventions. Up to date the GDSC has never been applied to PWHA, though the unique contribution of the GDSC lies in quantifying the modifiable factors that can lead to uncertainty. The important factors like information needs, personal values and decision-support needs both during the process of deliberation and following the choice need to be assessed in PWHA. The GDSC is useful in eliciting support needs of PWHA to enhance their quality of decision-making about treatment.

1.5. What is a good decision?

The Ottawa Decision Support Framework (DSF 1998) distinguishes between quality decision-making and quality outcomes, because good decisions can still result in bad outcomes, due to the probabilistic nature of clinical events. Indicators of quality decision-making may include:

- adequate knowledge
- realistic expectations
- clear values
- congruence between personal values and choices
- lower decisional conflict
- decision implementation
- satisfaction with the decision and decision-making process (DSF 1998).

These are the dimensions measured by the GDCS, which are in line with the definition of a good decision of PWHA in a pilot study on informed choice not to take HAART (Kremer 2001). One woman, who defined herself as an expert patient with realistic expectations and clear values, explained: *“I know, if it is not me, who has made the decision, I am not going to take the medication and there will be thousands of reasons to forget it.”* (Kremer 2001, *translated by the author*). The relationship between the quality of the decision-making and adherence to ART has not been investigated yet with the GDCS.

1.6. Medical decision-making in the understanding of adherence

The National Institute of Health (NIH 2001) identified patient’s medical decision-making about treatment as a gap in the understanding of adherence to ART and requested studies with emphasis on the development of interventions to improve adherence (NIH 2001). Qualitative findings suggest that non-adherence is not always unintentional (NIH 2001). Little is known about characteristics that may contribute to adherence or non-adherence decision-making. Partial or poor adherence can lead to a rebound in viral replication, poorer survival rates, and the mutation to treatment-resistant strains of HIV (NIH 2001). According to Frank and Miramontes (1997) adherence is defined as *“the extend to which a clients behavior coincides with the prescribed health care regimen determined through a shared decision-making process between the client and the health care provider”*. The benefits of ART are only tenable with consistent adherence, which is very difficult to achieve. In most studies successful adherence is defined as more than 80% of doses taken, though this convention may not be applicable to ART (Rabkin 1998). Several recent studies have shown that 90-95% of doses must be taken for optimal suppression with ART (Ledergerber et al. 1999, DHHS guidelines 2002). Insufficient adherence is rather a rule than an exception. Studies

found adherence rates ranging from 42% to 60% depending on the time-frame (Rabkin 1998). A survey conducted with 665 PWHA revealed that 43% of patients missed doses within the last week (Gallant & Block 1998). Main reasons for missed doses were predictable and included forgetting, being too busy, running out of pills, having difficulties with food requirements or having side effects (Gallant & Block 1998). Many predictors of adherence have been identified (DHHS Guidelines 2002) which are summarized in table 1.

Table 1: Predictors of poor or good adherence (DHHS Guidelines 2002)

Predictors of poor adherence	Predictors of good adherence
Poor doctor-patient-relationship	Emotional and practical life support available
Active drug and alcohol use	Ability to fit medications in daily routine
Active mental illness, in particular depression	Understanding the importance of adherence
Lack of patient education	Keeping up with clinic appointments
Lack of access to medical care or medication	Comfortable in taking HAART in front of people

Many of these predictors might be modifiable via tailoring the model of decision-making about ART to the patients’ preferences, enhancing knowledge and participation in decision-making, and by reducing decisional conflict and improving the quality of decision-making. In other chronic illnesses, studies have demonstrated that the interaction between patient and doctor plays a key role in adherence. A strong association between patient-doctor communication and patient’s adherence to medical recommendations has been demonstrated, i.e. .a woman's adherence to mammography screening related to guidelines was influenced by her involvement in shared decision-making with her doctor (Baker et al.1998). This experience with other chronic illnesses suggests that increased patient participation in medical decision-making may improve adherence among patients with HIV (Golin 2000).

Writing prescriptions is easy, but in the end, it is not the doctor’s decision if the patient is taking the medication or not. *“Recognition that taking medication correctly can ultimately be achieved by patients themselves, and that making the commitment to do so is most likely where patients can be active participants in the treatment decision, is an important acknowledgment to be remembered.”* (Guarinieri 2001).

1.7. Quality of decision-making and quality of life

In an article written from a patient's perspective on the discussions and presentations that took place at the *Early vs. Late Initiation of Treatment Meeting* (Thiemann 2003) a woman with an HIV/hepatitis co-infection asked: *“Can we expect that researchers will discover the “best evidence” to set a course for simultaneously prolonging life while delivering a decent quality of life for patients who have unique concerns, expectations, and values? As the DHSS*

Guidelines (2002, 2003) reflect, doctors mostly base their recommendation to start HIV-treatment mainly on physical symptoms, CD4-cells and viral load, whereas patients have a different view: they consider their entire quality of life in addition to surrogate markers and symptoms of HIV/AIDS. The benefits of early treatment, including improved survival, increased viral suppression, and delayed disease progression, were ultimately demonstrated in the Swiss Cohort Study (Zinkernagel et al. 1999).

However, medical logic that requires early treatment and optimal adherence in order to achieve treatment success is sometimes at odds with patients' logic (Montgomery et al. 2001). The aim of PWA is not to achieve optimal adherence to ART, the aim is to improve their quality of life. Sometimes PWA may decide not to take or not to adhere to ART, as the medication has a negative short term impact on their quality of life and interferes with the personal lifestyle. A pilot study of 11 PWA making an informed choice not to take ART revealed that all PWA made this decision, because they wanted to improve their quality of life (Kremer 2001). They felt that this choice improved their quality of life on a physical and psychological level. In social comparison to PWA taking ART they felt better, and the costs of ART in terms of side-effects outweighed the benefits in improvement of physical quality of life. The decision not to take ART improved their quality of life on a psychological level as they did not feel dependent on a medication and forced to schedule their life according to the therapeutic regimen. Some also were afraid of or had experienced body shape changes (so-called lipodystrophy syndrome) or psychotropic side-effects of HAART, like the "*feeling of not being I myself anymore*", which are known side-effect of some antiretroviral combinations.

The quality of decision-making about ART may be related to the quality of life in PWA. Calman (1984) has defined quality of life as congruence between one's dreams, ambitions, hopes for the future, present lifestyle, and experiences. This definition of quality of life largely parallels the World Health Organization definition of health: "*Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.*" (WHO 1948)

According to the First International Conference on Health Promotion (Ottawa Charter 1986) "*Health promotion is the process of enabling people to increase control over, and to improve, their health. To reach a state of complete physical, mental and social well-being, an individual or group must be able to identify and to realize aspirations, to satisfy needs, and to change or cope with the environment.*"

2. Objectives and hypothesis

Based on review of the literature and clinical experience with the community of PWHA it appears that in decision-making about ART patients may be taking more aspects into account than surrogate markers and HIV/AIDS symptoms. Thus the major purpose of this study is to explore the medical decision-making in PWHA who have met or meet the present criteria of U.S. Department of Health and Human Services guidelines (DHSS 2002) to initiate ART (CD4 cells below 350 cells/ μ l, or viral load above 55,000 copies/ml (bDNA or RT-PCR) or symptomatic HIV infection). The study is composed of a qualitative and a quantitative section aiming at investigating medical decision-making of PWHA, and its association with adherence to ART and quality of life in PWHA. The qualitative part of the study will focus on the reasons of PHWA for deciding to take or not to take ART, which sources of information they use in the decision, and if and why PWHA tell their doctors why they take ART or not or miss doses. The results of this section will undergo further quantitative analysis. Additionally the qualitative section will assess decisional role preferences and perceptions and decisional conflict with methods, which have proven to be reliable and valid in previous research studies on other chronic diseases. In the last step the results of the qualitative and quantitative study will be combined to investigate the relationship between these factors of decision-making about ART and their impact on adherence and quality of life in PWHA with instruments designed in the field of HIV-research. The final objective of this cross-sectional study is to explore the decision-making about ART in PWHA to provide baseline knowledge for interventions improve quality of decision-making and quality of life in PWHA.

2.1. Qualitative Study (aims 1-5)

The primary intention of the qualitative part of the study is to investigate which medical decisions PWHA have made at present (**aim 1**) and why they have made them (**aim 2**). Semi standardized interviews and qualitative content analysis (Mayring 2000 ii) will be used to provide doctors with evidence-based information why PWHA choose to take or not to take ART or not to adhere to ART.

The second objective using this qualitative techniques is to determine what decisions the patients fail to discuss with their doctors and why (**aim 3**). The expectation is that many patients don't tell their doctors when they make a decision to stop taking medications, or when they are not taking the medications as prescribed (i.e., not discussing reasons for missing doses). In addition, patients may often fail to share their decision-making process with their doctors (i.e., their reluctance to start a protease inhibitor)

A further objective is to list the sources of information PWHA have used to make their decision (**aim 4**). There are no pre-existing instruments to measure patients' reasons for their

decision or for communication with their doctor, so that category systems need to be developed.

In addition the underlying models of decision-making about treatment (ranging from the paternalistic to the informed choice model) as defined by Charles et al. (1999) will be determined (**aim 5**).

2.2. Quantitative Study (aims 1-10, hypotheses 1-6)

2.2.1. Medical decision-making (aims 1-5)

The first set of objectives of the quantitative section of the study is to provide descriptive statistical information on the categories found of means of qualitative analysis on the decision-making about ART (**aim 1**), the decision made about ART and the reasons for the decision (**aim 2**), the motives to tell the doctor or not why they have decided to take or not to take ART, or why they are non-adherent (**aim 3**), which sources of information are used in the decision (**aim 4**), and which model of decision-making about treatment applies to the decision (**aim 5**).

2.2.2. Decisional control and decisional conflict (aims 6-7)

The second set of objectives of the quantitative study is to assess decisional control preferences and perceptions (**aim 6**) and decisional conflict in PWHA (**aim 7**). This study is designed to measure how much PWHA want to be involved in their actual medical decision and how they perceive the reality by using the Control Preferences Scale (CPS: Degner et al. 1997 i) and to examine the factors contributing to quality of decision-making through the instrument of the Generic Decisional Conflict Scale (GDCS: O'Connor 1999).

- **Hypothesis 1:** PWHA prefer shared decision-making rather than leaving the decision up to the doctor. Only a small minority prefers making the decision alone.
- **Hypothesis 2:** The preferences of PWHA are not reflected in the clinical encounter.
- **Hypothesis 3:** PWHA who perceive less control than preferred have more decisional conflict in the decision about ART.

2.2.3. Adherence and quality of life (aims 8-9)

The third set of objectives of the qualitative investigation is to measure self-reported adherence (ACTG 2001) (**aim 7**) and HIV-related quality of life (Holmes & Shea 1998) (**aim 8**) and to relate this to the above findings on the decision-making process.

- **Hypothesis 4:** PWHA perceiving less control than preferred and more decisional conflict in the decision to take ART are less adherent to ART.

- **Hypothesis 5:** If PWHA perceive less decisional control than preferred, they talk less to their doctors about their reasons for non-adherence.
- **Hypothesis 6:** If decisional control preferences are met in the clinical encounter, this is associated with less decisional conflict and a better quality of life in PWHA.

2.2.4. Model to improve quality of decision-making and quality of life in PWHA (aim 10)

The last aim is to examine the relationship between the qualitative and quantitative results of the study. The models of decision-making about treatment will be related to the results of the qualitative part of the study (decision made about ART, the reasons for the decision, the communication with the doctor about the reasons for the decision about ART and the reasons for non-adherence and the sources of information used in the decision) and the results of the quantitative part of the study (decisional control preferences and perceptions, decisional conflict, adherence and quality of life, including relevant quantitative results of the parent study (Long-Term Survivor study) such as doctor-patient relationship, beliefs about medication, depression, and perceived stress). The final objective is to develop a model to improve the quality of decision-making about ART and the quality of life in PWHA out of the results of the qualitative and quantitative part of the study.

II. Methods

1. Study population and sampling

The study will be conducted as a sub-study of the longitudinal study on psycho-immunology of health and long-term survival with HIV/AIDS (LTS-study) (Ironson et al. 2001). The parent study (Psychology of Health and Long Survival with HIV/AIDS, Principal Investigator Professor Gail Ironson, ROIMH53791) has been supported by NIH/NIA and is currently running in the Behavioral Medicine Research Program of the Faculty of Psychology at the University of Miami in Florida. This project recruited a representative paid volunteer sample from community agencies, HIV-service organizations, doctors' offices and local HIV community-events, diverse with respect to gender, ethnicity and sexual orientation representing the face of HIV in South-Florida.

This longitudinal follow-up started in February 1997, just after HAART became available in 1996 by adding protease inhibitors to a combination of two other antiretroviral. The LTS study (Ironson et al. 2002, Balbin et al. 1999) included two rare groups and a comparison group. The first group was 79 long-term survivors of AIDS, who survived at least 4 years after the diagnosis of an AIDS defining event before being treated with protease inhibitors. The second group was 60 HIV positive people with CD4 cells below 50 cells/ μ l who have had a period of at least 9 months without developing CDC category C symptoms and have not received protease inhibitors, so-called healthy low CD4-group (HLC). The comparison group was 200 HIV-positive people with CD4 cells between 150-500/ μ l who had never had AIDS category C symptoms.

As the study sample is a subset of the LTS study, the participants are pre-selected according to the entry criteria of the parent study and have been both healthy and cooperative enough to have remained in the parent study for up to six years. The LTS study (Ironson et al. 2001, 2002) included participants who (1) have been diagnosed with HIV infection greater than one year, (2) are 18 years of age or older, (3) are able to speak, read and write in English, and (4) are oriented and able to complete the questionnaire. Exclusion criteria are (1) a score of 10 or less in the Johns Hopkins HIV dementia scale (Power et al. 1995), (2) less than 8th grade education, (3) active psychosis (4) co-existing other life-threatening illness (such as cancer), (5) active substance use disorder (6) taking street drugs within the past month (7) taking medications potentially affecting stress hormones (e.g., steroids, propranolol). During the course of the LTS study some participants developed other life-threatening illnesses or developed/relapsed into active substance use disorder but continued to be followed up. It has to be noted that this study was confined to the participants of the LTS study who were

healthy enough to attend the office at the University of Miami which imposes another indirect selection criterion limiting the study population to the healthier proportion of PWHA.

This sub-study investigated between February and September 2003 a total of 79 PWHA as a subset of the LTS, who should have been offered HAART according to the present DHSS treatment guidelines (DHSS 2002): (1) PWHA with symptoms ascribed to HIV-infection, (2) asymptomatic PWHA with CD4-Cells < 350/µl or plasma HIV RNA levels > 55,000 copies/ml (by RT-PCR or bDNA).

Major psychological variables are assessed longitudinally through interview and questionnaire by the LTS- study, some of which are included in the sub-study on medical decision-making, such as adherence, quality of life, doctor-patient relationship, attitude towards anti-HIV-medications, socio-demographic, medical and behavioral parameters. Other aspects examined in the LTS-study encompass depression, perceived stress, coping styles, social support, life satisfaction, life events, spirituality, optimism, hopelessness, emotional expression, personality style and an interview examining psychosocial characters of long-term-survivors with HIV/AIDS.

After 50 participants were included in the sub-study, the number of participants who were ART naïve or not taking ART was still small. In order to get sufficient statistical powers to compare participants currently taking and not taking ART we included all participants of the parent study who were ART naïve or potentially not taking ART. Even after enrolment of 75 participants (which was initially targeted for this study) there were only 5 ART naïve and 11 participants currently not taking ART in the medical decision-making sub-study, so that we interviewed 4 additional participants of the parent study who had currently decided to stop ART.

2. Study Design

This combined qualitative and quantitative study was designed as a cross-sectional sub-study to start with, but as patient's decision-making may change with time and circumstances, the 79 PWHA may also be seen in the future longitudinally to investigate the dynamics in medical decision-making. The questionnaire package, except for the ACTG adherence questionnaire and the physical symptom checklist, was sent out by mail approximately two weeks prior to the interview. Participants took a total of 3-5 hours to complete the package, which they did in several sessions. At the appointment they signed the renewed consent form and the researcher checked the questionnaire package if it was filled out completely and if the report was plausible. In some instances the questionnaires had to be re-completed, mainly because the participants had problems with the burden of

questionnaires and did start to answer the questions automatically. After thorough quality control of the questionnaires the participants completed the Physical Symptom Checklist and the ACTG adherence questionnaire in conjunction with the researcher. After a brief physical exam and the blood draw the participants underwent the interview for the medical decision-making study (15 to 30 minutes duration) and the interview for the LTS study (60-90 minutes duration). As part of the LTS study the participants received a small contribution (USD 50) to compensate for their expenses (time and traveling) in order to participate in the study.

Again, this sub-study on medical decision-making included only the participants who already voluntarily committed their time since more than 3 years to the LTS study. After IRB approval of the sub-study the participants of the LTS study who should have been offered HAART according to the present DHSS treatment guidelines (DHSS 2002) due to a CD4 nadir of 350 cells/ μ l or symptoms of HIV were assessed cross-sectionally with the following instruments:

2.1. Medical decision-making sub-study

2.1.1. Qualitative instruments

- Semi-standardized interview on medical decision-making (see appendix p. 1)

2.1.2. Quantitative instruments

- Control Preference Scale (CPS) for preferred and perceived role (Degner et al. 1997 I, see appendix pp. 2-3)
- Decisional Conflict Scale (GDCS) (O'Connor 1999, see appendix pp. 4-5)
- ACTG adherence questionnaire for follow up (ACTG 2001, see appendix pp. 6-11)
- HIV-AIDS targeted Quality of Life (HAT-QoL) (Holmes & Shea 1998, see appendix pp. 12-15.)
- Doctor-Patient Relationship (DPR) (Ironson et al. under review, see appendix p. 16)
- Beliefs about Medication Questionnaire (BMQ) (Horne & Weinman 1999, see appendix p. 17)
- Socio-demographic parameters: age, gender, ethnicity, sexual orientation, education level, employment status, income, relationship status, health insurance etc.
- Medical parameters: CD4-Flow cytometry (Coulter XL-MCL) and HIV-1 viral load RT/PCR (Roche Amplicor HIV-1 MONITOR® Test, measuring viral loads at levels as low as 400 HIV-1 RNA copies/ml), Physical Symptoms Checklist (over the past 6 months and over the past month), years since HIV diagnosis, Hepatitis Co-infection, Co-medication.
- Behavioral parameters: Use of complementary or alternative treatments, smoking, use of alcohol and recreational drugs etc.

2.2. LTS study

In the course of the medical decision-making sub-study the following questionnaires of the parent LTS-study were additionally analyzed in the medical decision-making sub-study:

- ACTG adherence questionnaire for follow up 1 year prior to entry in sub-study
- CD4 and viral load measurements 1 year prior to entry in sub-study
- Perceived Stress Scale (PSS) (Cohen et al. 1983, see appendix p. 18)
- Beck Depression Inventory (BDI) (Beck et al. 1961, see appendix pp. 19-21)

With respect to future analysis the following instruments of the LTS study were entered in the dataset of the medical decision-making sub-study:

- Beck Hopelessness Scale (BHS)
- Spielberger's State-Anxiety (SA)
- Optimism: Life Orientation Test (LOT)
- Coping-Style (COPE)
- Enriched Social Support Instrument (ESSI)
- Spiritual Support
- Ironson-Woods Spirituality/Religiousness Index (SR)

3. Qualitative study part

3.1. Qualitative measurements

The semi-standardized interview on medical decision-making (see appendix p. 1) was developed based on the research questions and first pilot tested in 8 participants. This helped to develop the probe questions exploring the reasons for the decision and the list of potentially important sources of information in the decision about HIV. The interviews were audio-taped and manually transcribed. After quality control of the transcripts the written text material was analyzed with the method of qualitative content analysis as developed by Mayring (2000 i). All interviews were performed by two trained interviewers who later also participated in the categorization of the text material.

3.2. Qualitative analysis

The approach of qualitative content analysis (Mayring 2000 i, 2000 ii) is a classical method for structuring and categorizing the content of any written material and particularly useful for systematic analysis of even huge amounts of unstructured textual material. The further advantage in using this method was the proximity to quantitative research, facilitating the combination and integration of qualitative and quantitative analysis. A third strength of this method is the oscillation between inductive and deductive steps in order to build the system

of categories, similar to grounded theory (Strauss & Corbin 1990, Flick 1999). The reason why grounded theory has not been applied is its problem of being too open ended (Flick 1999, p.234). Qualitative content analysis provides a systematic approach, trying to preserve some methodological strengths of quantitative content analysis, as developed within communication science (Krippendorff 1980), but with elaboration of the qualitative steps of analysis (Mayring 2000 i, 2000 ii). This method defines itself within this framework as an approach of empirical, methodologically controlled analysis of texts, following content analytical rules and step-by-step models, without rash quantification (Mayring 2000 i). The following advantages of quantitative content analysis have been preserved in this study: rules of analysis, categories in the center of analysis, criteria of reliability and validity.

3.2.1. Rules of analysis

The material was analyzed step by step, following rules of procedure (figure 2) (Mayring 2000 i, 2000 ii). These research questions guided the analysis: (1) reasons for deciding to take or not to take HAART, (2) why they tell their doctor or not what they have decided, including non/adherence, and (3) which sources of information have been used to make this decision. In this study the word was defined as the smallest content analytical unit.

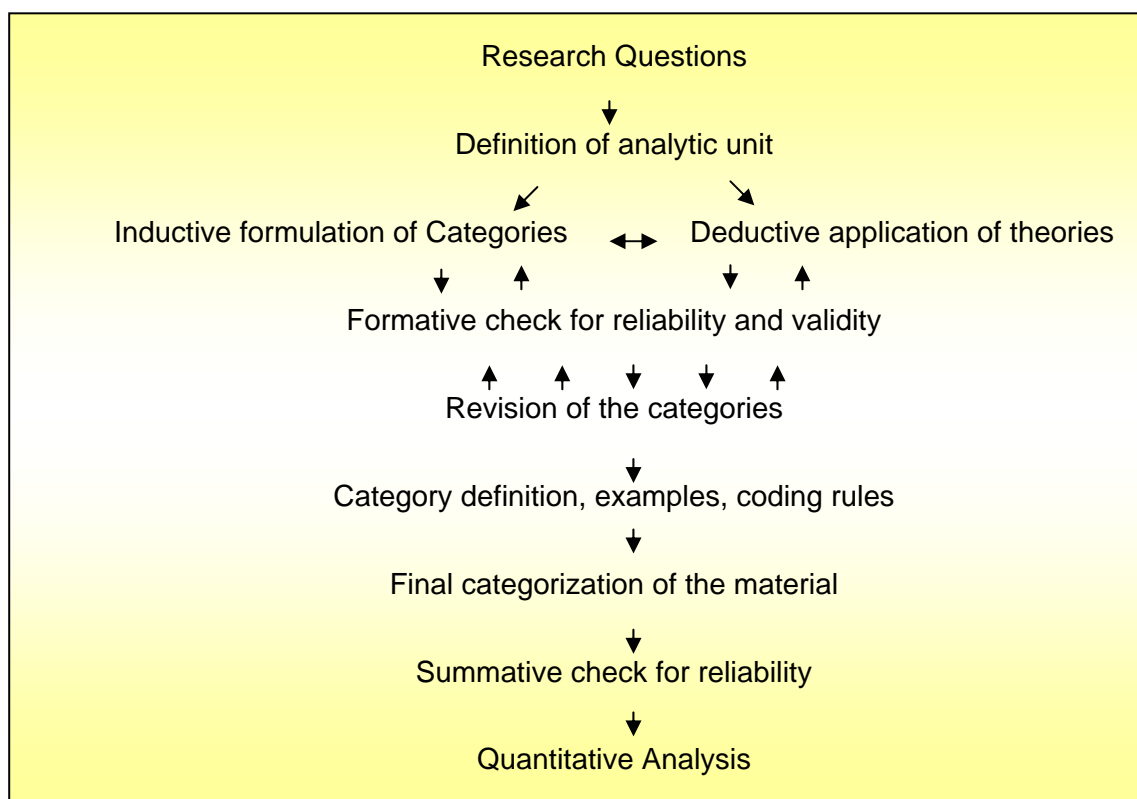


Figure 2: Analytical step-by-step model of qualitative content analysis (Mayring 2000 i, 2000 ii).

3.2.2. Categories in the center of analysis

The aspects of text interpretation, following the research questions, were put into categories, which were carefully founded and revised within the process of analysis through feedback loops (Mayring 2000 ii). Classical quantitative content analysis has few answers to the question from where the categories come, how the system of categories is developed: "*How categories are defined ... is an art. Little is written about it.*" (Krippendorff 1980, p.76). To explicit this procedure qualitative content analysis has developed its own technique of inductive category development, which derives from the reductive processes formulated within the psychology of text processing. Ballstaedt et al. (1981, p. 83) describe six reductive processes: (1) *Leaving out* what is irrelevant for the content, (2) *Generalization* of similar passages, (3) *Grouping* of similar codes, (4) *Construction* of new codes to subsume old codes, (5) *Integration* of codes into a hierarchical system, (6) *Selection* of the key-codes. This procedure of reduction is similar to the steps of open, selective and axial coding as used in grounded theory (Strauss & Corbin 1990). Central instrument of the inductive definition of categories is to develop a system of categories, as near as possible to the material, to formulate them in terms of the material and to give preference to in vivo codes, as aimed in grounded theory.

Following the research questions on reasoning of decision and communication of the decision with the doctor the interviews were worked through, one by one, word by word, applying the procedures of reduction until it came to a point of saturation, so that no further or new categories arose in analyzing the next interview. After 21 interviews were performed and analyzed, the last 4 interviews did not contribute much more to the formation of the preliminary inductive categories.

3.2.3. Reliability and validity

At the point of saturation of the inductive category formation several group meetings within the research team of the parent-study took place. They served as a formative check of reliability and validity to detect ill-defined categories. Within a feedback loop those categories were revised; e.g. the partial importance of surrogate-markers was redefined from *CD4 cells and viral load are partially important in the decision about ART* to: *Only one of the two criteria (either CD4 or viral load) is important for the decision, but the other is not.* Applying further theories from the parent study (deductive theory application) the categories *spirituality* and *body-mind-belief* were applied to the inductive category system. In the process of constructing codes of a higher level of abstraction and reducing, integrating, and selecting codes into a hierarchical system; it was found that the reasons for the decision to take ART and the reasons for the decision not to take ART did not require separate coding.

Surprisingly the same criteria applied for both decisions, whether to take ART or not to take ART at the time-point of the interview. This resulted in a coding agenda of category definitions, anchor-examples and coding rules. For the purpose of triangulation of the results all coding agendas were depicted in a meta-matrix for each research question. According to Wendler (2000) the use of the meta-matrix facilitates data analysis and allows pattern recognition across data sets. The coding agenda was used to check for independent inter-rater reliability in the first 21 interviews. To assess the independent inter-rater reliability for two raters Cohen's Kappa-coefficient (Hays 1981, pp. 558-559) was calculated for categorical data and respectively for data on ordinal-levels Kendall's Tau for two raters. The procedure has the pretension to be transparent, to perform validity control which is appropriate for qualitative methods in the sense of multiple triangulations (Denzin & Lincoln 2000), and to carry out checks for reliability (Mayring 2001).

a) Inter-rater reliability

Table 2 summaries the initial categories developed for the reasons for the decision about ART and the inter-rater reliability of 2 independent raters of the first 21 interviews. It is important to stress that a correspondence coefficient of "0" represents the expected random correspondence, as if two coders selected the categories by chance (Scott 1955). Therefore in general coefficients above .70 are considered as acceptable or even good (Bakemann & Gottman 1986, p.82). Further, the two raters looked at the reasons for discordance and discovered that the main reason for discordance was loss of concentration while reading through the sometimes long interviews. Similar results were found for inter-rater reliability with respect to the reasons for sharing or not sharing the reasons for the decision and the reasons for non-adherence with the doctor (table 3).

Based on this categorization with good inter-rater reliability all 79 interviews were rated by 3 trained team members in consensual ratings. The three raters first looked at the interview independently and then discussed their decision in the group. In case of disagreement the raters discussed whether the discordance was based on concentration errors (e.g., failing to consider a word or a sentence), insecurity and ill-defined categories or disagreement of the raters. In a few cases the raters had to go back to listening to the original tape of the interview, because the content message of the text was not clear in the transcript. Although emotions like laughter and crying were transcribed, the intonation was sometimes a key to understand the content of the message. Although the initial categorization system appeared to be easy to administer and reliable in the first 21 interviews (in which it was also developed), amendments had to be made in the initial systems of categorization.

Table 2: Meta-Matrix of reasons for decision: Thematic fields, categories, number of discordant ratings and inter-rater reliability (n=21).

Thematic field	Categories	N of discordant ratings	Inter-rater reliability (κ/τ_b of 2 raters, standard error)
CD4 count/ Viral load	<ul style="list-style-type: none"> • Important • Partially important • Not important 	1	$\tau_b = .94^{***}$ SE =.04
HIV/AIDS symptoms	<ul style="list-style-type: none"> • Yes, experienced • No, not experienced 	1	$\kappa = .83^{***}$ SE =.16
Side effects	<ul style="list-style-type: none"> • Absent • Present, tolerance <ol style="list-style-type: none"> 1) Very well 2) Well 3) Moderate 4) Not well 	0	$\tau_b = 1.0^{***}$ SE =.00
	<ul style="list-style-type: none"> • Yes, anticipated • No, not anticipated 	0	$\kappa = 1.0^{***}$ SE =.00
	If experienced/anticipated: <ul style="list-style-type: none"> • No reason to stop/change • Yes, reason to change • Yes, reason to stop 	0	$\kappa = 1.0^{***}$ SE =.00
Easy to take	<ul style="list-style-type: none"> • Yes, stated importance • No 	0	$\kappa = 1.0^{***}$ SE =.00
Resistance test (geno-/phenotypic)	<ul style="list-style-type: none"> • Present • Absent • Waiting for result • Not tested 	0	$\kappa = 1.0^{***}$ SE =.00
Beliefs about resistance linked to non-adherence	<ul style="list-style-type: none"> • Yes • No • No knowledge 	0	$\kappa = 1.0^{***}$ SE =.00
Quality of life (perceived impact of decision on quality of life)	1) Health/physical function <ul style="list-style-type: none"> • Negative • None • Positive 	2	$\tau_b = .86^{***}$ SE =.10
	2) Psychosocial function <ul style="list-style-type: none"> • Negative • None • Positive 	2	$\tau_b = .91^{***}$ SE =.07
	3) Financial situation <ul style="list-style-type: none"> • Negative • None • Positive 	0	$\tau_b = 1.0^{***}$ SE =.00
Spirituality	<ul style="list-style-type: none"> • Yes, important • No, not important 	0	$\kappa = 1.0^{***}$ SE =.00
Body-mind belief	<ul style="list-style-type: none"> • Yes • No 	1	$\kappa = .89^{***}$ SE =.11
Complementary/alternative medicine	Statement about preference <ul style="list-style-type: none"> • Yes • No 	0	$\kappa = 1.0^{***}$ SE =.00
Consensus doctor-patient	<ul style="list-style-type: none"> • Yes • No 	0	$\kappa = 1.0^{***}$ SE =.00
Doctor pressure	<ul style="list-style-type: none"> • Yes • No 	0	$\kappa = 1.0^{***}$ SE =.00
Patient makes suggestions	<ul style="list-style-type: none"> • Yes • No 	1	$\kappa = .89^{***}$ SE =.11

Table 3: Meta-matrix of motives to share or not to share the reasons for the decision about ART and for non-adherence with the doctor: Categories, number of discordant ratings and inter-rater reliability of 2 raters (n=21).

Category definition of the motives to share the reasons for the decision with the doctor	N discordant ratings	Inter-rater reliability (κ, standard error)
Wants to inform doctor	1	$\kappa = .90^{***}$ SE = .10
Wants/trusts doctors opinion	0	$\kappa = 1.0^{***}$ SE = .00
Presence of concerns	2	$\kappa = .81^{***}$ SE = .13
To maintain a good relationship with doctor	0	$\kappa = 1.0^{***}$ SE = .00
Doctor asks	0	$\kappa = 1.0^{***}$ SE = .00
Category definition of the motives not to share the reasons for the decision with the doctor	N discordant ratings	Inter-rater reliability (κ, standard error)
Anticipates doctor would not support decision	0	$\kappa = 1.0^{***}$ SE = .00
Cannot discuss feelings with doctor	1	$\kappa = .83^{***}$ SE = .16
Cannot trust their doctor's opinion	0	$\kappa = 1.0^{***}$ SE = .00
Cannot discuss spiritual/moral issues with doctor	0	$\kappa = 1.0^{***}$ SE = .00
Have not seen doctor yet	0	$\kappa = 1.0^{***}$ SE = .00
Category definitions of the motives to share the reasons for non-adherence with the doctor	N discordant ratings	Inter-rater reliability (κ, standard error)
Important to talk to the doctor about adherence	1	$\kappa = .89^{***}$ SE = .11
Doctor asks	0	$\kappa = 1.0^{***}$ SE = .00
Showed up on blood work	0	$\kappa = 1.0^{***}$ SE = .00
Category definitions of the motives not to share the reasons for non-adherence with the doctor	N discordant ratings	Inter-rater reliability (κ, standard error)
Not important to talk to the doctor about adherence	0	$\kappa = 1.0^{***}$ SE = .00
Not seen doctor yet	0	$\kappa = 1.0^{***}$ SE = .00
Rarely/never happens	0	$\kappa = 1.0^{***}$ SE = .00

b) Consensual reliability and validity of the reasons for the decision

Major problems occurred during consensual rating of the beliefs and knowledge about resistance. Initially the raters perceived much insecurity in differentiating the beliefs and the knowledge about resistance, as this categorization was insufficiently defined. The problem originated in the fact that the interviewer sometimes induced a reply through the probe question, as the following segment of the interview illustrates:

Interviewer: Have you ever had a resistance test done?

Participant: No.

Interviewer: Do you know where drug resistance comes from?

Participant: No.

Interviewer: Do you think that if someone is not taking the medication on time, do you think that is related ...

Participant: Their immune system will drop.

Interviewer: Their immune system will drop?

Participant: Yeah, they mean no medicine will work for them, if they are not taking the proper medicine that they normally take, taking it the right way, on schedule, on time, and they take it when they want to, it is not working with their immune system at all.

Interviewer: Do you also know what resistance is?

Participant: It's the medicine that you take... Could be and could not be resistant to your immune system.

The 3 raters finally decided to recode all interviews rating first the initial response to the probe question: “Do you know where drug resistance comes from?” It was rated as *no knowledge*, if the participant spontaneously stated that he/she had no knowledge, or if the reply indicated that the participant had no understanding of resistance. Again this category had to be revised, after participants were rated, who had knowledge about resistance, but believed only partially in a link between non-adherence and resistance. The following quotation demonstrated the necessity to include this further subcategory:

Participant: Why do I think, that I became resistant?

Interviewer: Yes.

Participant: I don't know. I think that after a while, the virus, after you take the same, it is just like anything, it became resistant. I don't know if it is a matter of time or what type of, you know my particular virus or maybe the time the doctor chose that particular combination, he really didn't get a good profile of the type of drugs that I could be resistant to.

Interviewer: Do you think that taking medications as prescribed is important to prevent resistance?

Participant: I think it is important not to miss any of them and also being on schedule. I have always been told that I should always try to do it within the time that, every twelve hours, so that I should try to do that every twelve hours.

Interviewer: Did you manage to do that?

Participant: With the previous combination the only problem I had was Videx. I had to take it on an empty stomach. So it was kind of hard for me to adjust to it, because I would always have to take it either an hour before or two hours after I ate. So if I took the pill at one o'clock, so I had to wait until two to be able to have lunch and or sometimes I was hungry and I could not wait an hour, so I had to make sure, that I took it two hours; so that, I always felt, that that was, you know, that was something were I was not sure, whether it was the right thing or not. I was wondering, you know, maybe I didn't take, I

didn't wait two hours, or maybe I took it before the two-hour period, before my stomach was empty.

Spontaneously this participant attributed his drug resistance rather to time and type of treatment, but when asked specifically about his belief in the link between non-adherence and resistance, he also considers this aspect as one possible reason in the development of resistance.

Analogous to the *beliefs about resistance*, the categorization of a *body-mind belief* required the introduction of a partial belief in body-mind connection, depicting participants who believed that their body was controlled by a higher mind power (e.g., god) without contribution of their own mind. Also, some participants did not consider spirituality but their worldview in their decision about ART, which was later incorporated in the category system.

Additional deductive application of theories resulted in the decision to rate the models of decision-making about treatment (Charles 1999) according to the interviews. This summarizes characteristics of the three categories: consensus (shared decision-making model), doctor's pressure (paternalistic model), and patient makes suggestions (shared decision-making or informed choice model). The criterion-validity of the ratings from the interview of the models of decision-making about treatment will be controlled using the patients self-rating on the CPS. This allows comparing the validity of the interview ratings to a standardized quantitative instrument.

c) Consensual validity of the motives for sharing the reasons of the decision and non-adherence with the doctor

During consensual rating of the interviews of the 79 participants 2 further motives for not sharing the reasons of the decision were identified and included: *Doctor does not ask* and *doctor does not need to know* and. Also the list of motives not to share the reasons for non-adherence with the doctor was expanded: *Doctor does not ask* and *does not show up on blood-work*. Even three further motives to share the reasons for non-adherence with the doctor appeared on the list: *To keep honest/friendly relationship with doctor, it rarely/never happens*, and *ran out of prescriptions*. As all new subcategories of the motives to communicate with the doctor were in vivo categories and appeared to be very easy to rate, there was no further independent check for inter-rater reliability.

4. Quantitative study part

4.1. Quantitative measurements

4.1.1. Control Preference Scale (CPS) for preferred and perceived role in decision about ART

a) Description of the CPS

The Control Preferences Scale (CPS) (Degner et al. 1997 i, see appendix pp. 2-3) was developed to measure a construct that emerged from a grounded theory of how treatment decisions are made among people with life-threatening illnesses. The control preferences construct is defined as “the degree of control an individual wants to assume when decisions are being made about medical treatment.” The CPS consists of five cards (A-E) each of which has a picture portraying a different model of medical decision-making. The cards range from an active role (cards A/B: patient deciding without/with considering doctors opinion) through a collaborative role (card C: shared responsibility in decision-making) to a passive role (cards D/E: doctor deciding with/without considering patients opinion). Using the “pick one” approach the cards were laid down in a fixed order, ranging from most to least control, and then the participants were asked to select the one that best represents their *preferred* role in the decision they have actually made about ART. Consecutively the participants were asked to describe if the statement on the card exactly represented their preference or if they wanted to add a comment. This was important to check, because the individual point may fall between two items. In the next step the participants were asked to look at the same order of the card set again and to indicate which role they had actually *perceived* in making their decision about ART. The CPS was used in the same approach in a study of women with breast cancer (Degner et al. 1997 ii) and has proven to be useful to gain insight into patients’ *preferences* and *perceptions* of their role in medical decision-making.

b) Reliability and validity of the CPS

The CPS has been tested in a variety of populations of several hundreds of people with different disease background, and has proven to be a clinically relevant and easily administered measure of preferred roles in health-care decision-making (Degner et al. 1997 i). In HIV the CPS has so far only been used in 61 PHWA in the US (Laws et al. 2000). Previous use of the CPS in other diseases showed high reliability with newly diagnosed cancer patients (various types of cancers), patients with breast cancer, and men with prostate cancer (Davison & Degner 1997). The scale has met Coombs’s criterion of 50% plus 1 subjects falling in the hypothesized dimension in all these studies (Degner et al. 1997

i). The CPS has also been adapted to study preferences for decisional control in kidney dialysis, in-vitro fertilization, and childbirth (Degner et al. 1997 i).

4.1.2. The Generic Decisional Conflict Scale (GDACS) for assessing the quality of decision-making, difficulties in decision-making and decisional support needs

a) Description of the GDACS

The original (Grade 8 reading level) version of the Generic Decisional Conflict Scale (GDACS) (O'Connor 1999, see appendix pp. 4-5) has 16 items with a 5 point Likert response format ranging from 1 (strongly agree) to 5 (strongly disagree) to measure the construct of decisional conflict. The 16 items of the general decisional conflict focus on:

- state of uncertainty (items 1-3)
- feeling uninformed (items 4-6)
- feeling unclear about values (items 7-9)
- feeling unsupported in decision-making (items 10-12)
- perception of the quality of the decision being made (items 13-16)

The items of quality of decision-making elicit the degree to which PWHA believe, they have made an informed choice, that reflects their values, that they anticipate with, and that they are satisfied with. Scores are summed and averaged for the total scale and each subscale. Scores of 2 or less are normally associated with no difficulty in decision-making. For the purpose of this study the introduction of the questionnaire has been adapted for the participant to consider the current decision about ART.

b) Reliability and validity of the GDACS

The scale has been used successfully with over 1000 male and female adults with different acute and chronic diseases, but it has not yet been used with HIV-infection. The instrument can be self-administered and takes 5 to 10 minutes to complete (O'Connor 1999). Test-retest reliability coefficients exceed .80 and the internal consistency alpha coefficients range from .78 to .89 for the total GDACS (O'Connor 1999). The subscales discriminated between different decision supporting interventions, with effect sizes .3 - .4 for the informed and the values subscale, and .2 to .3 for the quality of decision-making subscale and the total decisional conflict scale, but only .06-.3 for the uncertainty subscale (O'Connor 1999). The informed subscale showed most consistent results in its discrimination ability (O'Connor 1999). Thus the total scale and the subscale can be used as a reliable and valid instrument to characterize (1) difficulties in decision making as indicated in the overall level of decisional conflict, (2) need for information, clarification of personal values and decision support, and (3) the perceived quality of decision making.

4.1.3. ACTG adherence questionnaire for adherence to Anti-HIV Medications

a) Description of the follow-up ACTG adherence questionnaire

The standard self-reported adherence questionnaire of the AIDS Clinical Trials Group (ACTG 2001, see appendix pp. 6-11) is one of the simplest methods of assessing adherence to ART. PWHA were asked in the face-to-face interview which antiretroviral medications they are currently prescribed and if they know the special dietary guidelines associated with their medication. They are next asked how many medication doses they missed during the previous day, 2 days, and 3 days ago and if they disregard special dosing instructions. The original follow-up version of the ACTG-adherence questionnaire also assesses missed doses 4 days ago, but as recall of 4 days ago is usually less precise a 3 day span was used in the LTS study.

The ACTG adherence questionnaire also checks a 14-item list of possible common reasons for which PWHA miss taking medications. In this study the people were asked additionally in the interview if they had further reasons for non-adherence. The last section of the ACTG adherence questionnaire is dedicated to a checklist of 12 common symptoms related to HIV which are in the same time often symptoms related to the treatment of HIV (e.g., diarrhea, peripheral neuropathy, sleep disturbances etc.). The checklist is not designed to differentiate if the symptoms are attributed to HIV or to ART.

b) Reliability and validity of the follow-up ACTG adherence questionnaire

Taking an average of 10 minutes to complete, the follow-up ACTG adherence questionnaire is easy to perform, but the self-reported adherence measure has significant limitations in its accuracy. Answers in self-reports tend to be biased toward greater adherence, as people tend to provide socially acceptable responses (Miller & Hays 2000). In addition to self-presentational biases (participants may report better adherence to please the researcher) there is also a recall bias, as participants recall may be inaccurate. Self-report tends to overestimate the true extent of adherence by approximately 20% (Haynes et al. 1980, Liu et al. 2001). The ability of self-reported adherence to distinguish small degrees of non-adherence (e.g., 80% adherence from 85% adherence) is probably poor, but even though it is an imperfect measure, self-reported adherence does provide important information that explains some variation in clinical response to HAART, that is not explained by other clinical factors (Miller & Hays 2000). As the self-report assessment of adherence were significantly associated with HIV viral load concentrations in plasma, the ACTG adherence questionnaire is recommended as a practical instrument that is more acceptable to patients than electronic

monitoring and that has proven to be useful for efficient collection of data describing adherence to medication within clinical trials populations (Chesney et al. 2000).

4.1.4. The assessment of quality of life with the HIV/AIDS-targeted quality of life (HAT-QoL)

a) Description of the HAT-QoL

The HIV/AIDS targeted quality of life (HAT-QoL, see appendix pp. 12-15) is an HIV/AIDS specific instrument do assess quality of life which was developed from Holmes and Shea (1998) in collaboration with PWHA. Two linked studies elicited the domains which were important in the eyes of PWHA to be incorporated in the HAT-QoL. The first study on 42 asymptomatic PWHA used group discussions to generate the item content and to find out the concerns relevant for QoL through the view of PWHA. In the second study, 201 PWHA (78% male; 42% white; 55% gay/bisexual) were cross-sectionally studied to reduce the number of items and to the identify dimensions (Holmes & Shea 1998). The 35-item instrument measures 9 dimensions of QoL over the past four weeks:

- Overall function (6 items)
- Life satisfaction (4 items)
- Health worries (4 items)
- Financial worries (3 items)
- Medication concerns (5 items)
- HIV mastery (2 items)
- Disclosure worries (5 items)
- Provider trust (4 items)
- Sexual function (2 items)

As the previous instruments all item responses are scored on a 5 point Likert scale ranging from 1 to 5. Following the scoring guide (Holmes 1999) all subscales and the total are transformed to the final dimension score, a linear 0-to-100 scale, where 0 is the worst and 100 the best possible score.

The HAT-QoL has had limited use in populations of women and injection drug users and may have limited ability to differentiate across levels of severity of HIV disease. Among asymptomatic HIV-positive subjects (n = 106), there were more differences detected by the subscales for demographic variables than for disease-related variables (Berzon & Lenderking 1998). This instrument will be used because it was developed by a unique inductive patient oriented approach in generation of the items.

This is the main reason why the standard instrument of the Medical Outcome study HIV Health Survey (MOS-HIV) has not been selected, although it was originally developed for PWHA, but not with PWHA. Further the MOS-HIV shows substantial ceiling effects in certain scales (such as physical functioning), which may make it impossible to detect improvements in further longitudinal studies (Berzon & Lenderking 1998).

b) Reliability and validity of the HAT-QoL

A cross-sectional study in 215 PWHA comparing the psychometric properties of the newly developed HAT-QoL and the popular HIV specific quality of life instrument of the Medical Outcomes Study (MOS-HIV) showed that the HAT-QoL had better psychometric properties. The HAT-QoL had higher scaling success rates (>90% for 7 of 9 dimensions) than the MOS-HIV (> 90% for 2 of 8 dimensions) and only one dimension (provider trust) showed a substantial ceiling effect, compared to 6 of 11 dimensions in the MOS-HIV. Six dimensions of HAT-QoL (overall function, disclosure worries, health worries, financial worries, HIV mastery and life satisfaction) exhibited good psychometric properties; low dimension inter-correlations, high internal consistency, and evidence for construct validity (Holmes & Shea 1999). All internal consistency coefficients exceeded .80, except those for sexual function ($\alpha = .57$). The dimension of sexual function, asking difficulties in sexual arousal and with orgasm, had to be improved to be a more reliable and valid instrument for the use in female populations. For this reason the 2-item scale was supplemented by the third item of the first study of the HAT-QoL, which had been removed from the scale. Although the internal consistency coefficient of the 3-item scale for sexual function presumably did not exceed .80, this dimension was included in the study because there was not other instrument measuring sexual function in the LTS study.

The dimension provider trust had substantial ceiling effects, and could be substituted by the scale measuring the quality trust of the questionnaire on Doctor-Patient Relationship (DPR) (Ironson et al. under review).

The dimension medication concerns not only had some ceiling effects, but also a low internal consistency ($\alpha = .57$). For this reason the scale medication concerns was also removed from the HAT-QoL and substituted with the subscale concerns about ART from the Beliefs about Medication Questionnaire (BMQ) (Horne & Weinman 1999).

For this study the 6 scales from the shortened version of the HAT-QoL with good psychometric properties were used, and in addition the previous 3 item scale assessing sexual function. In summary the 7 subscales of the HAT-QoL used in this study have a total 27 items and measure:

- Overall function (6 items) ($\alpha = .90$)
- Life satisfaction (4 items) ($\alpha = .89$)
- Health worries (4 items) ($\alpha = .83$)
- Financial worries (3 items) ($\alpha = .85$)
- HIV mastery (2 items) ($\alpha = .82$)
- Disclosure worries (5 items) ($\alpha = .81$)
- Sexual function (3 items) (2-item version $\alpha = .57$)

and were supplemented by

- Trust (DPR, 5 items) ($\alpha = .90$)
- Medication concerns (BMQ, 11 items) (general version $\alpha = .63-.80$)

4.1.5. The styles and qualities in the doctor-patient Relationship

a) Description of the doctor-patient relationship questionnaire (DPR)

Despite that the potential importance of the doctor-patient relationship in long term survival with HIV is recognized, surprisingly little has been done to measure various aspects of this relationship and how doctor-patient relationship may relate to health outcome (Ironson et al. under review). A unique contribution of the LTS study is the assessment of doctor-patient relationship from the patient's perspective with the questionnaire on Doctor-Patient Relationship (DPR), which was constructed by Ironson et al. (under review) for the use in PWHA and people with other diseases where doctor-patient relationship might play a role in disease management. The items for the DPR were generated in interviews with PWHA in the LTS study asking whether they were satisfied with their doctor, and what they did and did not like about the interaction between them and their doctor. The 36-item long version of the DPR consists of 7 subscales measuring 3 styles and 4 qualities of doctor-patient relationship (see appendix p. 16).

3 Styles

- Collaborative (7 items)
- Compliant (4 items)
- Defiant (4 items)

4 Qualities

- Patient asks (6 items)
- Doctor informs (4 items)
- Trust (5 items)
- Doctor availability (6 items)

In the LTS study a 10-item short version is given, measuring the 3 styles of DPR, but after analysis of the first 21 interviews the study team found that doctor-patient relationship was a key factor in understanding decision-making about ART, adherence and quality of life in people living with HIV. For this reasons the long-version of the DPR was given in the medical decision-making sub-study and the initial participants who completed only the short version were contacted by mail or phone to complete the full version. Unfortunately two participants could no longer be contacted, one due to incarceration and one due to moving and loss of contact details. One of the 2 participants had completed the subscale measuring doctor availability at the interview. For both participants the values indicating the 3 styles of DPR could be interpolated from the 10-item short version. To interpolate the values, a z-score was calculated to each subscale score on the short form. Then a raw-score was calculated on the long-form corresponding to that z-score.

b) Reliability and validity of the DPR

The DPR was cross-validated with the 5-item scale on relationship with one's health care provider from the Attitudes Towards Health Care (ATHC) measure (Stall et al. 1996) and the 3-item providers trust scale of the HAT-QoL (Holmes & Shea 1998) establishing convergent validity with correlation coefficients between the DPR subscales and the ATHC ranging from .35** and .76** and correlation coefficients between the DPR subscales and the subscale trust of the HAT-QoL ranging between .49** and .50** (Ironson et al. under review). The internal consistency was below .80 for two scales of DPR style: defiant ($\alpha = .70$) and compliant ($\alpha = .76$), but exceeding .80 for all other scales. The 5-item trust scale of the DPR was equivalent in internal consistency to the 3-item trust scale of the HAT-QoL ($\alpha = .90$) (Ironson et al. under review, Holmes & Shea 1998). Thus the newly developed DPR offers a valid and reliable scale targeting the aspects of doctor-patient relationship that may relate to quality of life in PWHA.

4.1.6. The assessment of the attitude towards ART with the Beliefs about Medication Questionnaire (BMQ)

a) Description of the BMQ

The Beliefs about Medications Questionnaire (BMQ) (Horne & Weinman 1999) has been modified for the use in PWHA. The HIV/AIDS specific version of the BMQ comprises of two scales assessing patient's beliefs about the necessity of the prescribed medication for controlling their illness (8-items) and their concerns about the potential adverse consequences of taking it (11-items). The BMQ scales were derived from a pool of items representing commonly held beliefs about medication using exploratory principal components analysis. Participants indicate their degree of agreement with each individual

statement about medicines on a 5-point Likert scale, ranging from 1 = *strongly disagree* to 5 = *strongly agree*. Scores for the necessity and concern scales were summed and averaged to give a scale score for each ranging from 1 = *very little* to 5 = *very high*. For the LTS study the BMQ was modified to ask about the views about anti-HIV medication (see appendix p. 17).

b) Reliability and validity of the BMQ

The BMQ was validated in a population living with chronic diseases (n =1200), comprising asthmatic, diabetic, and psychiatric patients from hospital clinics and cardiac, general medical and renal (haemodialysis recipients) in-patients (Horne et al. 1998). Internal consistency coefficients for the necessity scale ranged between .55 and .86 and for the concerns scale between .63-.80 (Horne & Weinman 1999). According to recent communication with Horne (December 2003) the data on reliability and validity of the new HIV specific version has not been published yet as the questionnaire is still under development.

4.1.7. The assessment of depression with the Beck Depression Inventory (BDI)

a) Description of the BDI

The Beck Depression Inventory (BDI) (Beck et al. 1961) is a 21-item self-report rating inventory measuring characteristic attitudes and symptoms of depression and takes approximately 10 minutes to complete. For this study we used the original BDI revised in 1971 and copyrighted in 1978 (Groth-Marnat 1990, pp. 102-104) and asked for symptoms of depression over the past week (see appendix pp. 19-20). The content of the BDI was obtained by consensus from clinicians regarding symptoms of depressed patients (Beck et al. 1961). Each item is scored on a 4-point Likert scale ranging from 0 to 3, so that the highest possible total for the whole test is 63 and the lowest possible score for the whole test is zero, indicating no signs of depression. The total score indicates the level of depression:

- Up to 4 Possible denial of depression, faking good; is below usual scores for normal
- 05 - 09 These ups and downs are considered normal
- 10 - 18 Mild to moderate depression
- 19 - 29 Moderate to severe depression
- 30 - 63 Severe depression
- Over 40 This is significantly above even severely depressed persons, suggesting possible exaggeration of depression; possibly characteristic of histrionic or borderline personality disorders. Significant levels of depression are still possible (Groth-Marnat 1990, pp. 102-104).

b) Reliability and validity of the BDI

The BDI demonstrates high internal consistency, with alpha coefficients of .86 and .81 for psychiatric and non-psychiatric populations, respectively (Beck et al. 1988). The BDI has a split-half reliability co-efficient of .93 (Beck et al. 1988). Groth-Marnat (1990, pp. 102-104) reported that re-test reliabilities ranged from .48 to .86, depending on the interval between re-testing and style of population. However, Beck et al. (1961) reported that inter-rater reliability was not appropriate for the BDI. Furthermore, it has been suggested that the BDI is not specific to depression and controversy exists over whether the BDI is measuring state or trait variables (Groth-Marnat 1990, pp. 102-104).

4.1.8. The assessment with the perceived stress scale (PSS)

a) Description of the PSS

The impact of stressful life events is determined in large extent by the perception of their stressfulness, not the objective occurrence of the events (Lazarus 1977). The Perceived Stress Scale (PSS: Cohen et al. 1983) is designed to measure the degree to which life situations are appraised as stressful by an individual. The questions in the PSS (see appendix p.18) are easy to understand and ask about feelings during the last month, such as feeling nervous, stressed, upset, and overwhelmed by difficulties. The items were designed to “tap how unpredictable, uncontrollable, and overloaded respondents find their lives”. In this study the 10-item version was used, which is rated on a 5-point Likert scale (0 = never, 1 = almost never, 2 =sometimes, 3 = fairly often, 4 = very often). The PSS scores are obtained by reversing the scores on the seven positive items, and then summing across all 10 items. Higher scores indicate greater stress. The questions are quite general in nature and relatively free of content specific to any population group. For the PSS normative data has been collected from a large US sample size by the Harris survey (Cohen & Williamson 1988, pp 31-69).

b) Reliability and validity of the PSS

The 10-item version of the PSS used in this study has a better internal reliability than the longer 14-item version ($\alpha = .78$ for the 10-item PSS vs. $\alpha = .75$ for the 14-item PSS) in a probability sample of 2387 US residents of the Harris survey (Cohen & Williamson 1988, pp 31-69). In the Harris Survey the PSS 10 score was significantly correlated ($r = .32^{***}$) with the number of events in the 99-items life events scale, which confirmed the data of Cohen et al. (1983). Similarly the PSS 10 scores were correlated ($r = .39^{***}$) with reports of stress experienced during an average week.

4.1.9. Socio-demographic, medical and behavioral parameters

The socio-demographic parameters included age, ethnicity, gender, sexual orientation, living arrangements, relationship status, employment, income, education, and health insurance coverage of HIV medication. Medical parameters comprised CD4 cell counts and viral load at the interview and one year prior, antiretroviral treatment over the past year, prophylaxis of opportunistic infections over the past 6 months, years since HIV diagnosis, CDC category C symptoms since onset of HIV diagnosis (doctor verified patient reports on the Physical Symptom Checklist in the course of the LTS study), CDC category B symptoms over the past 6 months (assessed with the Physical Symptom Checklist), co-infection with hepatitis B or C (including diagnosis and treatment for hepatitis B or C), and other medications (i.e., antidepressants, tranquilizers, antihypertensive or lipid-lowering agents). Information on health behavior, such as weekly physical exercise, use of multivitamins, use of complementary or alternative treatments (e.g., yoga, nutritional supplements, relaxation, biofeedback, visual imagery, massage etc.) and health risk behavior, such as smoking, use of alcohol and recreational drugs (e.g., marijuana, opiates, nitrates, cocaine, amphetamines etc.) was asked in the questionnaire packet.

4.2. Quantitative Analysis

4.2.1. Data entry and quality control

The results of the categorization of the qualitative part of the study and all results of the quantitative measurements (listed in the study design pp. 21-22, and explained above) were double-entered in SPSS version 11.5 for windows by two researchers. In order to detect errors at data entry each single item of the qualitative and quantitative measurements of the two datasets was compared and entry errors were corrected.

4.2.2. Data cleaning

As deviation from a normal distribution, skewness and outliers have detrimental effects on univariate, bivariate and multivariate analysis and may produce under- or overestimates of relationships, all variables were explored. Histograms were used to depict deviances from normal distribution. A rough guide, a skewness value of more than twice its standard error was taken to indicate a departure from symmetry. Following this criterion viral load (at interview and one year prior) required a log transformation to normalize the data. In order to deal with the problem of outliers, Tukey's outlier detection method was used (Tukey 1977). Under this method the upper and lower bounds of the inner fence were created using the interquartile range (IQR), which is defined as the difference between the 25th and 75th

percentile (so-called Tukey's Hinges). An outlier is defined as being a value which is greater than $[1.5 \times IQR] + 75^{\text{th}}$ percentile or less than $[1.5 \times IQR] - 25^{\text{th}}$ percentile.

Outliers were identified in the GDCS (total and all subscales), ACTG adherence questionnaire (reasons for non-adherence, symptoms of HIV/ART), HAT-QoL (total and subscales life satisfaction and disclosure worries), DPR (all subscales) and BDI levels. These so-called outliers may lead to overestimated correlations using Pearson's coefficients to calculate correlations. To take these extremes into account, correlation coefficients with scales including outliers were calculated using Spearman's Rho (indicated as r_s), which measures the association between rank orders. In the Spearman correlation only the order of the data is important, not the level, therefore extreme variations in expression values have less control over the correlation (Lowry 2003). For the purpose of regression analysis (using Pearson's coefficients) all outliers (except for the subscales of the GDCS which were not used for regression analysis) were windsorized to the upper and lower bounds of the inner fence using Tukey's method (Tukey 1977).

4.2.3. Statistical analysis

a) Descriptive statistics (aims 1-9)

Initially all quantitative and qualitative variables were analyzed by means of descriptive statistics (frequencies, percents, means, and standard deviations). The first objective of the quantitative section of the study was to provide descriptive statistical information on the categories found of means of qualitative analysis on the medical decision made about HAART (**aim 1**), the reasons for deciding to take or not to take HAART (**aim 2**), why they tell their doctor or not what they have decided, including non-adherence (**aim 3**), how much each sources of information are used in this decision and (**aim 4**), and which model of medical decision making applies to the decision (**aim 5**).

The second objective of the quantitative study was to assess decisional control preferences and perceptions (**aim 6**), decisional conflict (**aim 7**), self-reported adherence (**aim 8**) and HIV-related quality of life (**aim 9**) and to relate them to the above findings on the decision-making process.

b) Significance testing

Due to the small number of participants in the study differences reaching $p \leq .05$ (two-tailed test) were considered as statistically significant.

c) Socio-demographic, medical and behavioral characteristics (aim 1- aim 9)

The reasons for the decision about ART, motives for sharing or not sharing the reasons for the decision and the reasons for non-adherence with the doctor, sources of information and their importance, decisional control preferences and perceptions, decisional conflict, adherence, and quality of life were also investigated for socio-demographic, medical and behavioral characteristics (see figure 3). To examine the association between two continuous variables bivariate correlations were calculated. The independent t-Test was used to compare two groups ($n > 30$ in each group) with normally distributed continuous variables. ANOVAs were considered to compare more than two groups on continuous variables that were normally distributed. To examine the relationship between socio-demographic, medical and behavioral characteristics and categorical variables the Chi-square test was used and the Fischer's exact significance test (indicated as p_i) was used for 2 X 2 tables if the sample size was too small to meet the assumptions of the chi-square test that the expected frequency in each cell has to be at least 5. The Mann Whitney U-test was applied to examine the relationship between socio-demographic, medical and behavioral characteristics and continuous variables that did not fulfill the assumptions of ANOVA, t-tests or Chi-square tests

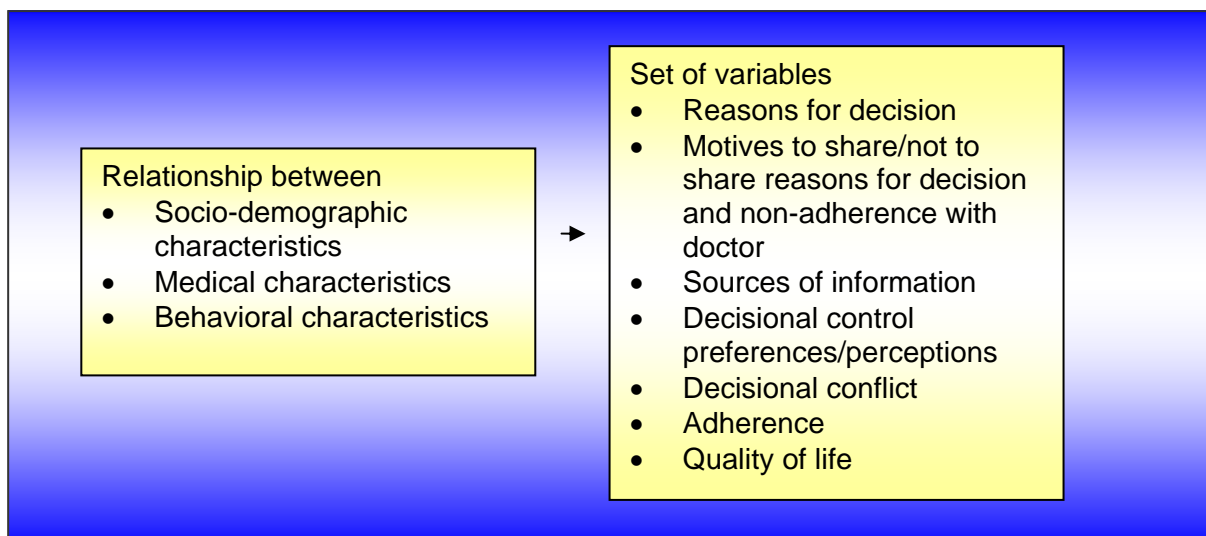


Figure 3: Relationship between socio-demographic, medical and behavioral characteristics and a set of qualitative and quantitative variables.

d) Hypothesis testing (*hypothesis 1-6*)

Another part of the quantitative study was to test the 6 hypotheses. Descriptive statistics of the decisional control preferences as indicated by the CPS were used to examine

- **Hypothesis 1:** PWHA prefer shared decision-making rather than leaving the decision up to the doctor. Only a small minority prefers making the decision alone. Descriptive statistics and Pearson's correlations of the decisional control preferences indicated by the CPS were used to investigate
- **Hypothesis 2:** The preferences of PWHA are not reflected in the clinical encounter.

Pearson's correlations followed by regression analysis were the methods used for testing:

- **Hypothesis 3:** PWHA who perceive less control than preferred have more decisional conflict in the decision about ART.
- **Hypothesis 4:** PWHA perceiving less control than preferred and more decisional conflict in the decision to take ART are less adherent to ART.
- **Hypothesis 5:** If PWHA perceive less decisional control than preferred, they talk less to their doctors about their reasons for non-adherence.
- **Hypothesis 6:** If decisional control preferences are met in the clinical encounter, this is associated with less decisional conflict and a better quality of life in PLWH.

e) Tests for differences between decisions made about ART and models of medical decision-making in the quantitative and qualitative variables of this study (aim 10)

As **aim 10** was to combine the results of the qualitative and quantitative part of the study, a set of variables (which included socio-demographic, medical and behavioral characteristics, reasons for the decision about ART, motives for sharing or not sharing the reasons for the decision and the reasons for non-adherence with the doctor, sources of information and their importance, decisional control preferences and perceptions, decisional conflict, adherence, quality of life, doctor-patient relationship, and beliefs about medication) was chosen to be examined for differences in this set of variables between the decision made about ART over the past year (i.e., to maintain, to change, to restart, to stop or not to start ART) and also to examine for differences in this set of variables between the 5 models of decision making about treatment (ranging from the pure paternalistic to the pure informed choice model) rated from the interviews. To test for significant differences ANOVAs were used for continuous variables, Mann Whitney U-tests were used for variables measured on an ordinal scale, and chi-square tests and Fischer's exact significance tests were used for categorical variables. To identify which medical model of decision-making performs best, the above set of variables were used for paired comparisons between the models of medical-decision making

(paternalistic model vs. other models, shared decision-making model vs. other models, and informed choice models vs. other models) using the Mann Whitney U-test for variables measured on an ordinal scale, and the chi-square test and the Fischer's exact significance test for categorical variables. Further this set of variables was used to explore potential correlates of the decision to take or not to take ART. Figure 4 summarizes the statistical analyses for differences in the set of variables and the decisions made about ART and the models of medical decision-making.

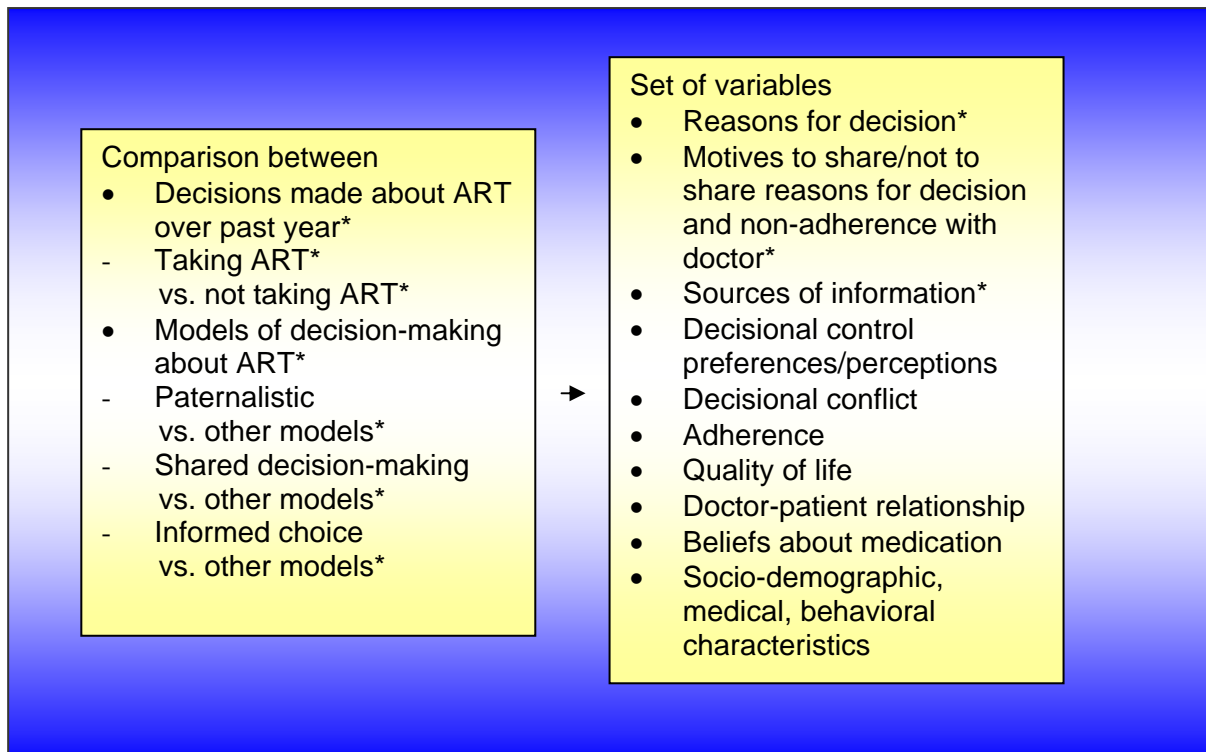


Figure 4: Comparison between the decision made about ART and models of medical decision-making about ART and a set of qualitative* and quantitative variables.

f) Regression analysis with stepwise exclusion (aim 3)

After motives of PWHA to share or not to share reasons for decision and non-adherence with doctor (**aim 3**) were identified, regression analysis with stepwise exclusion was used to analyze which motives contributed most to explain why PWHA failed to share the reasons for the decision with the doctor or not. Stepwise regression in SPSS version 11.5 for windows uses forward and backward routines to generate a series of models to choose the best of these models. In forward regression new independent variables are added to the model if they meet the significance criteria for inclusion ($p < .05$, for the partial F-test for the inclusion of the term in the model). In backwards regression all independent variables are initially entered into the model and sequentially taken out if they do not meet the significance criterion ($p > 0.1$, for the partial F-test for removal of a term). A variable is entered if it meets the p-

value to enter. After each variable is added to the equation all other variables in the equation are tested against the p-value to remove a term and if necessary thrown out of the model.

g) Mediation analysis to examine models to improve quality of decision-making and quality of life (aim 10)

The final objective (**aim 10**) was to develop a model of how to improve the quality of decision-making about ART and the quality of life in PWHA combining the results of the qualitative and quantitative part of the study. Because of the relatively small sample size exploratory analysis was used to examine potential correlates of decisional conflict and quality of life. The set of correlates included socio-demographic, medical and behavioral characteristics; decision made about ART, models of medical decision-making, decisional control preferences and perceptions, decisional conflict, adherence, doctor-patient relationship, beliefs about medication, depression, and perceived stress. If several scales (i.e., styles and qualities of DPR) were correlated with quality of decision-making or quality of life, stepwise regression analysis (see above) was used to choose which variables contributed most to improve quality of decision-making or quality of life.

In the next step all selected strong correlates of the outcome variables decisional conflict and quality of life were systematically examined in the interviews to build a theoretical model based on the results of the qualitative study. A variable functions as a mediator to the extent that it accounts for the relation between the predictor and the outcome criterion (Baron & Kenny 1986). Possible mechanisms how potential mediators might explain the relationship between the potential predict and the outcome variable were identified through the content of the interviews.

Initially all correlates of decisional conflict and quality of life were investigated for constructional overlap, to exclude that an overlap in items explained the relationship between the variables. If an overlap between the items of the instruments was identified, the overlapping items were removed form both instruments. If the alpha coefficient exceeded the critical value of .80 after removal of the overlapping item, the instrument was used excluding the overlapping item for further regression analysis. In case the alpha coefficient was below .80 after removal of the overlapping items, the reliability of the instruments would have been insufficiently excluding the overlapping items. These variables were not considered as overlapping constructs in the model.

Following the method of Baron and Kenny (1986) mediation analysis was performed to test the theoretical models. According to Baron and Kenny 4 criteria are essential for full mediation:

As Baron and Kenny (1986) proposed multiple regression analyses are conducted to examine the following four criteria (see figure 5):

- The independent variable should be significantly related to the mediator variable
- The mediator variable should be significantly related to the dependent variable
- The independent variable should be significantly related to the dependent variable
- The independent variable should no longer be significantly associated with the dependent variable, after the mediator variable is controlled.

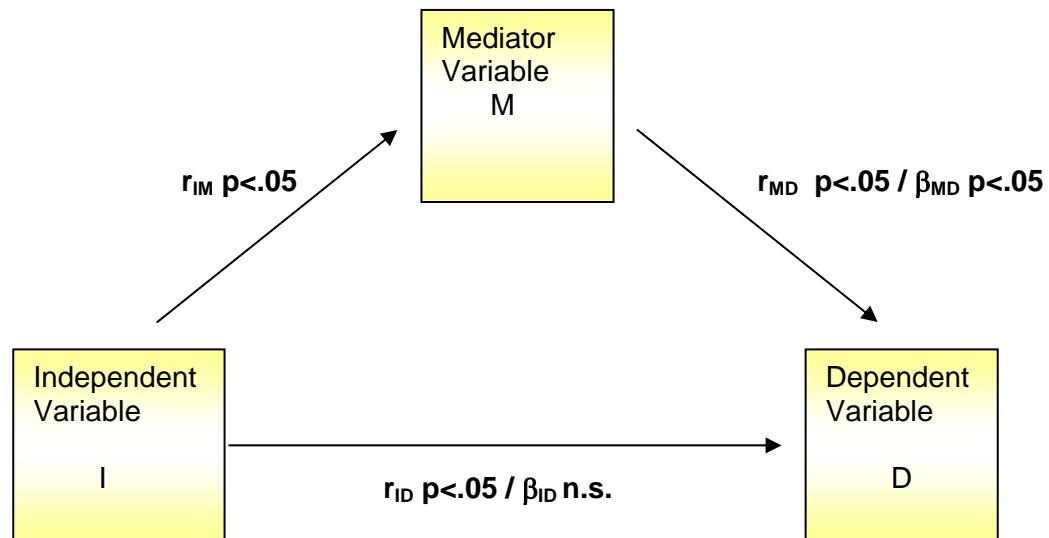


Figure 5: Path diagram for testing the mediator (M) of the relationship between the independent variable (I) and the dependent variable (D) (r = zero-order correlations, β = standardized coefficients in regression model of the dependent variable on the independent variable and the mediator variable, p = significance level).

If all 4 criteria are fulfilled, the model was confirmed and the potential mediator was considered as a full mediator. If the first 3 criteria are fulfilled and only the last criterion is violated, the variable examined as a potential mediator cannot explain the relationship between the predictor and the mediator completely but still may be a partial mediator. The magnitude of mediation (Cole et al. 2003) was quantified by the change in analysis of variance sums of squares for the regression of the dependent variable on the independent variable before versus after statistical control for the mediator variable using the formula $(1 - (\beta_{ID}^2 / r_{ID}^2)) * 100$

β_{ID} = standardized regression coefficient for the association between the independent variable and dependent variable after statistical control for the mediator.

r_{ID} = zero-order correlation coefficient for the association between the independent variable and dependent variable.

Partial mediation has to be considered, if the effect of the independent variable on the dependent variable (outcome) shrinks statistically significant upon the addition of the mediator to the model (Baron & Kent 1986). To test for statistical significance of the mediation the Z-value for the model was calculated using the formula:

$$z\text{-value} = a*b/\text{SQRT}(b^2*s_a^2 + a^2*s_b^2 + s_a^2*s_b^2)$$

a = raw (unstandardized) regression coefficient for the association between the independent variable and the mediator variable

s_a = standard error of a .

b = raw (unstandardized) regression coefficient for the association between the mediator variable and the dependent variable

s_b = standard error of b .

This is the Goodman (I) version of the Sobel test (Sobel 1982, pp 290-312) as suggested in Baron & Kenny (1986). A z value that exceeds ± 1.96 suggests the partial mediation is significant at the p-level .05.

III. Results

1. Socio-demographic, medical and behavioral parameters

1.1. Overview of socio-demographic parameters

1.1.1. Ethnicity, gender and sexual orientation

Figure 6 gives an overview of the frequency distribution of ethnicity, gender and sexual orientation in the study population.

a) Ethnicity

The ethnic background of the sample is shown in figure 6. Of the 79 participants 33 (42%) were African American, followed by 22 (28%) Hispanics, and 19 (24%) Caucasians whereas only 5 (6%) were of other ethnic origin.

b) Gender and sexual orientation

- Of the 79 participants 51 (65%) were men and 28 (35%) women.
- A predominantly heterosexual orientation was reported by 42 (53%) of the 79 participants, whereas 37 (47%) described themselves as homo- or bisexual.
- Of the 28 women 25 (89%) described themselves as heterosexual, whereas of the 51 men 34 (67%) reported being predominantly homosexually (48 of 51) or bisexually (3 of 51) orientated.

c) Main subgroups with respect to sexual orientation, gender and ethnicity

Over three quarters of the 79 participants could be categorized in three subgroups with respect to sexual orientation, gender and ethnicity:

- 32 of 79 (40%) were homo-/bisexual men who were not African American (15 Caucasian, 14 Hispanic, and 3 of other ethnic origin),
- 19 of 79 (24%) were heterosexual African American women, and
- 10 of 79 (12%) were heterosexual African American men.

The remaining quarter was heterogeneous with respect to sexual orientation, gender and ethnicity. Thirteen (16% of 79) heterosexual participants were not African American, which includes 7 (9% of 79) men (6 Hispanic, 1 Caucasian) and 6 (7% of 79) women (3 Caucasian, 2 other origin, 1 Hispanic). The remaining 5 (6% of 79) were homosexual participants (2 African American men, 2 African American women and 1 Hispanic woman).

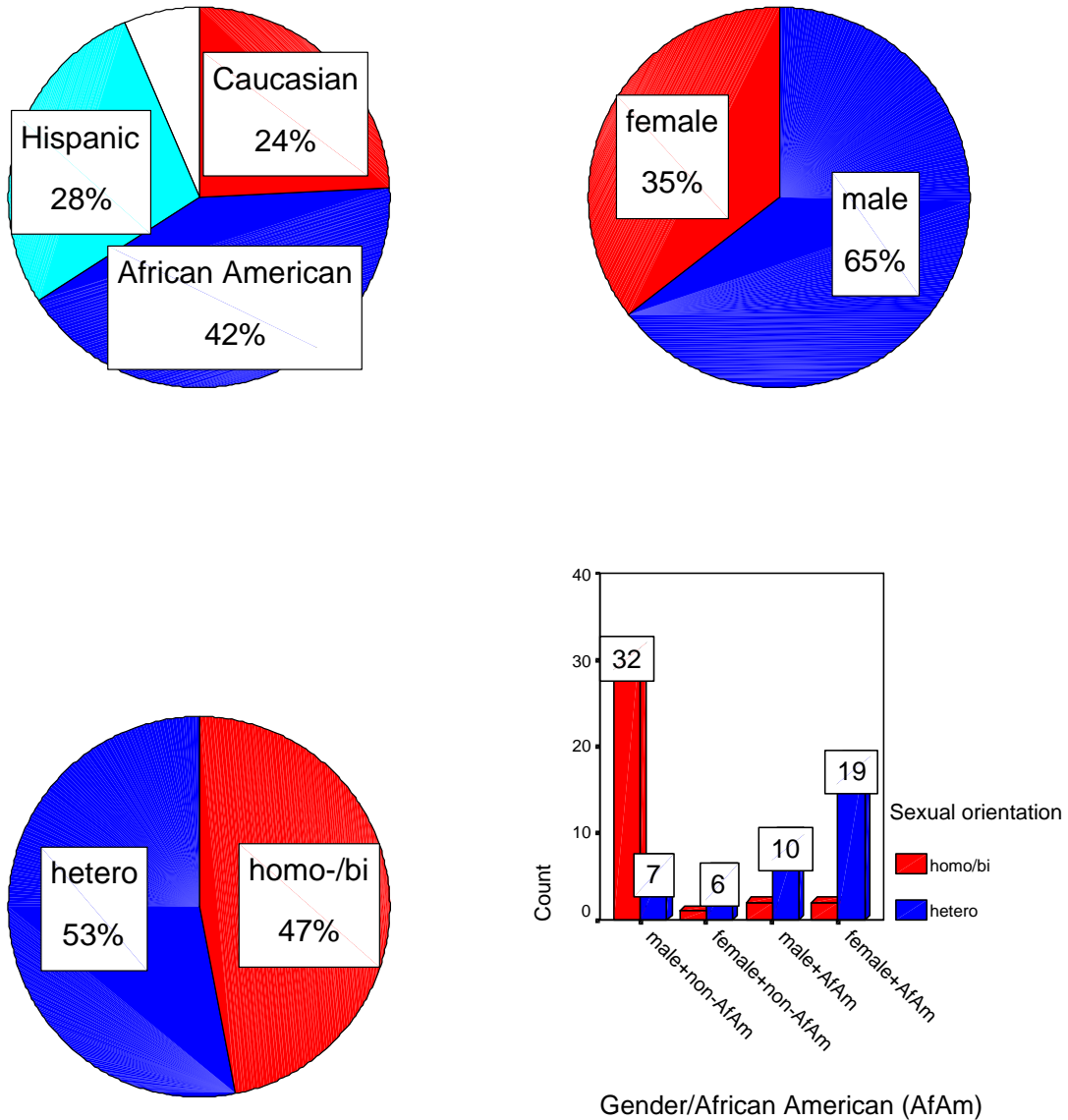


Figure 6: Frequency distribution of ethnicity, gender and sexual orientation in the study population (n=79).

1.1.2. Income, education, age, and health insurance

a) Income and education

The distribution of income and education in the study population is shown in figure 7.

- Half of the participants (43 of 79, 54%) reported a very low income (less than \$10,000), of which a quarter (20 of 79, 25%) stated an extremely low income (less than \$5,000). A low income (\$10,000- \$20,000) was reported in 16 (20% of 79) and a moderate income (\$20,000 - \$40,000) in 12 (9%) of 79 participants. Only 8(10% of 79) had a high income (more than 40,000).

- Of the 79 participants 29 (37%) had completed high school level or less, 28 (34% of 79) had finished trade school or some college and 22 (29% of 79) had accomplished a college degree or more.
- There was a significant correlation between income and education ($r = .59^{***}$): *The more educated, the higher the income.*

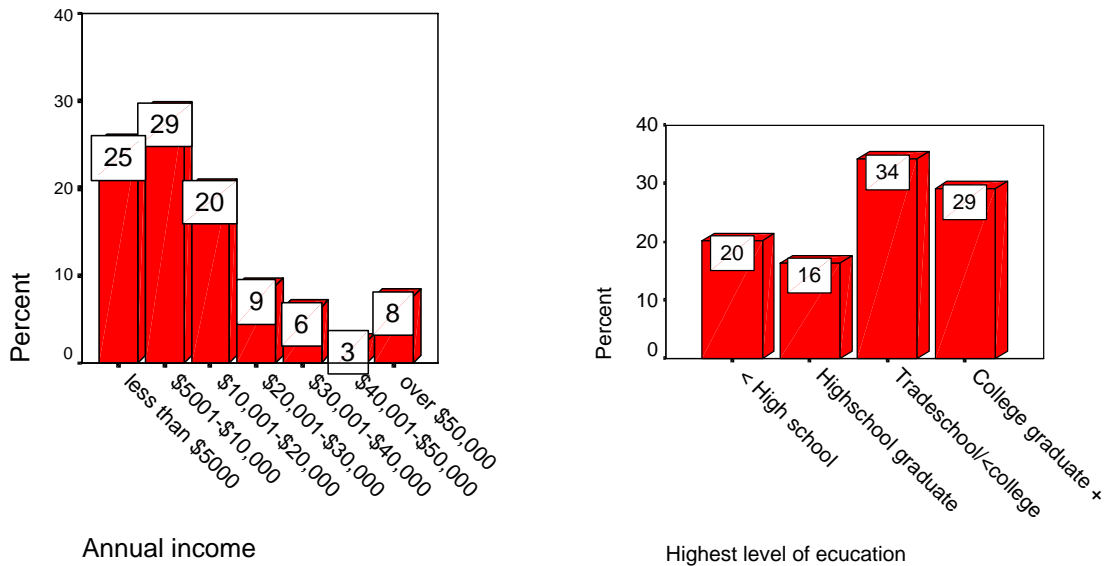


Figure 7: Frequency distribution of income and education levels in the study population (n=79).

b) Age and health insurance coverage

The mean age of the participants was 42.08 years (SD 7.88), ranging from 26 to 70 years.

- Age was positively associated with and income ($r = .37^{**}$) and education ($r = .27^*$): *The older the participants, the higher the income and education level.*

Health insurance covering costs of HIV related medications was reported in 67 (85% of 79) patients. Seven (8% of 79) had no insurance, and in 5 (6% of 79) participants health insurance did not cover the costs of HIV related medications completely. Participants who qualified for drug access programs (i.e., Ryan White foundation) were considered as having health insurance covering the costs for HIV related medication.

- There was a significant association between health insurance coverage and annual income ($F_{6, 72} = 4,08^{**}$). Only 6 (50%) of the 12 participants with an annual income between \$20,000-\$40,000 had health insurance completely covering HIV related medication, whereas 53 (90%) of the 59 participants with an annual income lower than \$20,000 had complete coverage. All 8 (100%) participants with an annual income greater than \$30,000 had complete coverage. Participants in the middle income class (who did not qualify for the Ryan White foundation) were mostly affected by having to pay or co-pay for HIV related medications.

c) The relationship between gender/ethnicity and income/education

The relationship between gender and education/income is shown in figure 8.

- Twenty (87%) of the 23 participants with an education level of college graduation or above were male, whereas 18 (62%) of 29 participants with high school degree or less were female. Men and women differed significantly on education levels, with women having a lower education level than men ($z = - 3.69^{***}$).
- All 8 (100%) participants with a very high income were male (all homo/-bisexual), whereas 12 (60%) of the 20 participants with an extremely low income were women. Men and women differed significantly on income levels, with women having a lower income level than men ($z = - 3.12^{**}$).

Further, the female participants in this study were significantly younger (mean 38.8, SD 7.2) than the male participants (mean 43.8, SD 7.7) ($z = - 2.27^*$).

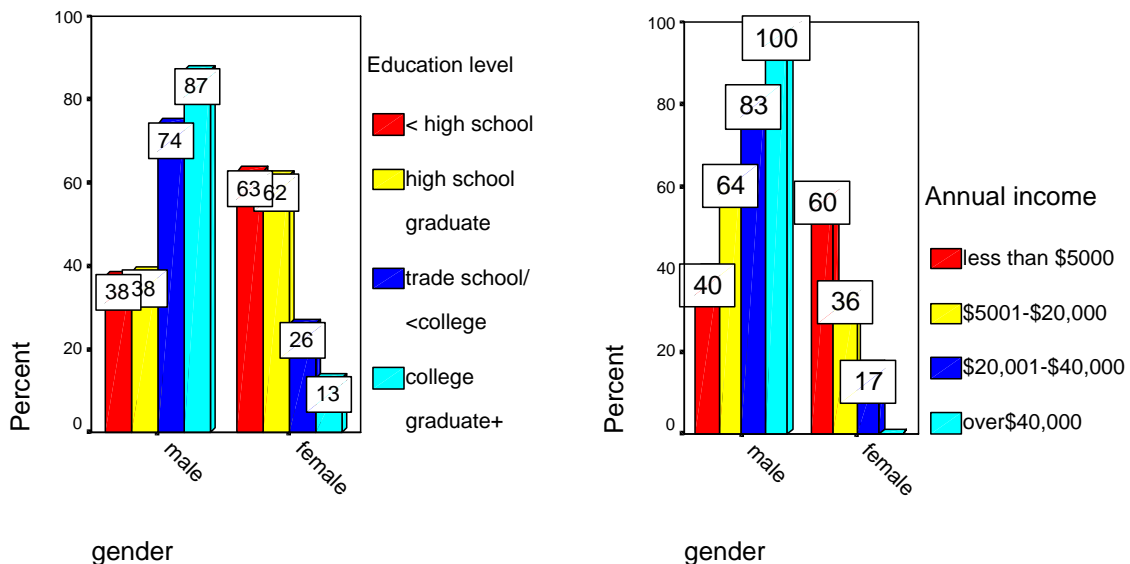


Figure 8: Relationship between gender (men n=51, women n=28) and education/income

The relationship between African American ethnicity and income/education is illustrated in figure 9.

- Of the 23 participants with an education level of college graduation or above 22 (96%) were not African American (10 Hispanics, 9 Caucasians, 3 other ethnic origins) whereas of the 29 participants with high school degree or less 23 (75%) were African American. Between ethnic groups significant differences were found on the level of education. African Americans had a lower education level than all other ethnic groups ($t = 6.32^{***}$, $df = 77$).
- Of the 8 participants with a very high income 7 (88 %) had no African American ethnicity (5 Caucasian, 1 Hispanic, 1 other ethnic origin), whereas 14 (70%) of the 20 participants

with an extremely low income were African American. There was a significant difference on income levels between ethnic groups. African Americans had a lower income level than all other ethnic groups ($t = 3.68^{***}$, $df 77$).

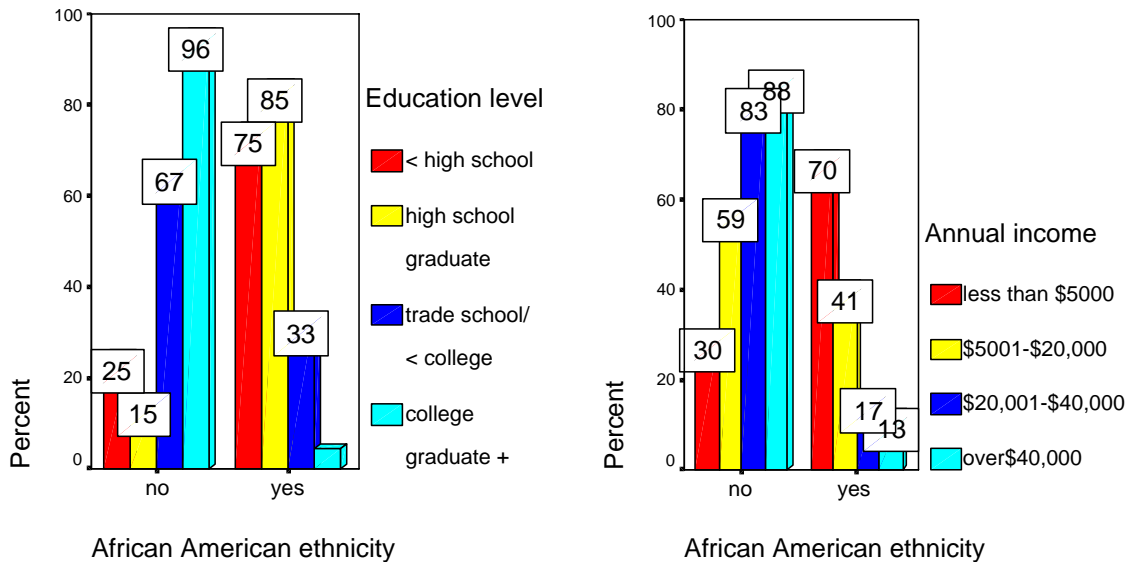


Figure 9: Relationship between African American ethnicity (African American $n=33$, Caucasian, Hispanic, other $n=47$) and education/income.

1.1.3. Employment, living arrangements and relationship status

Figure 10 summarizes the frequency distributions of employment status, living arrangements and relationship status in the study population.

a) Employment status

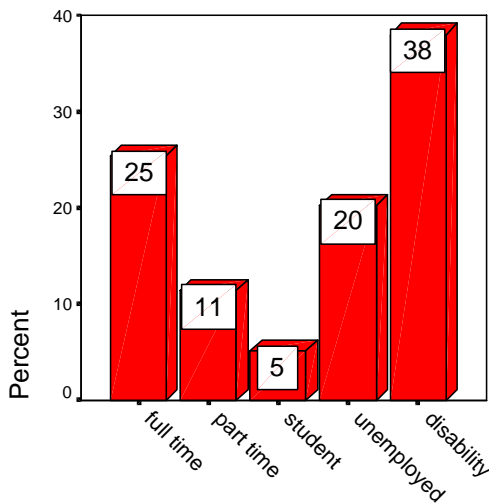
Of the 79 participants 30 (38%) lived on disability, 29 (36%) were still employed, 16 (20%) unemployed and 4 (5%) students.

- Of the 29 employed participants, 8 (28%) were working as HIV-service providers and further 2 (7%) worked in the health care field.
- The employment status was significantly associated with the education level ($r = .50^{***}$): *People on disability had a lower level of education.*
- Disability or employment status was not significantly related with age.
- The homo-/bisexual Caucasian/Hispanic men were significantly more likely (OR 5.67*) to be employed than heterosexual African American women (chi-square 5.44*, $df 1$).

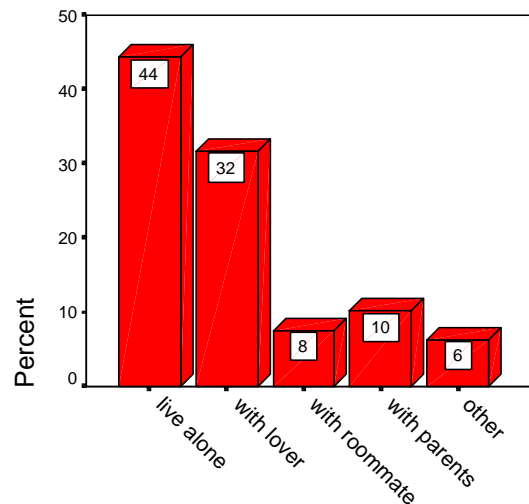
b) Living arrangements and relationship status

Of the 79 participants 35 (44%) lived alone, 25 (32%) with their lover, and 19 (24%) in other arrangements. Not having a partner was reported by 48 (61%) of the participants, whereas 31 (39%) had a partner.

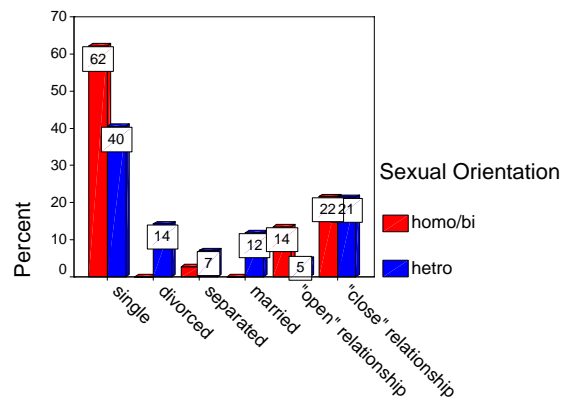
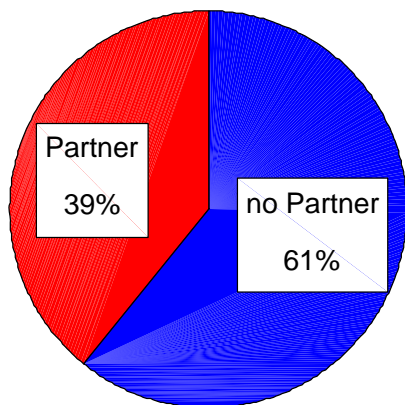
- With respect to the fact that homosexual partners had no opportunity to marry in the past, of the 37 homo-/bisexual participants 23 (62%) lived single, 8 (22%) in a close monogamous relationship, 5 (14%) in an “open” relationship and 1 (2%) was separated. Of the 42 heterosexual participants 17 (40%) reported living single, 9 (21%) living in a close monogamous relationship, 5 (14%) being married, 6 (14%) being divorced, 3 (7%) being separated and 2 (5%) living in an “open” relationship.



Employment status



Living arrangements



Relationship status

Figure 10: Frequency distributions of employment status, living arrangements and relationship status in the study population (n=79)

1.2. Overview of medical parameters

1.2.1. Years living with HIV diagnosis, CD4 counts and viral load

The descriptive statistics of time since HIV diagnosis, CD4 cells (absolute/nadir), and viral load are summarized in table 4.

- The mean onset of HIV diagnosis was 11 years (SD 4.15) before the time-point of the interview, ranging from 3 to 20 years.
- The mean current absolute CD4 cells/ μl were 347.00 (SD 93.99), ranging from 8 to 921 cells/ μl . Of the 79 participants 53 (67%) had more than 200 CD4 cells/ μl and 26 (33%) had less than 200 CD4 cells/ μl .
- The CD4 cell nadir was at a mean of 149.95 cells/ μl (SD 93.99), ranging from 8 to 350 (as the inclusion criteria of the DHSS treatment guideline was a CD4 cell nadir below 350 cells/ μl , or viral load above 55,000 copies/ml or HIV related symptoms (DHSS Guidelines 2002). However, of the 79 participants 58 (73%) had a CD4 nadir below 200 cells/ μl , whereas the CD4 nadir was in the range between 200-350 cells/ μl in 21 (27%) participants.
- The mean viral load at the time-point of the interview was 37,858 copies/ml, with 28 (49%) of the 58 participants on ART having an undetectable viral load. The maximal viral load was 611,682.
- The mean viral load log was 2.69 (SD 2.15).

Table 4: Descriptive statistics of time since HIV diagnosis, CD4 cells (absolute/nadir), and viral load (n=79)

	Minimum	Maximum	Mean	SD
Years since HIV diagnosis	3.00	20.00	11.14	4.15
CD4 absolute (cells/ μl)	8	921	347.00	227.65
CD4 nadir (cells/ μl)	8	350	149.95	93.99
Viral load (copies/ml)	0	611,682	37,858.14	83,125.47
Viral load log	0	5.79	2.69	2.15

a) Changes in CD4 cells and viral load over the past year

The changes in CD4-cells and viral load over the past year are illustrated in figure 11.

- One year prior to the interview the CD4 cells were at a mean of 350.16 (SD 201.96), ranging from 27 to 931 CD4cells/ μl . CD4 cells/ μl remained stable (± 50) over the last year in 33 (42%) of the 79 participants, 17 (22%) had an increase between 50-150

cells/ μ l and 16 (20%) had a decrease between 50-150 cells/ μ l. An increase of more than 150 cells/ μ l was in 7 (9%) of the 79 participants and a decrease of more than 150 cells/ μ l was in 6 (7%) of the 79 participants.

- One year prior to the interview, the viral load was at a mean of 46,871.01 copies/ml (SD 127,2000.60) ranging from undetectable to 750,000 viral load copies/ml. A stable viral load (\pm 1000) over the last year was measured in 31 (39%) of the 79 participants, (all of which had an undetectable viral load at both time-points, the interview date and one year prior). An increase in viral load between 10,000–100,000 copies/ml was seen in 20 (25%) of the 79 participants and 8 (10%) had a decrease between 10,000–100,000 copies/ml. A smaller increase in viral load between 1,000–10,000 copies/ml was seen in 7 (9%) of the 79 participants and 5 (6%) had a decrease between 1,000–10,000 copies/ml. Viral load decreases greater than 100,000 copies were seen in 5 (6%), and viral load increases greater than 100,000 copies were seen in 3 (4%) of the 79 participants.

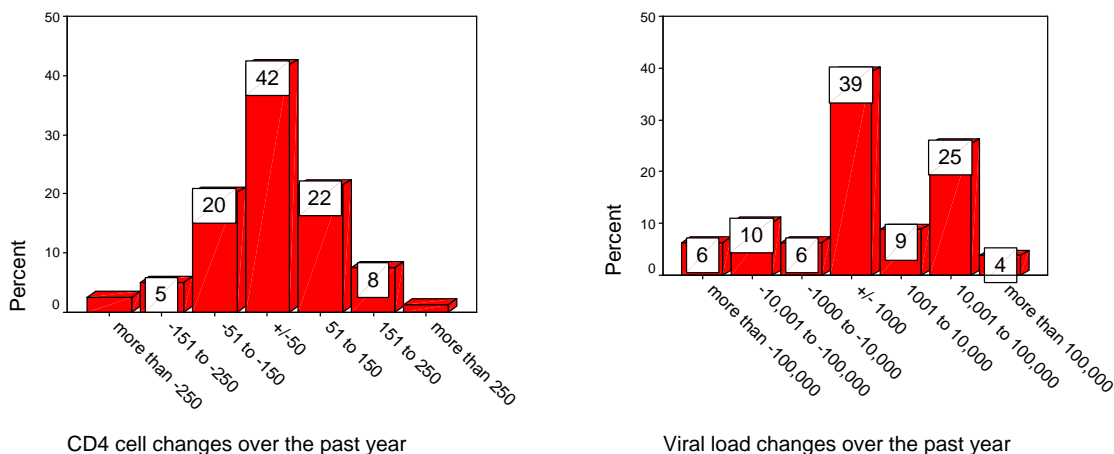


Figure 11: Frequency distribution of changes in CD4-cells and viral load over the past year (n=79)

b) Relationship between socio-demographic parameters and years living with HIV diagnosis, CD4 counts and viral load

The 19 heterosexual African American women were diagnosed more recently with HIV (mean 9.32 years, SD 4.04) than their male homo-/bisexual counterpart of Caucasian, Hispanic or other ethnicity (n=32), who were diagnosed a mean of 13.47 years (SD 3.50) prior to the interview. $T = 3.87^{***}$, $df 49$).

No further significant differences were found on current CD4 cells/ μ L, CD4 nadir, viral load or changes in CD4 cells and viral load over the past year between gender, ethnicity, sexual orientation, age, income, education, employment or relationship status.

1.2.2. CDC-category of HIV/AIDS symptoms

The CDC category was assessed with the Physical Symptom Checklist over six months followed by verification of patients reported category C symptoms by their HIV through their HIV treating physician.

a) CDC category B symptoms over the past 6 months

- At the time-point of the interview, 46 (58%) of the 79 participants did report HIV related symptoms (CDC category B) over the past six months, whereas 33 (42%) of the 79 participants did not report any HIV related symptoms over the past six months. Excluding diarrhea (lasting more than two weeks) and peripheral neuropathy as potential side effects related with ART, only 16 (20%) reported CDC category B symptoms, whereas 63 (80%) of the 79 participants did not.
- Of the 79 participants 26 (33%) reported one category B symptom, 12 (15%) two and 8 (10%) three category B symptoms. Revised for the symptoms of diarrhea (lasting more than two weeks) and peripheral neuropathy, only 13 (16%) of the 79 participants reported one and 3 (4%) of the 79 participants reported two category B symptoms.

Figure 12 illustrates the total sum of reported CDC category B symptoms over the past 6 months.

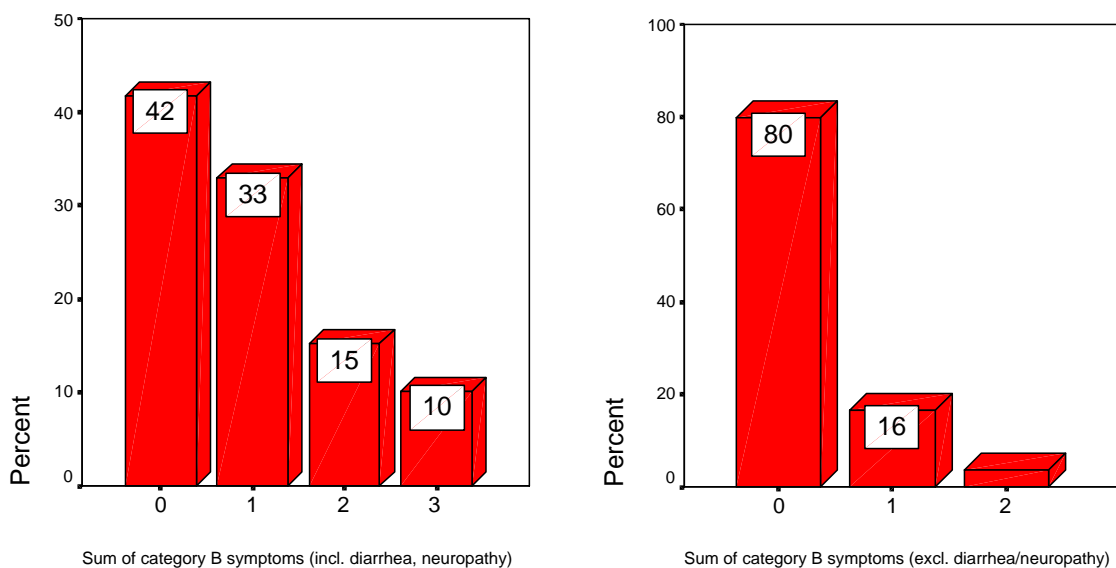


Figure 12: Total sum of reported CDC category B symptoms over the past 6 months including and excluding diarrhea and peripheral neuropathy as potentially ART related effects (n=79)

b) Doctor verified AIDS defining events (CDC category C) since onset of HIV diagnosis

Of the 79 participants 67 (85%) never had any AIDS defining symptoms (category C), whereas 12 (15%) had AIDS defining symptoms at some time-point since onset of their HIV diagnosis. It has to be noted that one criterion for two subgroups for entry into the parent LTS study was never having had a category C symptom.

- Verified with doctor’s reports, of the 11 patients who have had category C symptoms, 5 had HIV related wasting and 4 had pneumocystis carinii pneumonia, and one each had cryptosporidiosis and recurrent pneumonia respectively.
- The mean time in years since onset of AIDS defining events was 2.55 years (SD .93), ranging from 1 to 4 years.

1.2.3. Antiretroviral treatment

Figure 13 illustrates the frequency distribution of the intake of HAART and the relationship between taking HAART and having a partner.

In total, 55 (69.5%) of the 79 participants took HAART, 21 (27%) did not take any ART and 3 (3.5%) took a combination therapy (one took two protease inhibitors, one two nucleoside inhibitors and the other three nucleoside inhibitors but not containing Abacavir/Tenofovir).

- Participants on HAART were significantly more likely to have a partner (chi-square 10.3**, df 1, OR 11.5**). Of the 31 participants having a partner 28 (90%) were taking HAART, and only 3 were not on ART. Of the 48 participants not having a partner 27 (56%) were taking HAART, and 21 (44%) were either no ART or a combination therapy. All 3 participants on combination therapy did not have a partner.

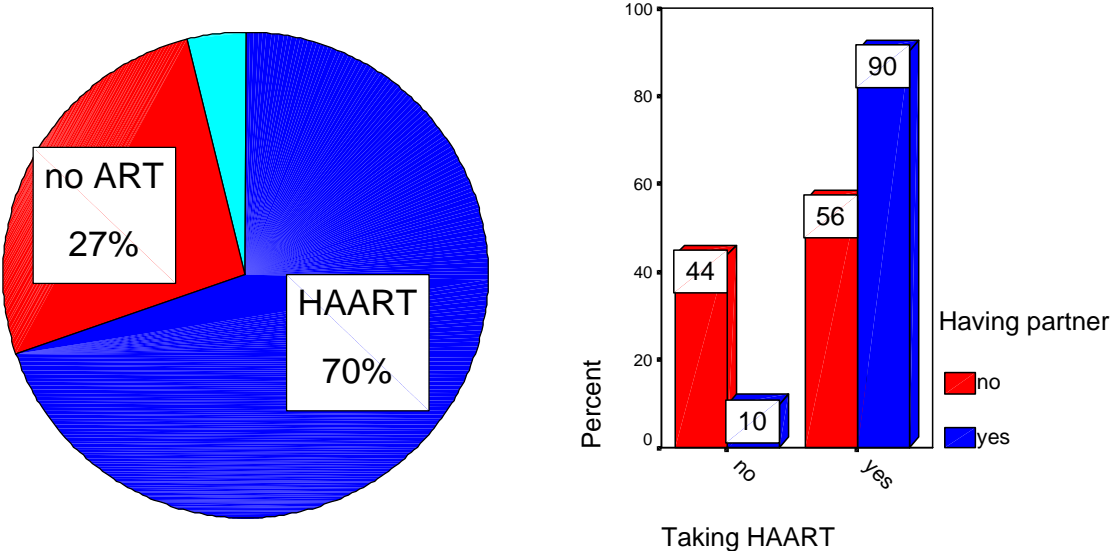
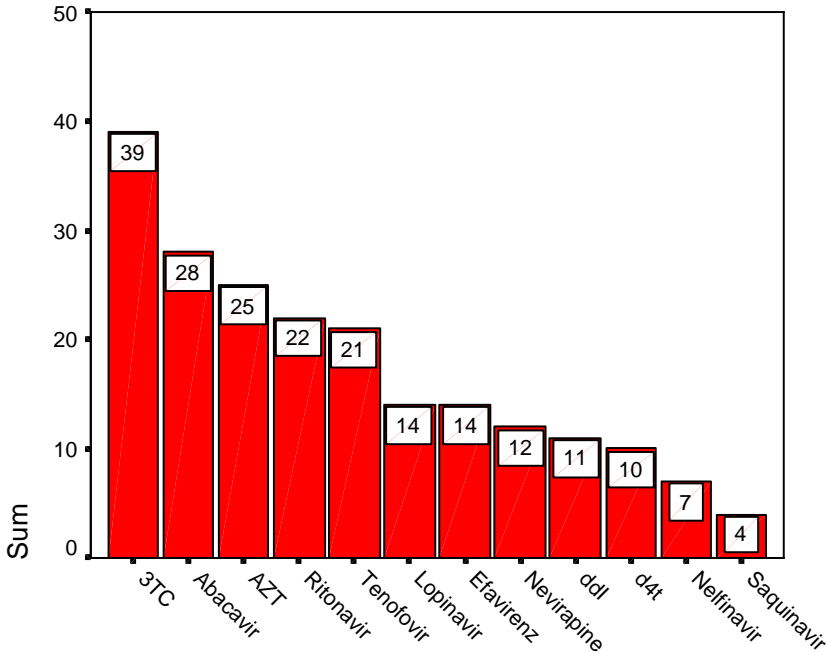


Figure 13: Frequency distribution of the intake of HAART and the relationship between taking HAART and having a partner.

a) Medications prescribed at the time-point of the interview

The 58 participants, who were taking ART at the time-point of the interview, were prescribed 18 different antiretroviral substances (classification of the antiretroviral drugs see appendix p. 22).

- The seven major prescribed drugs were the nucleoside inhibitors 3TC (39 of 58, 67%), Abacavir (28 of 58, 48%) and AZT (25 of 58, 42%), the protease inhibitor Ritonavir 400mg or 100mg boost (22 of 58, 38%), the nucleotide inhibitor Tenofovir (21 of 58, 36%), the protease inhibitor Lopinavir and the non-nucleoside inhibitor Efavirenz (each 14 of 58, 24%) (figure 14).
- Other drugs prescribed were the non-nucleoside inhibitor Nevirapine (12 of 58, 20%), the nucleoside inhibitors ddl (11 of 58, 19%) and d4T (10 of 58, 17%), the protease inhibitors Nelfinavir (7 of 58, 12%) and Saquinavir (4 of 58, 7%) (see figure 14).
- Further, 3 patients were on the protease inhibitor Amprenavir and 2 on the protease inhibitor Indinavir and one participant each took Atazanavir (new protease inhibitor), GW433908 (experimental protease inhibitor), T-20 (new fusion inhibitor), and Hydroxyurea (adjuvant drug).



Medication prescribed at interview to more than 3 patients

Figure 14: Sum of the main antiretroviral substances prescribed at the time-point of the interview (n=79)

b) Changes in ART over the past year

Changes (including restarting and stopping) in ART over the past year mainly concerned the protease inhibitors Ritonavir, Nelfinavir, Lopinavir, Saquinavir, the nucleoside inhibitor ddl, and the non-nucleoside inhibitor Delavirdin (figure 15).

- Eleven patients had stopped Ritonavir since last year, but also another 11 had started. Nelfinavir was stopped by 11 and started by 7 patients, Lopinavir was stopped by 10, but also started by 10, Saquinavir was stopped by ten, but only started by 4. The nucleoside inhibitor ddl was stopped by 7, but also started by 7, and all patients who took the non-nucleoside inhibitor Delavirdin one year prior no longer took this substance at the time-point of the interview.
- The protease inhibitors Indinavir and Amprenavir were stopped in 3 patients each and started in one patient each. The nucleoside inhibitor AZT was stopped in 3 patients and the nucleoside inhibitor in 2 patients. All other medications did not change (± 1).

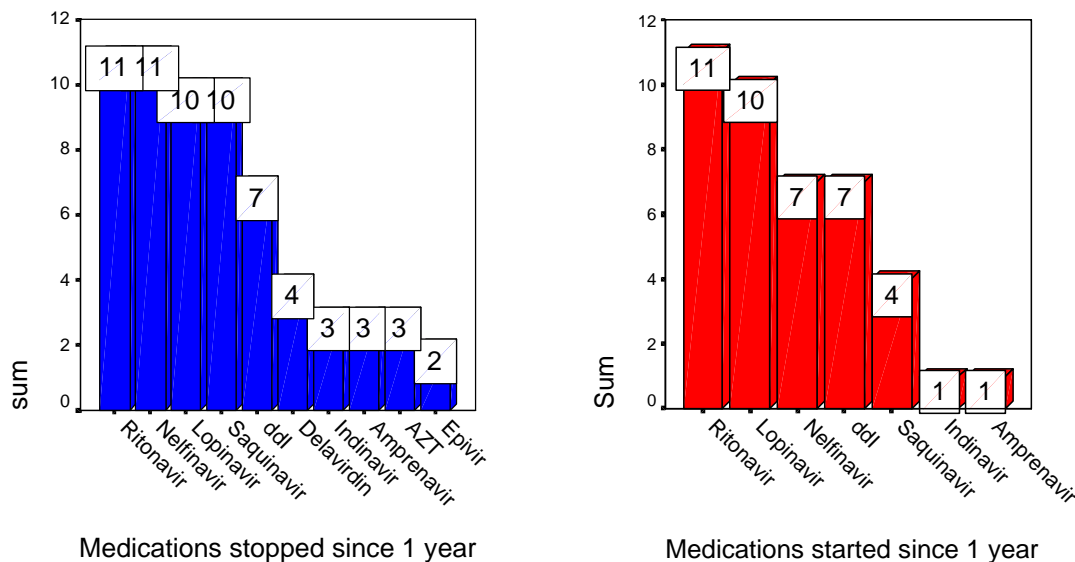


Figure 15: Medications stopped and started over the past year (n=79)

c) Switches in substances over the past year

A subgroup of 28 (35% of 79) participants was continuous on ART over the past year but switched their combination. Switches of substances concerned mainly the protease inhibitors (Ritonavir, Lopinavir, Saquinavir, Amprenavir, Crixivan, Atazanavir), but also the nucleoside inhibitor ddl, and the non-nucleoside inhibitor Delavirdin.

- Of the protease inhibitors Ritonavir was stopped in 4 and started in 8 participants, Lopinavir was stopped in 3 and started in 7 participants, Saquinavir was stopped in 3 and started in 1 participant, Amprenavir and Crixivan were stopped in 1 and started in 1 participant and 1 participant stopped Atazanavir.
- The nucleoside inhibitor ddl was stopped in 3 and started in 6 participants.

- The non-nucleoside inhibitor Delavirdin was stopped in 3 participants.
- All other nucleoside inhibitors (3TC, Abacavir, AZT, Tenofovir, d4T) and non-nucleoside inhibitors (Efavirenz, Nevirapine) and one protease inhibitor (Nelfinavir) were not switched.

1.2.4. Prophylaxis of opportunistic infections

Of the 79 participants 46 (58%) did not take any prophylaxis for opportunistic infections (OI) whereas 33 (42%) did take prophylaxis for OI.

- Participants with less than 200 CD4 cells/ μ l were significantly more likely to take prophylaxis for OI than participants with more than 200 CD4 cells/ μ l (chi-square 4.0*, df 1, OR 4.0*). Fifteen (58%) of the 26 participants with fewer than 200 CD4 cells/ μ l used prophylaxis for OI and even 18 (34%) of the 53 participants with more than 200 CD4 cells/ μ l used prophylaxis for OI.
- Of the 33 participants using prophylaxis for OI 17 (52%) took prophylaxis for pneumocystis carinii pneumonia, 8 (24%) each for Herpes virus and candida infections and 7 (21%) for mycobacterial infections.

1.2.5. Co-medication and co-infection

- Of the 79 participants 21 (27%) reported taking central nervous medications such as anti-depressants and/or tranquilizers at the time-point of the interview.
- Cardiac medications were taken in 13 (16%) of the 79 participants, of which 8 (10% of 79) were treated for hypertension or myocardial infarction and 5 (6% of 79) to control ART induced hyperlipidemia.
- Co-infection with hepatitis B and/or C was reported and doctor-verified in 11 (14%) of the 79 participants. Seven were infected with hepatitis C, 3 with hepatitis B and one with both hepatitis B and C virus. Mean onset of diagnosis of hepatitis co-infection was 1.81 years (SD 2.09). Two patients with hepatitis C were treated with Ribavirin and Interferon alpha and one with Interferon alpha only. Of the 4 patients with hepatitis B one was on Eпивir and Tenofovir and one on Eпивir (Eпивir and Tenofovir are antiretroviral drugs which are also effective in the treatment of hepatitis B infection). The other six patients received no treatment for their viral hepatitis B or C. It has to be noted that the incidence of hepatitis B and C is lower than expected in the HIV positive population; because participants were excluded from entry into the parent LTS study if they had taken street drugs during the last month.

1.3. Overview of behavioral parameters

1.3.1. Health behavior

- Weekly physical exercise of at least one hour or more was reported by 59 (75%) of the 79 participants (whereby some considered walking around the block as physical exercise).
- Non-smoking was reported by 48 (61%) of the 79 participants.
- Use of multivitamins was reported by 50 (63%) of the 79 participants.
- Use of alternative treatments (e.g., yoga, nutritional supplements, relaxation, biofeedback, visual imagery, massage, etc.) was reported in 40 (51%) of the 79 participants. A higher level of education was significantly associated with use of alternative treatments ($t = -3.55^{***}$, $df77$), use of vitamins ($t = -2.63^{**}$, $df77$) and non-smoking ($t = 2.94^{***}$, $df77$).

1.3.2. Drug and alcohol use over the past month

- No consumption of alcohol was reported in 45 (57%) of the 79 participants. Twenty (25%) of the 79 participants consumed alcohol up to once a week, 9 (12%) several times a week and 5 (6%) daily.
- No use of marijuana was reported in 64 (81%) of 79 participants. Eight (10%) of 79 participants used marijuana once or twice a month, and 7 (9%) as much as daily.
- No use of recreational drugs over the last month was reported in 63 (80%) of the 79 participants. Eight (10%) of 79 participants reported use of opiates, 6 (8%) nitrates, 5 (6%) cocaine, and one participant reported use of amphetamines over the past month.

1.4. Summary of the socio-demographic, medical and behavioral parameters

The sample of the study was composed of a spectrum ranging between two major groups:

- homo/bisexual Caucasian/Hispanic men with a higher socioeconomic status (education, employment, and income), who were older and less recently diagnosed with HIV
- and heterosexual African/American women with a lower socioeconomic status, who were younger and more recently diagnosed with HIV

Overall the sample was rather poor, due to disability and unemployment, although half of the participants had at least some college education. Education was significantly associated with healthy behavior, such as use of alternative treatments ($t = -3.55^{***}$, $df77$), use of vitamins ($t = -2.63^{**}$, $df77$) and non-smoking ($t = 2.94^{***}$, $df77$).

Despite an average of 11 years since HIV-diagnosis, only one third had less than 200 CD4 cells/ μ l, and only 11 (15%) of 79 participants had AIDS symptoms in the past. All participants fulfilled the criteria of the current treatment guidelines to be on HAART, but only 55 (69.5% of 79) were taking HAART, 3 (3.5% of 79) took a combination therapy and 21 (27% of 79) no antiretroviral treatment at the time-point of the interview. Only half of the patients taking ART had an undetectable viral load. Treatment changes mainly concerned switches within the class of protease inhibitors.

2. Overview of results of the qualitative study (aims 1-5)

The primary intention of the qualitative part of the study was to investigate which decisions PLWH have made about ART at the interview (**aim 1**) and why they have made them (**aim 2**). Another objective was to determine why PWHA fail to share the reasons for their decision about ART and their reasons for not taking the medications as prescribed with their doctor (**aim 3**). A further objective was to list the sources of information PLWH have used to make their decision (**aim 4**). In addition the underlying models of decision-making about treatment of Charles et al. (1999) (ranging from the paternalistic to the informed choice model) were determined (**aim 5**).

2.1. Medical decisions regarding ART made over the past year (aim 1)

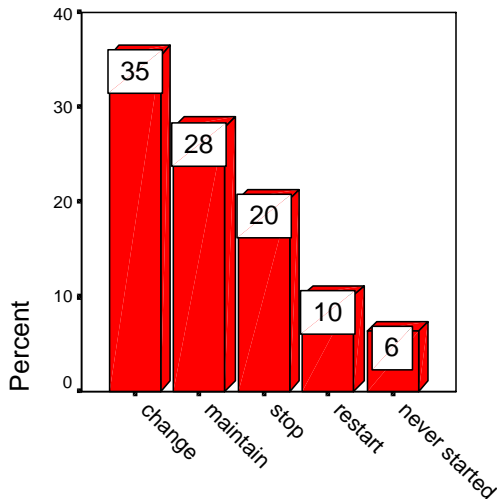
2.1.1. Decisions made about ART

At the time-point of the interview 58 (73%) of the 79 participants were taking ART and 21 (27%) were not taking ART.

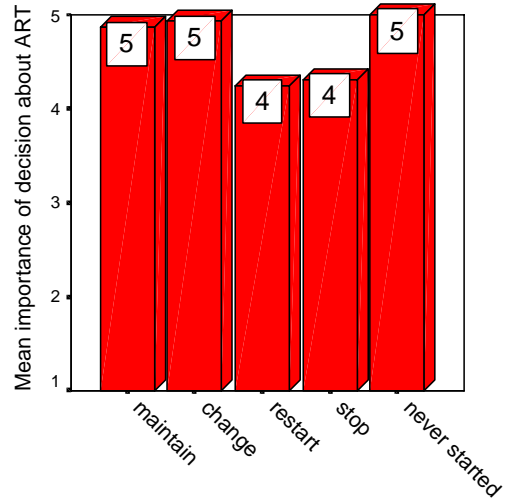
- Of the 79 participants 28 (35%) had changed their antiretroviral treatment, 22 (28%) had maintained, 16 (20%) had stopped, 8 (10%) had restarted and 5 (6%) never had started ART over the past year (see figure 16).

The participants rated the importance of their decision about ART on a 5 point Likert scale ranging from 1 = *very little* to 5 = *very much*. Overall the importance of the decision about ART was rated on average as *very much* (mean 4.72, SD .83). However there were significant differences in importance of the decision between the decisions made about ART ($F_{4, 74} = 2.53^*$).

- The decision not to start ART was rated on average as *very much* important (mean 5.00, SD .00), followed by the decision to change ART (mean 4.93, SD .26), and to maintain ART (mean 4.86, SD .47), whereas the decisions about treatment interruptions were considered less, but still on average *much* important: The decision the stop ART was rated at a mean importance of 4.31 (SD 1.35) and the decision to restart had a mean importance of 4.25 (SD 1.39) (see figure 16).



Decision about ART over past year



Decision about ART over past year

Figure 16: Frequency distribution of the decisions made about ART over the past year and mean importance (scale 1=*very little* to 5=*very much*) of the decisions made about ART (n=79).

2.1.2. Relationship between decisions made about ART and socio-demographic parameters

The decisions about ART (to maintain, change, restart, stop or no to start (ANOVA); and taking ART vs. not taking ART (Pearson’s correlation) were analyzed for socio-demographic characteristics.

a) Relationship between the decisions made about ART and income and employment status

Between the decisions about ART (to maintain, change, restart, stop or not to start ART) significant differences were found on the annual income level ($F_{4,74} = 2.95^*$) (see figure 17).

- The 5 participants who never started ART had the highest income level (mean 4.60, SD 2.30, 4 (80%) had an annual income above \$20,000), compared to the 16 participants who stopped ART, who had the lowest income (mean 2.19, SD 1.60, only 2 (37%) had an annual income above \$20,000), and the 22 participants who maintained ART (mean 2.55, SD 1.06, 3 (14%) had an annual income above \$20,000), the 28 participants who changed (mean 2.71, SD 1.96, 7 (25%) had an annual income above \$20,000), and the 8 participants who restarted ART (mean 3.88, SD 1.73, 4 (50%) had an annual income above \$20,000).

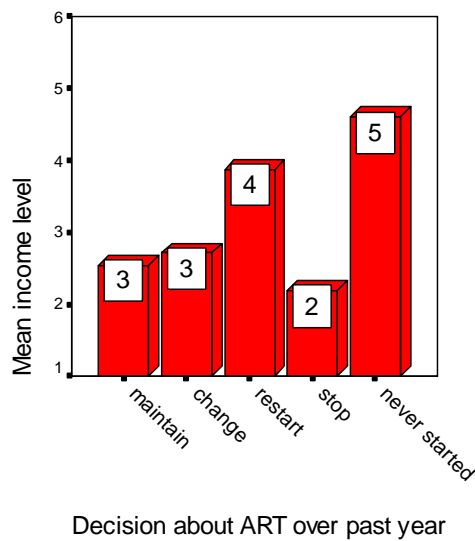


Figure 17: Mean annual income levels of the participants making different decisions about ART over the past year (n= 79).

Correspondingly significant differences were found between the decisions made about ART (to maintain, change, restart, stop or no to start ART) on the employment status ($F_{4,74}= 2.95^*$).

- Most (4 of 5, 80%) of the participants who never started ART and also half of the participants (4 of 8, 50%) who restarted ART were full time employed, compared to the participants who were mostly living on disability: 10 of 22 (46%) of participants maintaining ART, 7 of 16 (44%) participants stopping ART and 12 of 28 (43%) of participants changing ART were living on disability.

b) Relationship between the decisions made about ART and health insurance

The participants taking ART were more likely to have health insurance than participants not taking ART ($r = .26^*$), although taking ART or not was not significantly correlated with having health insurance covering the cost of HIV medication.

- Of the 58 participants taking ART 56 (97%) reported to have health insurance compared to 17 (81%) of the 21 participants not taking ART. It has to be noted that 5 (9%) of the 58 participants taking ART reported that the health insurance covered some costs of HIV related medication (one participant of the 4 even reported to have no coverage of HIV related medication despite having health insurance), and 1 (5%) of the 21 participants not taking ART reported that the health insurance would cover some costs of HIV related medication.

c) Relationship between the decisions made about ART and partnership status

The participants taking ART were more likely to have a partner than the participants not taking ART ($r = .31^{**}$) (which accounts particularly for the participants taking HAART, see p. 57). Whereas half of the participants taking ART (28 of 58, 48%) reported having a partner, only 3 (14%) of the 21 participants not taking ART reported having a partner.

d) Relationship between the decisions made about ART and other socio-demographic parameters

The decisions made about ART (to maintain, change, restart, stop or no to start (ANOVA); and taking ART vs. not taking ART (Pearson's correlations) were not significantly associated with gender, ethnicity, sexual orientation, age, and education.

2.1.2. Relationship between decisions made about ART and medical parameters

The decisions about ART (to maintain, change, restart, stop or no to start (ANOVA); and taking ART vs. not taking ART (Pearson's correlation) were analyzed for medical characteristics.

a) Relationship between the decision made about ART and CD4 counts

In comparison to the other participants the 22 participants who maintained their treatment over the past years had a significantly higher mean CD4 count at the time-point of the interview ($F_{1,77} = 8.72^{**}$) and were more likely to have CD 4 cells above 200 cells.

- In the 22 participants who maintained ART mean CD4 cells/ μl were 463.14 (SD 236.94). This was followed by the 28 participants who changed ART (mean 324.82 cells/ μl , SD 214.78), the 8 participants who restarted ART (mean 298.00 cells/ μl , SD 225.82), the 16 participants who stopped ART (mean 276.00 cells/ μl , SD 222.64) and the 5 ART naïve participants (mean 265.00, SD 126.12) (see figure 18).

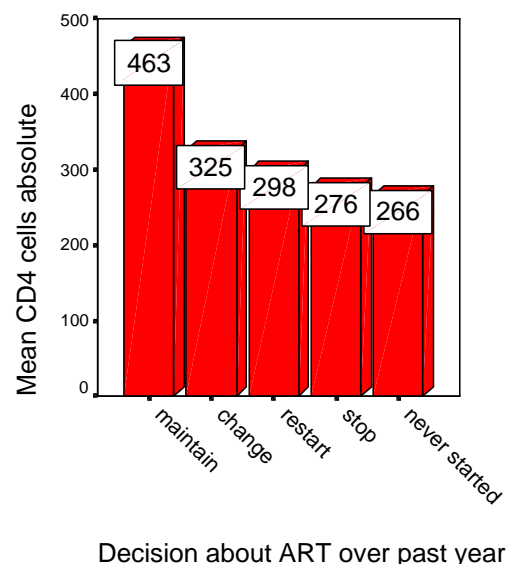


Figure 18: Relationship between the decisions made about ART over the past

year and mean absolute CD4 cells/ μ l (n=79).

- Of the 22 participants maintaining ART over the past year 19 (86%) had CD4 cells above 200 cells/ μ l at the interview compared to 34 (60) of the other 57 participants who changed, restarted, stopped or did not start ART over the past year.

Between the decisions made about ART (to maintain, change, restart, stop or no to start (ANOVA); and taking ART vs. not taking ART (Pearson's correlation)) no significant differences were found on changes in CD4 cells over the past year and on the CD4 cell nadir.

b) Relationship between the decisions made about ART and viral load

Between the decisions made about ART over the past year significant differences were found on viral load log ($F_{4, 74} = 5.76^{***}$), absolute viral load ($F_{4, 74} = 2.66^*$) (see figure 19) and having an undetectable viral load or not ($F_{4, 74} = 4.79^{**}$) at the interview. Participants who were taking ART at the interview were more likely to have a lower viral load log ($r = .41^{***}$), a lower absolute viral load ($r = .26^*$) and an undetectable viral load ($r = .40^{***}$) than participants who did not take ART at the interview.

- Mean viral load log was highest in participants who were currently not on ART (mean 4.20 log (SD .70) in the 5 ART naïve participants and mean 4.13 log (SD 1.39) in the 16 participants who stopped ART), followed by participants who changed ART (mean 2.72 log (SD 2.30) and the 8 participants who restarted ART (mean 2.57 log, SD 2.23)). Viral load log was lowest (mean 1.31 log, SD 1.81) in the 22 participants who maintained the same treatment over the past year. After controlling for CD4 cells differences between the decisions made about ART (to maintain, change, restart, stop, or never start) on viral load log were still significant ($F_{4, 73} = 3.62^*$). The partial eta square of .166 suggests a weak relation between the decision made about ART and viral load log, controlling for CD4 cells.
- One of the ART naïve participants was very different from the others. He only had a viral load of 1,470 copies/ml. For this reason mean viral load copies/ml were lower in ART naïve participants (mean 32,052 copies/ml, SD 31,775) than in participants who had changed their treatment without discontinuation over the last year (mean 41,882.07 copies/ml, SD 62,360). Participants who had stopped treatment had the highest viral load (mean 87,268 copies/ml (SD 152,471)). Still mean viral load was lowest in participants who maintained their treatment over the last year (mean 3,000 copies/ml, SD 7,022), followed by participants who had restarted (mean 24,426 copies/ml, SD 41,967). Again, the one-way ANCOVA controlling for differences in absolute CD4 cells/ml indicates that

there are differences among mean viral load copies/ml between the decisions made about ART ($F_{3,73} = 3.62^*$, partial eta square .166).

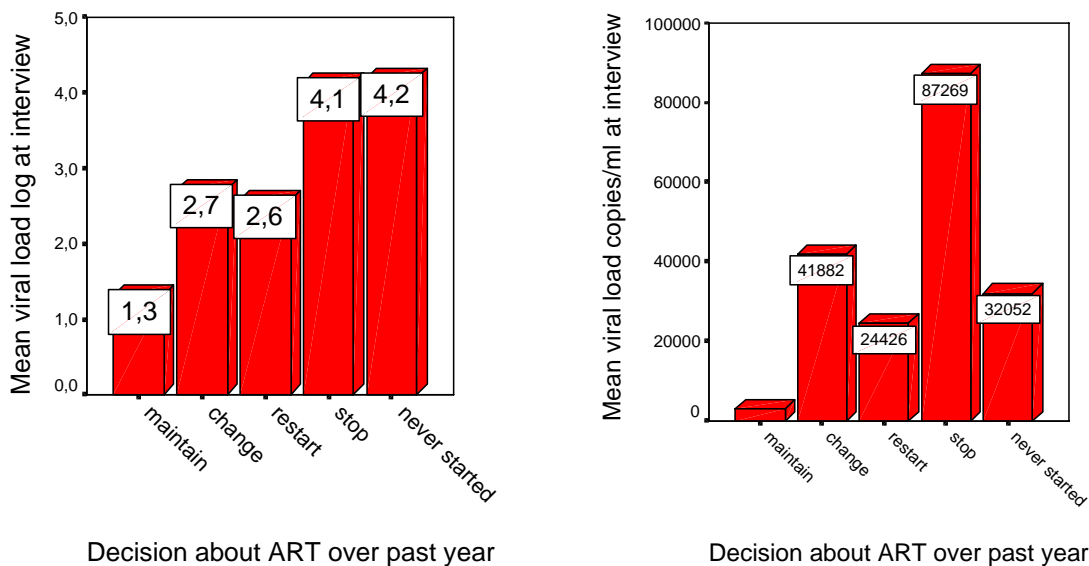


Figure 19: Relationship between the decisions made about ART over the past year and mean viral load (log and copies/ml) (n=79).

- Half of the 58 participants taking ART (48%) had an undetectable viral load at the interview. All but one (20 of 21, 95%) of the participants not taking ART at the interview had a detectable viral load. The participants with the undetectable viral load reported that she stopped ART three weeks ago when she became homeless. Her undetectable viral load suggests that she may still take her medications.

Between the decisions made about ART (to maintain, change, restart, stop or no to start (ANOVA); and taking ART vs. not taking ART (Pearson's correlation)) no significant differences were found on changes in viral load over the past year.

c) Relationship between the decisions made about ART and other medical parameters

Between the decisions made about ART (to maintain, change, restart, stop or no to start (ANOVA); and taking ART vs. not taking ART (Pearson's correlation)) no significant differences were found on years since HIV diagnosis, and category B symptoms over the past 6 months on the Physical Symptoms Checklist and doctor verified category C symptoms since onset of diagnosis.

2.1.3. Relationship between decisions made about ART and behavioral parameters

The decisions about ART (to maintain, change, restart, stop or no to start (ANOVA); and taking ART vs. not taking ART (Pearson's correlation) were analyzed for behavioral characteristics. Between the decisions made about ART (to maintain, change, restart, stop or no to start) significant differences were found on smoking or not ($F_{4, 74} = 2.61^*$).

- Whereas all 5 ART-naïve participants were non-smokers, 11 (69%) of the participants who stopped ART reported to be smokers. Only about a third of the other participants reported to smoke: 3 (38%) of 8 participants restarting ART, 8 (36%) of 22 participants maintaining ART and 9 (32%) of 28 participants changing ART over the past year reported smoking.

The participants taking ART were less likely to use alcohol than the participants not taking ART ($r = -.30^{**}$).

- Of the 58 participants taking ART 36 (62%) reported no use of alcohol over the past month compared to 9 (43%) of the 21 participants not taking ART.

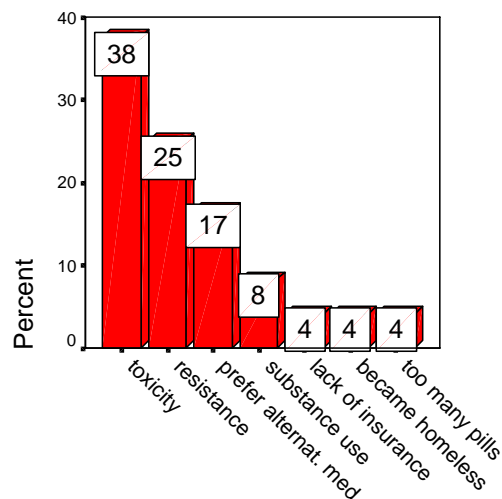
The decisions made about ART (to maintain, change, restart, stop or no to start (ANOVA); and taking ART vs. not taking ART (Pearson's correlation) were not significantly associated with use of complementary or alternative treatments as a health related behavior or use of recreational drugs as a health risk behavior.

2.1.4. The decision to interrupt ART when treatment is recommended according to the DHSS treatment guidelines

In all participants of this study ART was recommended according at the interview to the current DHSS Guidelines (2002) (CD4 cells < 350 cells/ μ l, or viral load > 55,000 copies/ml or symptomatic HIV infection). All participants had a CD4 nadir below 350 cells/ μ l, except one, who was symptomatic with a CD4 cell nadir of 350 cells/ μ l. Of the 79 participants 24 (30%) had interrupted treatment, which are the 8 participants who restarted and the 16 participants who changed ART over the past year. According to the interviews the decision to interrupt ART was made by the doctor in 3 (12.5%), by doctor and patient in 4 (16.5%) and by the patient in 17 (71%) of the 24 patients. The average duration of treatment interruptions was 2.18 months (SD 7.01), ranging from one week up to 4 years.

a) Reasons for treatment interruptions

Main reasons for treatment interruptions in the 24 participants were toxicity of ART in 9 (38% of 24) participants, drug-resistance in 6 (25% of 24) participants and preference for complementary/alternative medicine in 4 (17% of 24) participants. Two participants discontinued treatment because of substance use, one had temporarily lack of health insurance, one became homeless, and one felt he had too many pills to take (see figure 20).



Reasons for treatment interruptions

Figure 20: Frequency distribution of reasons for treatment interruptions

b) Socio-demographic, medical and behavioral characteristics of participants interrupting treatment

Participants interrupting ART did not differ from participants who did not interrupt ART on socio-demographic characteristics such as gender, ethnicity, age, sexual orientation, partnership status, income, education, employment status, and health insurance.

The 24 participants interrupting ART had in mean a significantly higher viral load log ($r = .29^*$), as well as higher viral load copies/ml ($r = .23^*$) and were less likely to have an undetectable viral load than the 55 participants who did not interrupt ART. No significant differences were found on other medical characteristics, such as years since HIV diagnosis, CD4 nadir, CD4 stage, category B or C symptoms, CD4 cells/ μ l at the interview and changes in CD4 cells or viral load over the past year.

Of the behavioral characteristics interrupting ART vs. not interrupting ART was significantly associated with smoking. The 24 participants interrupting ART were more likely to be smokers than the 55 participants who did not interrupt ART ($r = .26^*$). No significant differences between participants interrupting ART and participants who did not interrupt ART on use of complementary or alternative treatments, and on alcohol or recreational drug use.

2.1.5 The decision not to start ART when treatment is recommended according to treatment guidelines

Of the 79 participants 5 (6%) were still ART naïve, despite that they should be on ART according to the current DHSS Guidelines (2002) as they all had a CD4 nadir below 350 cells/ μ l and one also had a viral load above 55,000 copies at the time point of the interview (see table 5).

Table 5: ART-naïve participants: CD4 nadir, CD4 cells/ μ l and viral load at interview and one year prior (n=5).

#	CD4 nadir	CD4 cells/ μ l at interview	Viral load c/ml at interview	CD4 cells/ μ l 1 year prior	Viral load c/ml 1 year prior
1	85	85	79,374	111	10,2748
2	172	176	45,825	205	24,823
3	225	400	6,573	410	21,361
4	279	279	27,020	264	42,177
5	321	389	1,470	371	1,018

a) Reasons not to start ART when treatment is recommended according to treatment guidelines

Four did not start ART as they preferred alternative medicine because out of the fear of side effects and toxicity of ART. One participant (#5 in table 5 did not start ART, because his CD4 cells were still high (389 cells/ μ l) and his viral load was low (1,470 copies/ml), although his CD4 nadir was at 321 cells/ μ l.

b) Socio-demographic, medical and behavioral characteristics of participants not starting ART despite treatment is recommended according to treatment guidelines

The five participants who were still ART-naïve differed in the following socio-demographic, medical and behavioral parameters from the other 74 participants, who were ART experienced:

- ART naïve participants had a higher socioeconomic status than ART experienced participants. They had a significantly higher employment status ($F_{1,77} = 6.25^{**}$) and income ($F_{1,77} = 5.98^*$): Four were full-time employed (one as HIV-service provider and one in health care) and one was unemployed. Two of the five had college experience and three graduated from college, although this was not a significant difference ($F_{1,77} = 3.5$; $p = .064$). The ART-naïve participants also had a higher mean annual income than the ART experienced participants ($F_{1,77} = 5.98^*$).
- ART naïve participants were significantly less likely to have health insurance than ART experienced participants (chi-square = 7.99, $p_f = .04$, df_1 , OR 4.61*). Two (40%) of the 5

ART-naïve participants had no health insurance, whereas only 4 (5%) of the other 74 participants had no health insurance.

- ART naïve participants had less HIV related symptoms (including diarrhea and peripheral neuropathy) ($F_{1,77} = 5.01^*$). None of the ART-naïve patients reported HIV related symptoms. Also none of the ART naïve participants had category C symptoms in the past.
- ART naïve participants made significantly more use of complementary or alternative medicine (CAM) than ART experienced participants ($t = 2.99^{**}$, $df77$). The 5 ART-naïve participants used in mean 2.40 (SD 1.95) different kinds of CAM in comparison to the 74 ART experienced participants who used in mean .85 (SD 1.06) different kinds of CAM. All ART-naïve participants were non-smokers ($F_{1,77} = 3.51^*$).

No significant findings were found comparing ART naïve vs. ART experienced participants on gender, age, ethnicity, sexual orientation, partnership status, income, surrogate markers, and use of alcohol or recreational drugs. Although these preliminary findings suggest that the participants who decided not to start ART when they had a CD4 nadir below 350 cells/ μ l, were participants with a higher socioeconomic status, practicing health related behavior and still fairly healthy according to their surrogate markers and symptoms, it has to be noted that the number of ART-naïve participants in this study was too small to investigate the socio-demographic, medical and behavioral characteristics with sufficient statistical power.

2.1.6. Summary of the medical decisions regarding ART made over the past year

Five different decisions about ART over the past year were identified in the 79 participants: to change (28 of 79, 35%), to maintain (22 of 79, 28%), to stop (16 of 79, 20%), to restart (8 of 79, 10%) and not to start (5 of 79, 6%). All decisions about ART were considered on average as *much* or *very much* important: the decisions to take ART continuously were considered as more important than the decisions to interrupt ART, while the decision never to start ART was considered as maximal important ($F_{4,74} = 2.53^*$).

Surrogate markers were best in the participants who maintained the treatment regimen over the entire year (CD4 cells $F_{1,77} = 8.72^{**}$, viral load log $F_{4,74} = 5.76^{***}$, controlled for CD4 cells/ μl $F_{4,73} = 3.62^*$). Participants taking ART were more likely to have partner ($r = .31^{**}$), to have health insurance ($r = .26^*$) and not to use alcohol use ($r = -.30^{**}$) than participants not taking ART.

The majority of the participants (50 of 79, 63%) took ART continuously over the past year, as it is recommended in the treatment guidelines, but more than one third (29 of 79, 37%) did not take ART continuously over the past year:

One-third (24 of 79, 30%) interrupted treatment (restarted or stopped ART within the last year). The main reasons comprised of drug toxicity, drug resistance and preference for CAM. Social problems (substance use, lack of insurance, homeless) or pill burden were only single motives for participants to interrupt treatment, although participants who stopped treatment reported also significantly more health risk behavior (smoking chi-square = 7.33^{**}, df1, OR 7.21^{**} and alcohol use $F_{1,77} = 3.88^*$). The decision to interrupt treatment was mainly made by the patient (17 of 24, 71%).

Five ART naïve participants accounted for a small subgroup with a higher socioeconomic status (employment $F_{1,77} = 6.25^{**}$ and income $F_{1,77} = 5.98^*$). Four never started ART because they preferred CAM and wanted to avoid the potential toxic effects of ART. One never started because his immune-parameters were only marginally in the range where ART is recommended.

2.2. Reasons for the decision about ART (aim 2)

2.2.1. Meta-matrix of thematic fields, categories, category definitions and anchor examples

The qualitative content analysis of the interviews revealed 10 thematic fields, which were important reasons for the decision to take or not to take ART:

- CD4 counts and viral load
- HIV/AIDS symptoms
- Side effects
- Easy to take
- Resistance testing
- Beliefs about drug resistance
- Quality of life
- Spirituality or world view
- Body mind belief
- Complementary or alternative medicine

Each thematic field was classified by 3 raters (see methods p. 26) into different categories, which are summarized in table 6 and described below:

- *CD4 counts and viral load* were classified into three categories (important, partially important and not important) according to the importance of CD4 and viral load as criteria in the decision to take or not to take ART.
- *HIV/AIDS symptoms* were simply classified as experienced or not experienced according to the report of the participant. It is important to note that some participants did not have knowledge about HIV/AIDS related symptoms. Even if they reported CDC category B or C symptoms in the questionnaire, they were not aware that these symptoms were HIV related and did not take those into consideration in their decision about ART (see chapter 2.2.5., p. 111).
- *Side effects* were categorized according to their presence or absence. If they were present, the tolerance of the side effects was rated on a 4-point scale ranging from 1 = *very well* to 4 = *not well*. Further, all side effects participants reported spontaneously in the interviews, which have been relevant to their decision to take and not to take ART, have been listed. Additionally the raters categorized whether experienced or anticipated side effects were a reason to stop or to change treatment. This categorization was not applicable to participants who neither experienced nor anticipated side effects.
- The raters categorized whether the participants spontaneously emphasized that the antiretroviral regimen should be *easy to take*.

- For *resistance testing* the raters categorized whether a test was performed or not as well as the reported result of the test (if already available).
- The *beliefs about drug resistance* were categorized according to the idea of the participants about non-adherence as the cause of drug resistance. Some participants had no knowledge of drug resistance so that they were unable to state their beliefs about the cause of resistance.
- The perceived impact of the decision to take or not to take ART on *quality of life* was rated on a 3-point scale ranging from *negative* to *none/neutral* to *positive* for the following three domains: 1) health and physical function, 2) psychological and social function and 3) financial situation.
- Spirituality is conceptualized as seeking a connection to the sacred, but not necessarily through a specific religion (Ironson et al. 2002). In contrast, worldview is defined as a system of beliefs (other than spiritual beliefs or beliefs in body mind connection, e.g. scientific or optimistic worldview) that helps to shape the aspects of a Pearson's life (including medical decision-making) (Walsh & Middleton 1984, p. 32). In this thematic field the raters categorized whether either *spirituality or worldview* were important in the decision or not.
- For *body-mind belief* participants were classified according to whether they described spontaneously that they believed or partially believed in a body-mind connection. If participants believed that their body was controlled by a higher mind power (e.g., god) without contribution of their own mind, this was considered as a partial belief in body-mind connection by the raters.
- Finally all 79 participants were categorized according to whether they made a spontaneous statement about preference for *complementary or alternative medicine* or not.

Table 6: Meta-matrix of reasons for the decision made about ART: Thematic fields, categories, category definitions and anchor examples (n=79).

Thematic field	Categories	Category definition	Anchor examples
CD4 count/ Viral load	<ul style="list-style-type: none"> Important 	CD4 count and viral load are important criteria for the decision	I cannot sit and wait until viral load goes up and up. ...I would like to get to the point where my T-cells are at above 400.
	<ul style="list-style-type: none"> Partially important 	Only one of two criteria (CD4 or viral load) is important for the decision, but the other is not.	My understanding about T-cell count is, that this really does not really that mind much about the progress or non-progress of the disease. ... I need the medications to stop the viral replication, which is the only benefit that I receive from them.
	<ul style="list-style-type: none"> Not important 	CD4 count and viral load are not important criteria for the decision	They (CD4 & viral load) are numbers, and if I let those numbers drive me nuts, I'm the one that's going to be nuts.
HIV/AIDS symptoms	Experienced <ul style="list-style-type: none"> Yes No 	Rate if HIV-symptoms have been experienced	Yes: The type of symptoms I had, fatigue, night sweats, loss of appetite, I don't want to be bothered with this.
Side effects	<ul style="list-style-type: none"> Absent Present, tolerance 1) Very well 2) Well 3) Moderate 4) Not well 	If side effects are present, rate how well they are tolerated	1) I had a fall dream (on Sustiva), like if I was stoned. I enjoyed it actually, very much. 2) At the beginning I had a little bit of nausea, like normal, and felt kind of muscle aches, but they went away. ... Maybe my body adjusts to it. 3) At the beginning it was a little hard, but then it went away. I had a lot of stomach pain, but I was a little tough about it ... and kept doing the medicine. 4) (ART) was killing me. I was health bound from the stomach up so I had diarrhea and I lost twenty pounds.
	<ul style="list-style-type: none"> Type 	List all side effects	(see figure 23, p. 81)
	Anticipated <ul style="list-style-type: none"> Yes No 	Rate if side effects of medication are anticipated	Yes: I am glad that I did not jump on the bad wagon, because you know everyone having diabetes and neuropathy and lipodystrophy. I am the only girl, who is HIV and white, who still has a butt (laughs).
	Reason to stop/change <ul style="list-style-type: none"> N/A No Yes, change Yes, stop 	Rate if person states that experienced or anticipated side effects are a reason to stop or change ART	N/A: I haven't had any side effects. No: I had diarrhea and that was the most severe side effect. (I continued), because I have to take the medication that the doctor gave me. Yes, change: I blacked out (on ART), but they said it may be the nausea. That's another reason why I had to change, because I could have hit my head and killed myself. Yes, stop: I don't feel anything while taking it (ART). It is important, if at any time I start to develop side effects or whatever, it is my choice to stop taking it.
Easy to take	Easy regimen important <ul style="list-style-type: none"> Yes No 	Rate if person states, that it is important, that the regimen is easy to take	Yes: First of all I just wanted to get a loss less pills.

Thematic field	Categories	Category definition	Anchor examples
Resistance test	Resistance test <ul style="list-style-type: none"> • Present • Absent • Waiting for results • Not tested 	Categorize reported status of drug-resistance testing	Present: Results from a resistance test came back and it changed the medication ... based on the resistance test. Absent: (I have had a resistance test done). No, I don't have any resistance. Waiting for results: We will have the results from the resistance test. Not tested: I was thinking about a resistance test to see how well it is still working for me.
Beliefs about drug resistance	Causality belief <ul style="list-style-type: none"> • Yes • Possible • No • No knowledge 	Rate if person believes that non-adherence is a cause of resistance to ART, or does not know what resistance is.	Yes: (Being non-adherent) is like playing with fire. Possible: I think (resistance is) partly from not adhering to the regimen enough. I think it's more just the virus itself, mutates to fight it. No: My opinion on resistance is that, pretty much how my body is reacting to a certain drug, ... resistance is not just the virus mutating...I look at it as if your body is showing you a sign: "Hey! What you are putting into me is something very toxic... You gave me this and that is the end result or it." No knowledge: Resistance? What is that? Can I take it?
Quality of life	Impact (neg./none/pos.) <ul style="list-style-type: none"> • Health/physical function • Psycho-social function • Financial situation 	Rate which impact person mentions on each dimension of quality of life	Physical: I'm feeling miserable because of the drugs. It's not a good quality of life. Basically they're probably keeping me alive, and that's why I keep taking them. But if I stop them, I just feel so much better. Psychosocial: The medication, it gives me hope. Compared to when I first started I'm doing a lot more with people, with my Family, the before. Financial: Earlier would have been wrong, because I am trying to get a viatical supplement.
Spirituality/World view	Important <ul style="list-style-type: none"> • Yes • No 	Rate if spirituality or world view are important in the decision to take ART	Spirituality: You have to put god first and the medication a second. He (god) says in his words, acknowledge him and he would direct your path. ... He said to me in his voice, when he is talking to you, when I went to the doctor, and I say: "Hello, is this the best medicine? Help me to find something else that is better for me, because I do not want to take all these pills." Worldview: I am totally optimistic upon life, absolutely, in the most positive way. However science proved me wrong (my viral load was shooting up during drug holidays). I am still optimistic about new medication to bring it back to the level where I want it to be. I believe I am the most positive person in the world.
Body-mind belief	Present <ul style="list-style-type: none"> • Yes • Yes, partially • No 	Rate if person states a belief or partial belief in body-mind connection	Yes: With all my healers behind me who taught me the body's ability to heal itself ... I have even achieved undetectable viral load in the course of my study here. (She is ART naïve). Nobody even could believe it. So I did it once and I will do it again. Yes, partially: My believe is that God will work it out and I wouldn't have to take the medicine.
Complementary or alternative medicine	Preference <ul style="list-style-type: none"> • Yes • No 	Rate if person states to prefer complementary or alternative medicine	Yes: I did a lot of research and I found out, that if I build my immune system on its own I can do, what the drugs are attempting to do without the toxicity and the side effects.... I have been doing alternative, complementary therapy vigorously since that time period when I found out.

2.2.2. Descriptive statistics of the categories and inter-rater consensus

The descriptive statistics and inter-rater consensus of the categories for the reasons for the decision made about ART are summarized in table 7. For the categorization of importance of CD4 cells and viral load, experience of HIV symptoms, experience of side effects, importance of an easy to take regimen, resistance testing, knowledge/beliefs about resistance, quality of life, and preference for complementary or alternative medicine there was 100% consensus. In categories with disagreement of the three raters kappa (κ) was calculated for nominal variables. For ordinal variables Kendalls tau_b (τ_b) was calculated for each pair of raters (raters a-b, raters a-c, and rates b-c) respectively. For the categorization of tolerance and anticipation of side effects and importance of spirituality/worldview and body mind belief the values for κ or τ_b ranged between .97*** and .98***. If the three raters did not come to a consensus, it was always the case that two raters agreed and one disagreed. Therefore the modal category (which is what two raters agreed upon) was used for further statistical purposes.

Table 7: Reasons for decision made about ART: Categories, frequencies, percentages and consensus.

Thematic field	Categories	Frequency (%) (n=79)	Consensus (if < 100%: κ/τ_b of 3 raters)
CD4 count/ Viral load	<ul style="list-style-type: none"> Important Partially important Not important 	61 (77%) 8 (10%) 10 (13%)	79 (100%)
HIV/AIDS symptoms	<ul style="list-style-type: none"> Yes, experienced No, not experienced 	31 (39%) 48 (61%)	79 (100%)
Side effects	<ul style="list-style-type: none"> Absent Present, tolerance 	20 (25%) 59 (75%)	79 (100%)
	1) Very well 2) Well 3) Moderate 4) Not well	1 (1%) 15 (11.5%) 15 (11.5%) 40 (51%)	77 (98%) rater a-b: $\tau_b = 1^{***}$ SE.00 rater a-c: $\tau_b = .97^{***}$ SE.02 rater b-c: $\tau_b = .97^{***}$ SE.02
	<ul style="list-style-type: none"> Yes, anticipated No, not anticipated 	25 (32%) 54 (68%)	78 (99%) rater a-b: $\kappa = .97^{***}$ SE.03 rater a-c: $\kappa = .97^{***}$ SE.03 rater b-c: $\kappa = 1^{***}$ SE.00
	If experienced/anticipated <ul style="list-style-type: none"> N/A No reason to stop/change Yes, reason to change Yes, reason to stop 	12 (15%) 20 (25%) 24 (31%) 23 (29%)	78 (99%) rater a-b: $\kappa = .98^{***}$ SE.02 rater a-c: $\kappa = .98^{***}$ SE.02 rater b-c: $\kappa = 1^{***}$ SE.00
Easy to take	<ul style="list-style-type: none"> Yes, stated importance No 	46 (58%) 33 (42%)	79 (100%)
Resistance test	Geno-/phenotypic resistance <ul style="list-style-type: none"> Present Absent Waiting for result Not tested 	23 (29%) 6 (8%) 3 (4%) 47 (59%)	79 (100)

Continuation of table 7: Reasons for decision made about ART

Thematic field	Categories	Frequency (%) (n=79)	Consensus (if < 100%: κ/τ_b of 3 raters)
Beliefs about resistance (link non-adherence/ drug resistance)	<ul style="list-style-type: none"> • Yes • Possible • No • No knowledge 	40 (51%) 12 (15%) 4 (5%) 23 (29%)	79 (100%)
Quality of life (perceived impact of decision on quality of life)	1) Health/physical function	<ul style="list-style-type: none"> • Negative • None • Positive 5 (6%) 16 (20%) 58 (74%)	79 (100%)
	2) Psychosocial function	<ul style="list-style-type: none"> • Negative • None • Positive 12 (15%) 22 (28%) 45 (57%)	79 (100%)
	3) Financial situation	<ul style="list-style-type: none"> • Negative • None • Positive 76 (96%) 1 (1%) 2 (3%)	79 (100%)
Spirituality/ World view	<ul style="list-style-type: none"> • Yes, spirituality important • Yes, worldview important • No, not important 	38 (48%) 8 (10%) 33 (42%)	78 (99%) rater a-b: $\kappa = .98^{***}$ SE.02 rater a-c: $\kappa = .98^{***}$ SE.02 rater b-c: $\kappa = .96^{***}$ SE.03
Body-mind belief	<ul style="list-style-type: none"> • Yes, stated • Yes, partially stated • No, not stated 	28 (36%) 16 (20%) 35 (44%)	78 (99%) rater a-b: $\kappa = 1.00^{***}$ SE.00 rater a-c: $\kappa = .98^{***}$ SE.02 rater b-c: $\kappa = .98^{***}$ SE.02
Complementary or alternative medicine	Statement about preference <ul style="list-style-type: none"> • Yes • No 	13 (16.5%) 66 (83.5%)	79 (100%)

a) Importance of CD4 cells and viral load

In the rating of the interviews CD4 counts and viral load were considered as important in 61 (77%) of the 79 participants. Ten (13%) participants did not consider surrogate markers as important and 8 (10%) considered them as partially important in their decision to take ART or not (see figure 21).

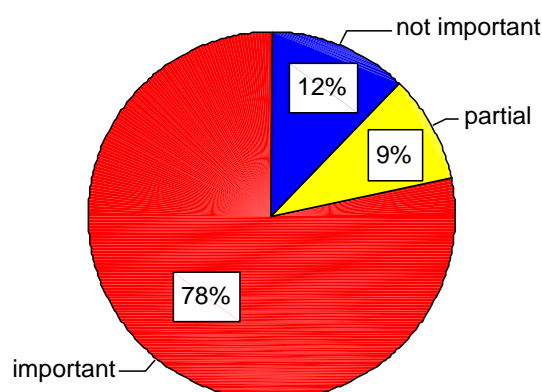


Figure 21: Frequency distribution of the importance of CD4 counts and viral load in the decision to take ART (n=79)

b) Experience of HIV-symptoms

Of the 79 participants 48 (61%) stated that they never experienced HIV/AIDS symptoms and 31 (39%) stated that they had experienced symptoms of HIV/AIDS in the past.

c) Side effects

Of the 79 participants side effects of ART were rated as present in 59 (75%) participants and as absent in 20 (25%) participants. As 5 of the 79 participants were ART naïve, side effects were present in 59 (80%) and absent in 15 (20%) of the 74 ART experienced participants.

With respect to the sum of reported side effects in the interview, one single side effect was reported in 31 (42%) of the 74 ART experienced participants, two side effects in 16 (22%) of 74 participants, three side effects in 6 (8%) of 74 participants, four and seven various side effects in 2 (3%) of 74 participants each, and one (1%) participant each attributed even eight and nine different side effects to ART (see figure 22).

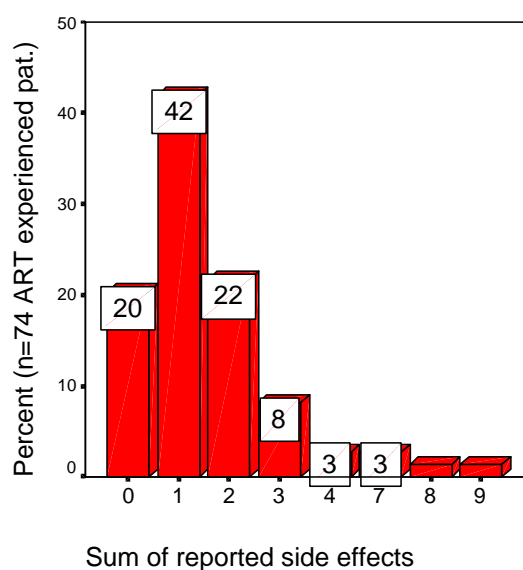


Figure 22: Frequency distribution of the sum of reported side effects of ART in the ART experienced participants (n=74).

The 74 ART experienced participants attributed 33 different side effects to ART (see figure 23). Nausea was the most common side effect, which was reported in 18 (24%) of 74 ART experienced participants, closely followed by diarrhea in 16 (22%) of 74 participants. Lipodystrophy was mentioned in 9 (12%) of 74 participants and peripheral neuropathy in 8 (15%) of 74 participants. One African American woman had obvious signs of lipodystrophy and had realized changes in body shape, but she was not aware that this was a side effect of ART. Another African American woman could barely walk due to her pain associated with her iatrogenic peripheral neuropathy. She never shared this problem with her doctor, although it occurred after she started ART. Both side effects were included in this list, although the participants did not attribute them to the medication. Skin rash, hepatotoxicity, lipoatrophy and fatigue were reported in 5 (7%) of 74 participants, poor appetite, muscle aches and cramps and nightmares were described in 4 (5%) of 74 participants, insomnia, hyperlipidaemia and anemia were reported in 3 (4%) of 74 participants, and kidney-stones

and agitation/restlessness were reported in 2 (3%) of 74 participants. Further, one (1%) participant each perceived forgetfulness, euphoria, sensitivity to smell, dry mouth, black-out, weight loss bone pain, palpitations, myocardial infarction, hypertension, polyglobulinaemia, neutropenia, idiopathic thrombocytopenic purpura, mastopathia, pancreatitis, headache and depression as a side effect of ART.

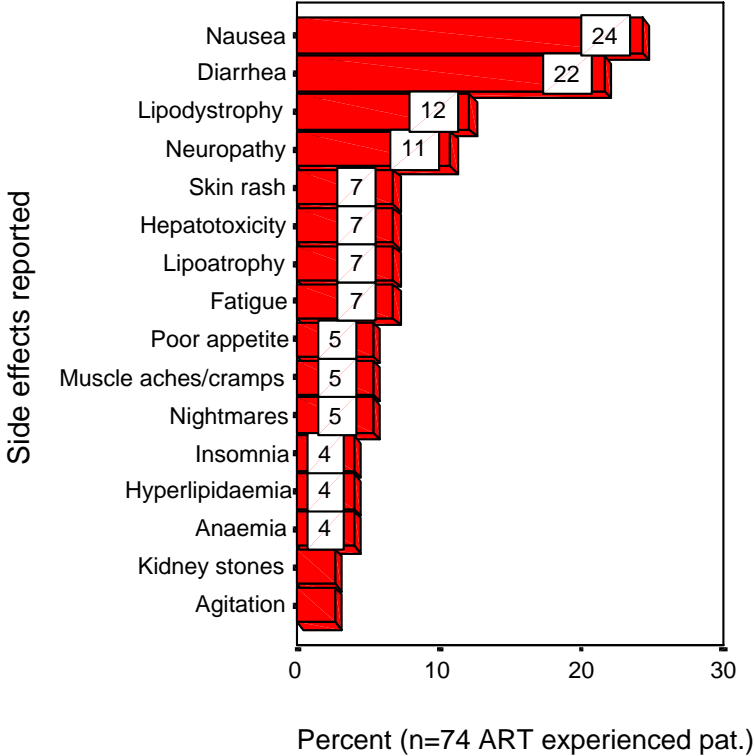


Figure 23: Frequency distribution of the types of side effects of ART reported by ART-experienced participants (n=74).

Although participants might have experienced side effects, they were sometimes tolerated well (see anchor examples table 6, p. 76). The tolerance of side effects in the 74 ART experienced participants was rated according to the description of the participants in the interview.

- Overall side effects were rated as *not well* tolerated in 40 (54%) of 74 participants, *moderately* in 9 (12%), *well* in 9 (12%) and even *very well* in 1 (1%), whereas 15 (20%) of 74 participants did not experience side effects and were rated as N/A (see figure 24). In other words, of the 59 participants experiencing side effects 68% were rated as tolerating them *not well*, 15% of 59 participants tolerated their side effects *moderately* well and 15% *well* and even as *very well* in 2% of 59 participants experiencing side effects. In this rating the consensus was only 98% as in 2 participants the raters disagreed in the rating of the tolerance levels according to the interview.

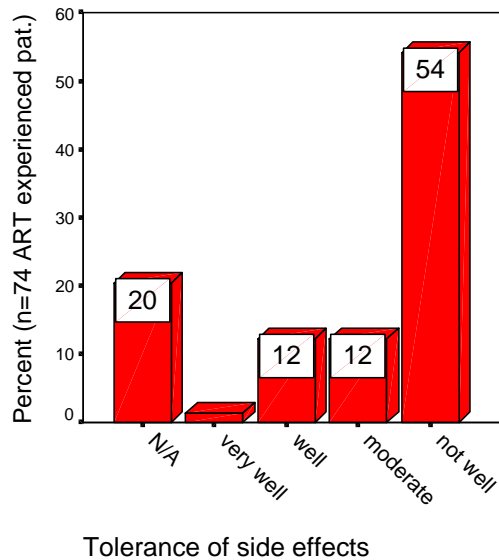


Figure 24: Frequency distribution of tolerance of side effects of ART in ART experienced participants (n=74). (N/A = no side effects experienced)

No anticipation of side effects was rated in 54 (68%) of the 79 participants, whereas anticipation of side effects was rated in 25 (32%) of the 79 participants.

- Of the 25 participants anticipating side effects, 15 (60%) reported both experienced as well as anticipated side effects, which were important in their decision. Ten 10 (40%) anticipated side effects although they never experienced side effects, but the anticipated side effects were important in their decision. In one case the raters disagreed on whether side effects were anticipated or not.

Of the 79 participants 5 (6%) were ART naïve and 7(9%) did neither experience nor anticipate side effects, although they were ART experienced. For this reason 12 (15%) of the 79 participants were categorized as N/A, as they could not be rated for the aspect if they would stop or change ART for experienced or anticipated side effects.

- Overall for 24 (31%) of 79 participants experiencing or anticipating side effects were a reason to change ART, and for 23 (29%) of 79 participants experiencing or anticipating side effects were a reason to stop ART. For 20 (25%) of 79 participants experiencing or anticipating side effects were not given as a reason to stop or change treatment (see figure 25). Of the 67 participants with experience or anticipation of side effects, side effects were a reason to change ART in 36% and a reason to stop ART in 34%, whereas 30% were prepared to maintain their treatment regimen despite experiencing or anticipating side effects. In one case the raters disagreed whether the anticipated side effects were a reason to stop or to change.

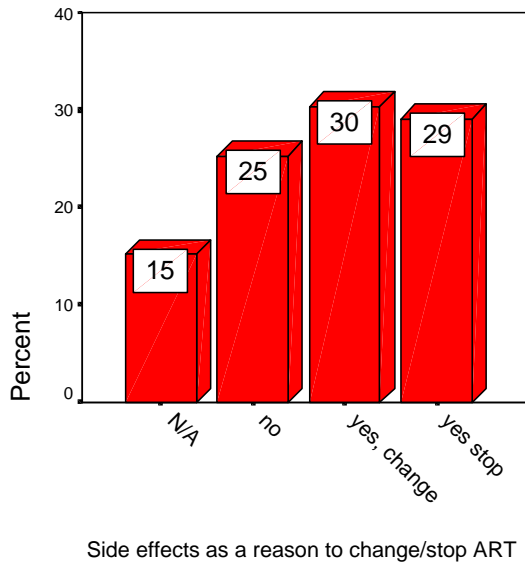


Figure 25: Frequency distribution of side effects of ART as a reason to stop/change ART (n=79) (N/A = ART naïve or not experiencing/anticipating side effects)

d) Easy to take regimen

A statement that it was important to have an *easy to take* was rated as present in 46 (58%) of the 79 participants and absent in 33 (42%) participants. Patients statements about the importance of an *easy to take* regimen was not significantly associated with the times daily they actually had to take their medication according to their prescription ($r = .07$, $p = .53$), but only 4 (7%) of the 58 participants on ART had to take their regimen more than twice daily.

e) Resistance testing

Being asked if they ever had a resistance test performed, 47 (59%) of the 79 participants reported that no resistance test has been performed and 32 (41%) reported that a resistance test has been performed. According to the participants' reports in the interviews geno- or phenotypic drug resistance was present in 23 (29%) and absent in 6 (8%) of the 79 participants. Three (4%) of 79 participants were waiting for the test result (see figure 26). Resistance was present in 23 (79%) and absent in 6 (21%) of the 29 participants who had a result of the resistance test (see figure 26).

Drug resistance

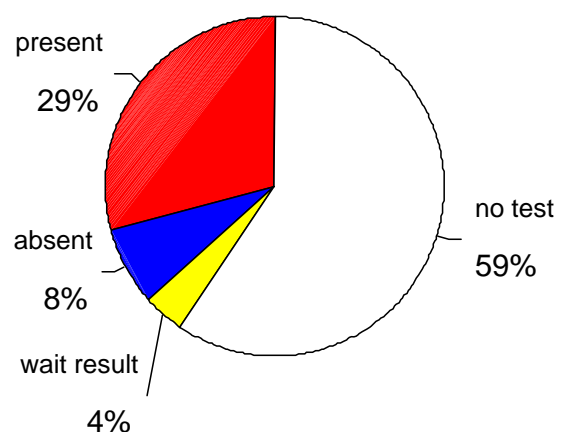


Figure 26: Frequency distribution of status resistance testing reported in the interviews (n=79)

The current DHSS Guidelines (2002) recommend resistance testing in PWHA receiving ART with failure to decrease viral load to less than 1000 copies/ml after 16 to 24 weeks. According to the DHSS guidelines resistance testing was recommended over the past year in 33 participants, as they had a viral load of more than 1000 copies/ml after more than 16 weeks on an antiretroviral regimen. Of the 33 participants fulfilling this criterion resistance testing was performed in 19 (58%), whereas 14 (42%) reported that they never had a resistance test performed (see figure 27).

Resistance tests in participants in which test is recommended

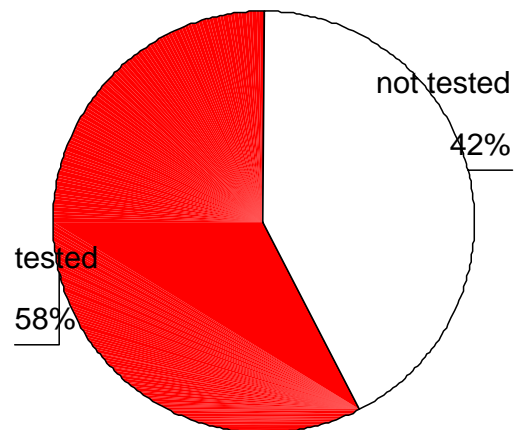


Figure 27: Performed resistance tests in participants in which resistance testing is recommended (viral load >1000 copies/ml after 16 to 24 weeks ART) (n=33).

f) Knowledge and beliefs about resistance

When asked to define drug resistance (“What is drug resistance?”) 56 (71%) of 79 participants could give a definition, whereas 23 (29%) were rated as not knowing what drug resistance is. Consecutively they could not give a self-reflected answer to the follow-up probe (“What is the cause of drug resistance?”) (see figure 28).

- Half of the 79 participants (40 of 79, 51%) were classified as believing that non-adherence is a predominant cause of drug resistance, 12 (15%) were rated as considering non-adherence as a possible cause and 4 (5%) did not believe that non-adherence is a cause of drug-resistance. Of the 56 participants who could define resistance 78% believed in causality between non-adherence and resistance, 27% believed in a possible causality, and 7% did not believe that non-adherence is linked to resistance.

Knowledge/beliefs about link between non-adherence and resistance

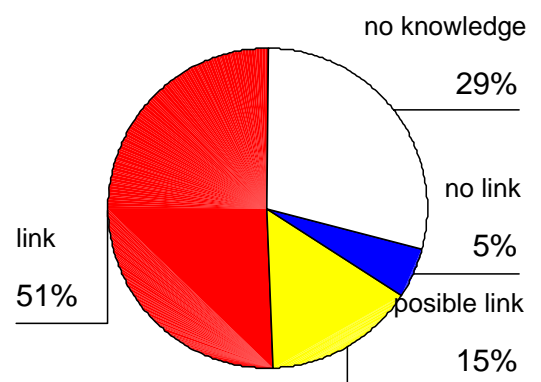


Figure 28: Frequency distribution of knowledge/beliefs about link between non-adherence and resistance (n=79)

Although at the end this categorization achieved 100% consensus, this classification went through a long process of continuous comparison until a cut off point was defined, when a participant was classified as having knowledge of resistance (see methods pp. 28-30).

Of the 74 ART experienced participants individuals with knowledge of resistance were more likely to be tested for resistance than participants with no knowledge of resistance ($r = .23^*$).

- Of the 51 ART experienced participants with knowledge of resistance 26 (51%) were tested for resistance compared to 6 (26%) of the 23 participants with no knowledge of resistance.

In the 29 participants where the result of the resistance test was available, there was no linear association between the knowledge/beliefs about resistance and the presence or absence of resistance.

- According to the interviews in all 5 participants without knowledge of resistance and in all 8 who believe in a possible link between non-adherence and resistance was present. Of the 15 participants, who believed that non-adherence causes resistance 10 (67%) reported presence of drug resistance and 5 (33%) absence of drug resistance. The one participant who did not believe in a linkage between non-adherence and resistance had no drug resistance.

g) Quality of life

Figure 29 shows the impact of the decision made about ART over the past year on health/physical function and psychosocial function as two domains of quality of life.

- The impact of the decision to take or not to take ART on health and physical function as a domain of quality of life was rated positive in 54 (78%) of 79 participants, whereas in 16 (20%) it was rated as no impact and in 5 (6%) the impact of the decision on health and physical function was rated as negative.
- For psychosocial function as a domain of quality of life the impact was rated positive for 45 (57%) and negative for 22 (28) of 79 participants, whereas no impact was rated in 12 (15%).

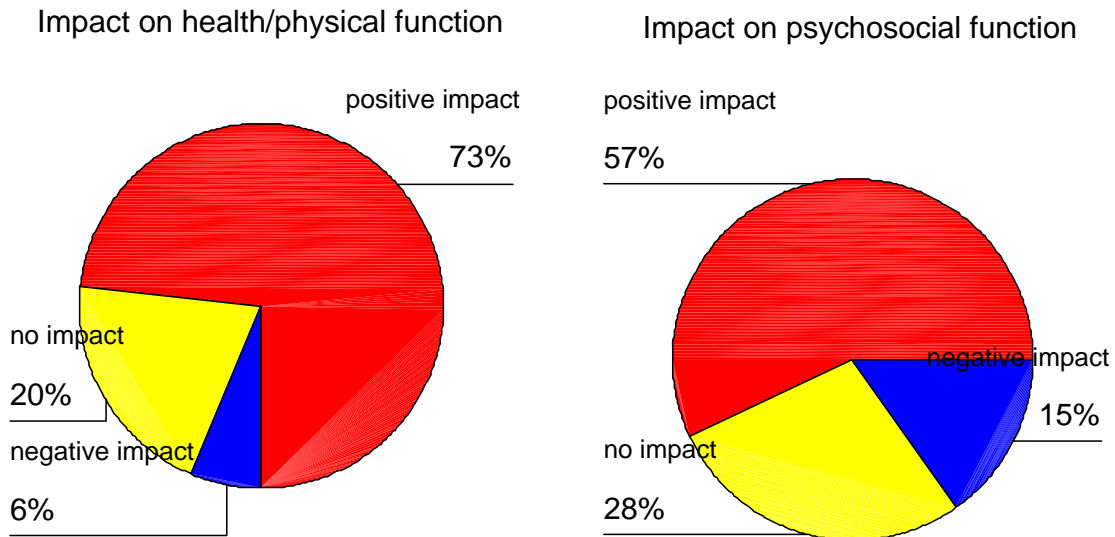


Figure 29: Frequency distribution of the impact of the decision made about ART over the past year on two domains of quality of life: health/physical function and psychosocial function (n=79).

The impact of the decision on health/physical function was not significantly concordant with the impact of the decision on psychosocial function (Kendall's $\tau_b = .15$, $p = .16$).

- Concordances in the direction of the impact were found in 36 (47%) of the 79 participants of whom 36 (46%) reported an improvement on both physical and psychosocial function and one (3%) a deterioration on both. The decision was rated as not making a difference on either physical or psychosocial function in 32 (40% of 79 participants), of whom 16 (50% of 32 participants) perceived no difference on psychosocial function, 10 (31% of 32 participants) no difference on physical function and 6 (19% of 32 participants) no difference on both, physical and psychosocial function. Discordances in the direction of the impact on physical and psychosocial function were found in 10 (13%) of 79 participants: in 8 (10%) the decision improved health but deteriorated psychosocial function and in 2 (3%) the decision improved psychosocial function but deteriorated health (see table 8).

Table 8: Cross-tabulation of the count of the impact of the decision about ART on quality of life (health/physical function x psychological/social function) (n=79)

Impact of the decision about ART on Quality of Life		Psychosocial function			Total
		negative impact	no impact	positive impact	
Health/physical function	negative impact	1 (1.3%)	2 (2.5%)	2 (2.5%)	5 (6.3%)
	no impact	3 (3.8%)	6 (7.6%)	7 (8.9%)	16 (20.3%)
	positive impact	8 (10.1%)	14 (17.7%)	36 (45.6%)	58 (73.4%)
Total		12 (15.2%)	22 (27.8%)	45 (57.0%)	79 (100%)

Table 8 also illustrates that the decision about ART had a positive on impact on either on physical or psychosocial function 67 (85%) of 79 participants. Only 12 (15%) participants the decision about ART had neither a positive effect neither on physical nor on psychosocial function according to the ratings of the interviews.

The decision had no influence on the financial situation in 76 (96%) of 79 participants. Only in 2 (3%) of 79 participants it had a positive impact and in one (1%) a negative impact. This third dimension was only integrated as an aspect of quality of life, as it appeared in 2 of the first 21 interviews rated. Looking at the 79 participants the decision made about ART does not seem to have a major impact on the financial situation of the participants.

h) Spirituality or worldview

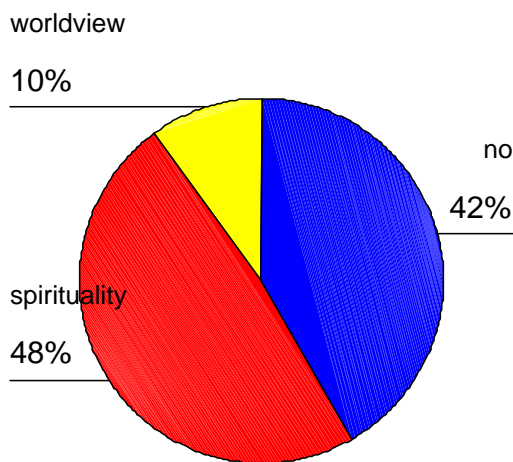
Spirituality was rated as important in the decision to take or not to take ART in 33 (42%) of the participants and worldview in 8 (10%) of 79 participants, whereas in 33 (42%) spirituality and worldview were both not important. In one participant the raters disagreed whether worldview was important or not (see figure 30).

i) Belief in body-mind connection

A spontaneous statement about a belief in body mind connection was rated in 35 (44%) of 79 participants, a partial belief in 16 (20%) participants, whereas 28 (35%) did not make a spontaneous statement about a belief in body-mind connection (see figure 30).

The belief in body-mind connection was significantly strongly correlated with the importance of spirituality/worldview in the decision ($r = .60^{***}$).

Importance of spirituality/worldview



Body mind belief

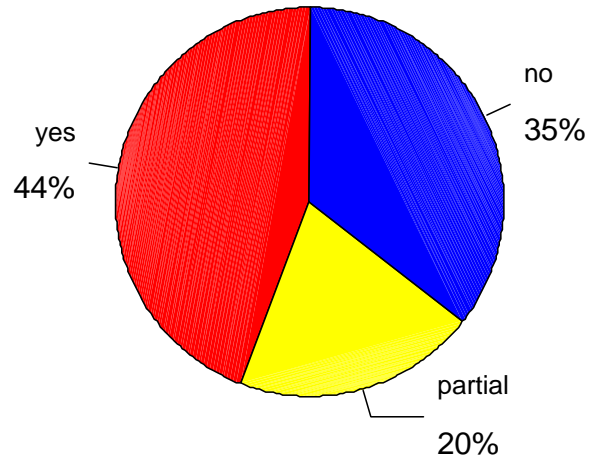


Figure 30: Frequency distribution of the importance of spirituality/worldview and body mind belief in the decision about ART (n=79)

j) Complementary or alternative medicine

According to the rating of the interviews a spontaneous statement about a preference for complementary or alternative medicine (CAM) was made in 13 (16%) of 79 participants, whereas 66 (84%) did not make a spontaneous statement a preference for CAM (see figure 31).

The preference for CAM was significantly correlated with a body-mind belief ($r = .34^{**}$) and the importance of spirituality/world view ($r = .24^*$).

Preference of alternative/ complementary medicine

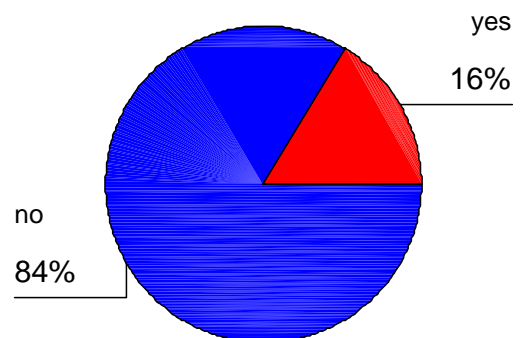


Figure 31: Frequency distribution of a spontaneous statement about a preference for complementary or alternative medicine in the interview (n=79)

2.2.3. Individual reasons not captured in the categorization

Some reasons in the decision made about ART applied only for single individuals and under special circumstances, so that they were not captured in the categorization. They will be described in the following passages.

a) Communication problems: A 44-year-old homosexual Caucasian man, living with his lover and working part time as a sales person, was diagnosed with HIV 8 years ago. He started ART based on the information from the doctor that he had Kaposi's sarcoma (KS). Being classified as an AIDS patient he felt the need to start HAART although he preferred complementary or alternative medicine: *"Well, when I really looked at the situation, I felt like it helped, possibly with the KS, which is really the only reason, why I started them. But I was getting a lot of side effects that I didn't like. For instance, anemia, low white blood cells, at one point I was scared that I had a cyst or even breast cancer because there was a huge lump in my chest. So the doctor had me go to the breast cancer treatment center at Jackson hospital, where they basically stuck a needle in ...just to test it. And I'm very happy to say that it came back cancer free and cyst free, but what the doctor told me was that I had breast buds. I was growing breasts. She this is the same feeling that a 12 or 13 year old girl developing breasts would feel. Very, very sensitive, nipples all the time, like very sensitive and sore. She said that it was directly related to taking the medication, and it wasn't the first time she'd seen that."* His severe anemia and neutropenia required treatment with erythropoietin and neupogen. The participant listed many other side effects, which he attributed to ART, such as lipodystrophy, lipoatrophy, pancreatitis, nightmares and agitation/restlessness. Later the HIV treating physician did send a report of a gastroscopy, which did not confirm the diagnosis of a KS. Therefore the doctor was called to verify the diagnosis of the category C symptom. On the phone the doctor revealed that the patient has been told by the gastroenterologist, that he had a lesion that looked like a fading KS. The patient himself was not consented that he never had a KS. At the interview the patient had stopped ART without consulting his doctor.

b) Social comparison: Sometimes participants based their decision about ART on social comparison with other people living with HIV, such as a 38-year-old homosexual Hispanic man, living alone and working full-time as a massage therapist. He was diagnosed with HIV 16 years ago (CD4 nadir 172 cells/ μ l) and had 176 CD4 cells/ μ l and 45,825 viral load copies/ml at the interview but is still ART naïve: *"I see, what the medicines do to other*

people. What really made me want to stop treatment was when my cousin passed away, and my friends passed away, and they were taking a lot of medication.”

- c) Loss of insurance:** The 40-year-old heterosexual African American father of a 13 year old daughter, who is raising his child with HIV-positive girl-friend, was forced to stop medication: *“It wasn’t a decision I made because it was the insurance, they didn’t want to put the insurance to cover it back on. If I was able to get the medication, I would be taking it. But I’m not able to receive it right now. Cause I can’t afford it.”* He reported that he spoke to his doctor about this situation, but the doctor did not react, although the participant is living on disability and qualified for Ryan-White insurance (which is a welfare institution covering costs for medication in people living with HIV who have a low income). He was diagnosed with HIV 13 years ago (CD4 nadir 25 cells/ μ l) and had 45 CD4 cells/ μ l with a viral load of 16,173 at the interview.
- d) The mom factor:** A 44-year old homosexual Hispanic man, living on disability, not having a partner but living with a roommate, has been diagnosed with HIV 11 years ago (CD4 nadir 189 cell/ μ l). Currently he has 302 CD4 cells/ μ l and 8.337 viral load copies/ml but is not tested for resistance. He maintained ART over the past year: *“To me they’re poison, I feel like I’m putting poison in my body. I mean I know basically they’re probably keeping me alive, and that’s why I keep taking them. But if I stop them, I just feel so much better. I have more energy. So I know the medicines have an effect on me, and I know I need them to keep the virus in check, but it also, they just don’t make me feel good. They make me feel pretty crappy most of the time. I guess one of the main reasons I do it still, is what I call the “mom factor.” After my dad died, she was so broken up, that I just determined I have to stay as healthy as I can to make her feel better, cause I know it would kill her to loose a child.”* He never spoke about the mom factor with his doctor.
- e) The empowerment of saying no:** A 41-year-old African-American homosexual man, currently unemployed and living alone, was diagnosed with HIV 14 years ago. He never started ART despite a CD4 nadir of 225 cells/ μ l: *“I think it gave me a sense of respect for my own opinions. And it, it sort of empowered me because I didn’t, per say, look at the doctors and say, “Well they know what’s best.” I took a look at what was going on in my own life, especially as far as my eating habits, my exercise habits, and uh, just also, just everything that was going on with me, and I felt that my life was pretty balanced. And I was doing very healthy things to keep myself in great health. So it just gave me a sense of empowerment to be able to, to say that I really have to decide this because I’m the one who’s living with it, and even though doctors are saying do this and that, do you want to really just rely on their, what they have to say, and not take what you, what you feel is*

best, cause I do listen to my doctor. And I go to various seminars, but I don't take everything as gospel what doctors say, you know, so. For me it was just about still having a sense of, a sense of ability to, to say no, even though doctors may say yes." At the interview he had 400 CD4 cells/ μ l and a viral load of 6,573 copies/ml.

- f) Attitude towards death:** A 60-year-old homosexual African American man, full-time employed teacher and artist, who was diagnosed with HIV 7 years ago and has never been on ART despite that he has currently 85 CD4 cells / μ l and 79,374 copies/ml viral load stated in the interview: *"I had decided that death was inevitable. So if death was in my front door, accept it. And if you should survive death beyond what everybody was saying, because HIV was a death sentence; it still is for most people. My decision not to take HIV drugs was based on the fact that God could or would kill me. I've written a book, which is, "that's the end", it will never be that way, because tomorrow will be something different, you know, if we had to decide that, we wouldn't stay on boats, we wouldn't be flying. It's a progression. The more knowledge we have, the more we are able to. Nothing is an ultimate. And I proved that. I proved that just by not taking medication."* Another 52-year old Caucasian homosexual man, fulltime working as a realtor and living in an open relationship was diagnosed with HIV 16 years ago (CD4 nadir 60 cells/ μ l). Over the past year he agreed with his doctor's suggestion to interrupt ART in order to avoid the potential interactions with his required treatment for syphilis. At the interview his CD4 cells were at 584-cells/ μ l with an undetectable viral load. He explained based on his Jewish religion: *"I believe that life is something sacral, and that to throw it away unnecessarily, if there is such a thing as a sin, it has to be a sin. Yeah, I mean I absolutely believe, that not taking the best treatment you can, is a kind of suicide and I believe that is wrong."*
- g) US immigration restrictions:** A 48-year-old homosexual Hispanic man, working full-time in catering, diagnosed with HIV 15 years ago, postponed to start HAART, even though he had 222 CD4 cells/ μ l and HIV wasting, because he was afraid of entry restriction in the US for people living with HIV: *"And I let the time go on and in the end of the year I had the chance to come to America. And I did not want to get here with medication, because I did not know, how it was, the custom. And I was worried about that. I spoke to my doctor and she said: Well, wait until you get there. And when you get there, you have to start your medication."* And when I came here, I went to the doctor and I have to do it all over again. I have to test, you know, what I mean? I could not say: *"I am HIV positive."* I had to prove it. He changed his ART over the last year and had 717 CD4 cells/ μ l and an undetectable viral load at the interview.

- h) The peer educator:** A 46-year-old heterosexual single Hispanic woman, diagnosed with HIV 3 years ago, is now working full time as a peer educator: *“The reason why I’m out in the field, is because at the beginning the doctor was giving me like 26 pills a day, and making me feel like pieces of dirt. So that is why I said, no, this is not going to happen to me. I’m going to see why he is giving me 26 pills; that is why I went into the field, I wanted to educate myself. Now I know that one pill can be enough. So I want to know why one pill can be enough, what is the side effect, what is good for me, what is bad for me, everything. So I share this with Dana, who is my doctor, and she is going to say, well this is this and this, and she is going to present the pros and cons, and I will say okay this has more pros, less cons, what do you think about it, well lets stick with this, that’s how it is.”* She had a CD4 nadir of 184 cells/ μ l and had 250 CD4 cells/ μ l and 26,085 viral load copies/ml at the interview, despite that drug resistance was absent in the resistance test and she maintained the same treatment.
- i) Parenting:** A 29-year-old African American mother of three children (7, 8 and 13 years old) is a single parent, separated from the father of the children and currently also a student. She had 623 CD4 cells/ μ l and an undetectable viral load at the interview maintaining the same combination over the last year. She was diagnosed with HIV 7 years ago and her motive to start ART with 350 CD4 cells/ μ l was: *“I also have three children that I need to be here for. They know nothing about it.”*
- j) Social stigma:** A 37-year-old homosexual Hispanic man, who is living with his lover and full time working as a salesperson, feels very ambivalent about the decision to restart a treatment regimen, which was selected according to the results of a resistance test. He was diagnosed with HIV 12 years ago (CD4 count nadir 300 cells/ μ l) and had 398 CD4 cells/ μ l with an undetectable viral load at the interview. The reason for his ambivalence is the stigma of he perceives through his facial lipoatrophy: *“Well, I have been very, very conscious of it. I guess almost every day, when I look into the mirror; I keep hoping that my face will look bigger, like it did before. There are time, when I am, when I go to the gym, or when I am in a social environment, that I feel self-conscious and I wonder, if people will notice and people will say: “Oh, he is HIV.” Because they can tell from my face. It is something new. I have been dealing with that in the last year. The change is, when I look at my face in the mirror, I am reminded of the HIV.”* He broke out into tears and cried for a longer period of time, when he described his feelings during the interview, but he never shared these concerns with his doctor.

- k) Running out of options:** A 42-year old Asian homosexual man, working full-time as a paralegal, living in an open relationship, has been diagnosed with HIV 17 years ago (CD4 nadir 110 cells/ μ l). He changed his treatment over the past year and had 263 CD4 cells/ μ l with a viral load of 152,175 copies/ml. Although he is aware that non-adherence can cause resistance he said: *“We do that (resistance test), I think at least twice a year. Ah, it was resistant to pretty much everything except the Videx. So that’s the point which we decided, that we want to make a change and see what happens, because it didn’t seem like there was, there weren’t too many alternatives left.”* He did not share his reasons for non-adherence with his doctor: *“No. I didn’t need to, because it’s a, the only time I miss, is if I, it’s usually the first dose in the morning, which I might sleep through, so the only problem that tells me is that I need to get more sleep, and I can take care of that myself.”*
- l) Waiting for T-20:** A 52-year-old Hispanic homosexual man, single and unemployed, was diagnosed with HIV 17 years ago (CD4 nadir 46 cells/ μ l). At the interview he had stopped treatment with 97 CD4 cells/ μ l and 72,793 viral load copies/ml: *“I was resistant to just about everything except for 2 meds which I don’t recall what they were, but there are only 2 meds to which I show possible reaction to. So at that point my doctor and I decided that, well, the only choice I had, I had several choices: one of them would be to get on those two meds and one other thing that didn’t really, that I was already resistant to, to keep kind of better place as far as the viral load or hold of and not use those meds until T20 was available to me, since my numbers were so bad there was little doubt that I would qualify, I mean that I wouldn’t qualify. Basically the decision to stop taking meds was in order to wait for the new med to come along, that was relieved, you know, in 99.9% of the reasoning.”*
- m) Hepatitis B:** A 40-year-old Caucasian man, single, living with his parents, part time employed as army reserve, was diagnosed with HIV 12 years ago His hepatitis B co-infection was diagnosed 3 years ago. He restarted ART at a CD4 nadir of 52 cells/ μ l after 28 months treatment interruption. At the interview, his HIV viral load was 40,831 copies/ml and the CD4 count 109 cells/ μ l. However, the main reason to start ART was his hepatitis B viral load, which was greater than one million copies/ml: *“I thought it was time. It was a lot of things coming together. My friends were getting on me; my doctor said I had to do something about the hepatitis, because he didn’t want the hepatitis to progress. I am in stage two right now, as far as my liver is concerned. He was threatening me. He said: “You know you are going to die if you don’t treat the hepatitis. And the Viread helps HIV and hepatitis. I felt as if I didn’t do it, they would give up on me. My*

doctors would give up. ...I did not want my doctors to think that I was irresponsible. Well, also I did not want to progress, because I knew that just talking to my physician, that if the viral load did progress, there may be a time were I couldn't be treated." We are talking about my liver." Although he recognized from his pale face and his blood work, that his anemia got worse despite treatment with erythropoetin, he did not share his concerns regarding his medication with his doctors. He tried not attributing the anemia to the medication: "My main symptom is fatigue. Everything else is fine. I guess it is having so little T-cells. Because I noticed, when my T-Cells dropped below 400, I had fatigue forever. So they tell me it is my system fighting the virus that makes me tired. That is the only thing I can think of. Now I have the anemia. I am afraid to say, I am afraid to think that might be the medicine that I am taking. So I still want to face it. Because I can almost cope with the anemia. Almost, not really. Do the basic essentials that I would like to do." He complained about shortness of breath and was not able to climb stairs due to his iatrogenic anemia. Even through slightest physical strain (e.g., getting up from the chair) he felt heart palpitations. Although he always consulted four different doctors at the same time, none of them was aware of the severity of his side effects. The interview supported him to reflect his situation. Immediately after the interview he visited one of his doctors and ended up in the emergency room with a hemoglobin level of 5.4 mg/dl. After blood transfusions and a further treatment interruption he recovered from his symptoms.

2.2.4. Relationships between the reasons for the decision and the decisions made about ART

The following passages will examine for each reason whether it is associated with the decision to take ART or not to take ART. Further, the relationships between the reasons for the decision and the decision to maintain, change, restart, and stop or not to start ART will be analyzed. Additionally case-presentations will be used to illustrate the relationships between the reasons for the decision and the decision made about ART.

a) Associations between the importance of CD4 counts and viral load and the decisions made about ART

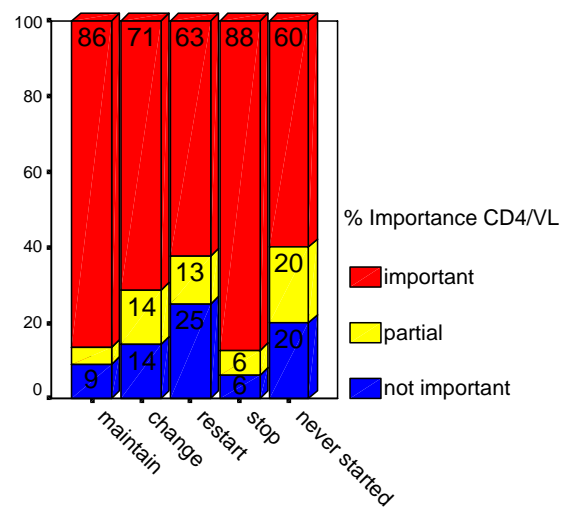
The decision to take ART or not was not significantly correlated with the importance of CD4 counts and viral load ($r = .06$, $p = .60$). Further, there were no significant differences in the importance of surrogate markers between the decisions to maintain, change, restart, and stop or not to start ART ($F_{4,74} = .94$, $p = .45$) (see figure 32).

Of the participants currently taking ART:

- In the 22 participants deciding to maintain ART CD4 counts and viral load were important in 19 (86%) participants, partial important in one (5%) participant, and not important in 2 (5%) participants.
- In the 28 participants deciding to change ART 20 (71.4%) participants considered surrogate markers as important, and 4 (14.3%) each as partially important or not important.
- In the 8 participants deciding to restart 5 (62.5%) did consider surrogate markers as important, one (12.5%) as partially important and 2 (20%) as not important.

Of the participants currently not taking ART:

- In the 16 participants deciding to stop surrogate markers were important in 14 (88%) participants, and for one (6%) each partially important or not important
- and in the 5 participants deciding not to start important in 3 (60%) and not important in 1(20%) each.



Decision about ART over past year

Figure 32: Relationship between the decisions made about ART over the past year and the importance of CD4 counts and viral load in this decision (n=79).

Although all participants had a CD4 nadir of ≤ 350 cells/ml in which case ART is recommended based on surrogate markers according to the current treatment guidelines (DHSS guidelines 2002) it is interesting to note that participants who decided not to take ART despite their surrogate markers did not consider surrogate markers as less important than participants who decided to take ART in line with the recommendations of treatment guidelines. The following citation of two participants considering surrogate markers both as important in their decision, but one taking ART and one ART naïve, illustrate how the knowledge and critical attitude towards treatment guidelines might explain why equal importance of surrogate markers may lead in one individual to the decision to take ART and in another not take ART despite both fulfill the surrogate marker criteria to recommend treatment:

- A 37-year old Caucasian heterosexual single woman, working full-time as an HIV-service provider, has been diagnosed with HIV 8 years ago. She is still **ART naïve**, asymptomatic, and had 279 CD4 cells/ μ l with a viral load of 27,020 copies/ml at the interview. She stated: *“My lowest (CD4) count was about 239. We were basically looking on the viral load. It has always been quite low, meaning like anywhere from 7 to under 20.000. When my friend died, it shot up to 42.000 and my T/cells dropped to 239. So we weren’t making any decisions based on that situation... and obviously I am doing what is right; because now they keep lowering the guidelines to even start meds at 200 T-cells. To see there is no difference between 200 and 350. I might as well wait a little bit longer.”* She just came back from the World AIDS Conference in Barcelona 2002 and referred to an announcement of the International AIDS Society (Yeni et al. 2002) to update treatment guidelines, as it has not yet been proved that early is better than deferred therapy and that one should start therapy when the CD4 count reaches 200 cell/ μ l.
- A 47-year old African-American heterosexual divorced woman, living on disability, has been diagnosed with HIV 9 years ago (CD4 nadir 320 cells/ μ l). She decided to **maintain ART**, despite being asymptomatic, having 921 CD4 cells/ μ l and an undetectable viral load at the interview: *“Because everything was good, T-cells high and viral load low, so I figured if its not grope, why fix it? To me it’s simple, you know, I’m used to it, for me it’s working.”*

b) Associations between the experience of HIV-symptoms and the decisions made about ART

Taking ART or not was significantly inversely correlated with the experience of HIV/AIDS symptoms ($r = -.22^*$). *Participants taking ART reported less experience of HIV/AIDS related symptoms.*

- Of the 21 participants not taking ART 12 (57%) reported the experience of HIV/AIDS symptoms and 9 (43%) did not.
- Of the 58 participants taking ART 19 (33%) reported the experience of HIV/AIDS symptoms and 39 (67%) did not.

According to the interviews there were no significant differences in the experience of HIV/AIDS symptoms between the decision to maintain, change, restart, and stop or not to start ART ($F_{4,74} = 1.67, p = .17$). It has to be taken into account that HIV/AIDS symptoms are underreported in the interviews. Some participants did report in the interview that they never experienced HIV/AIDS symptoms, although they stated differently in the HIV/AIDS symptom checklist (see chapter 2.2.5., p. 111).

c) Associations between the side effects of ART and the decisions made about ART

In the 74 ART experienced participants the decision to take ART or not was significantly related with the experience and tolerance of side effects ($r = -.26^*$). *Participants taking ART did tolerate side effects better and reported less experience of side effects.* There were significant differences in the experience and tolerance of side effects between the decisions made about ART (i.e., to maintain, change, restart, stop or not to start ART) ($F_{3,70} = 3.01$) (see figure 33).

- In the 22 participants deciding to maintain ART side effects were experienced in 14 (64%) participants, followed by 6 (75%) of the 8 participants deciding to restart ART. In the 28 participants deciding to change ART 24 (86%) perceived side effects and in 16 participants deciding to stop ART even 15 (94%) experienced side effects.

Overall 59 participants experienced side effects.

- Seven (32%) of 22 participants maintained ART despite not tolerating the side effects well. The tolerance of side effects was an important factor in the decision to change or interrupt ART. In the decision to change 15 (54%) of 28 participants did not tolerate side effects well, compared to 5 (63%) of 8 participants who restarted ART and 13 (81%) of 16 participants who stopped ART.

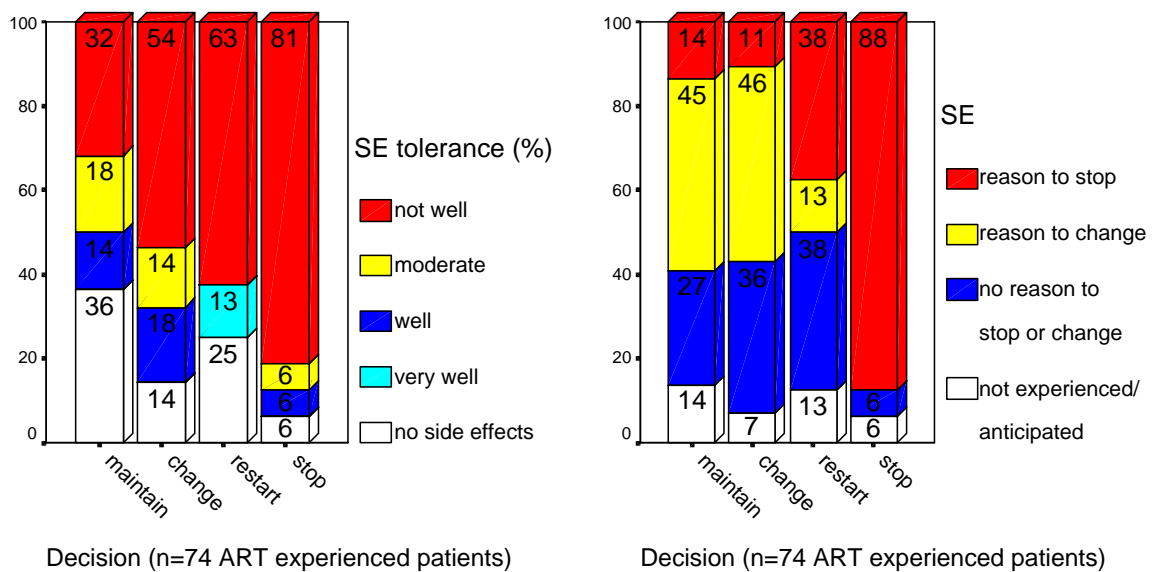


Figure 33: Relationship between the decisions made about ART over the past year and the experience/tolerance of side effects of ART and changing/stopping ART due to experienced/anticipated side-effects in ART experienced participants (n=74).

Analyzing the interviews of the 74 ART experienced patients, significant differences were found between the decisions about ART (i.e., to maintain, change, restart, stop or not to start ART) and changing/stopping ART due to experienced or anticipated side effects of ART ($F_{3,70} = 6.13^{***}$) (see figure 33).

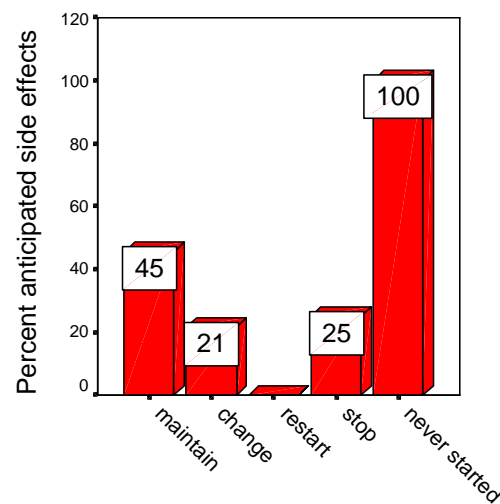
- In the decision to stop ART, 14 (88%) of 16 participants did stop ART because of side effects, and only in 2 (12%) side effects were not the reason to stop (one of which because he did neither experience nor anticipate side effects).
- In the decision to restart 3 (38%) of 8 participants restarted despite side effects, but another 3 (38%) would stop ART again if side effects occur, only one (13%) would change ART for this reason, and another did neither experience nor anticipate side effects.
- In the decision to change side effects were the reason in 13 (46%) of 28 participants and even 3 (11%) would stop if side effects were severe, but 6 (36%) would neither stop nor change because of side effects and 3 (11%) did not experience or anticipate side effects.
- In the decision to maintain 3 (14%) of 22 participants would stop for side effects, 13 (45%) would change, but 6 (27%) maintained treatment despite experiencing or anticipating side effects and 3 (11%) did not experience or anticipate side effects.

Although there was no significant linear association between the anticipation of side effects and taking vs. not taking ART ($r = -.05, p = .20$), there were significant differences in anticipation of side effects between the decisions about ART (i.e., to maintain, change, restart, stop or not to start ART) in the 79 participants ($F_{4, 74} = 5.51^{***}$) (see figure 34).

- According to the rating of the interview all 5 ART naïve participants did not start ART because they anticipated side effects. In contrast none of the 8 participants restarting ART took anticipated side effects into account. Ten (45%) of 22 participants decided to maintain ART despite anticipated side effects, whereas anticipated side effects were considered in 4 (25%) of 16 participants in the decision to stop ART and in 6 (21%) of 28 participants in the decision to change ART.

As noted above, the participants interrupted or changed ART mainly because they already had experienced side effects of ART, which partially explains why the participants who

restarted, stopped or changed ART anticipated less side effects.



Decision about ART over past year
 Figure 34: Relationship between the decisions made about ART over the past year and the anticipation of side effects of ART (n=79).

Although participants who decided to take ART at the interview perceived on average less side effects and tolerated side effects better than participants not taking ART, there is an interesting contrast: Some individuals continued the same regimen despite tolerating side effects not well; others did not start ART in anticipation of side effects they never experienced:

- A 38-year-old Hispanic homosexual single man, working full-time as a massage therapist, has been diagnosed with HIV 16 years ago. He **never started ART** and is asymptomatic, although he had his CD4 nadir with 116 CD4 cells/ μ l and 45,825 viral load copies/ml viral load at the interview: *“Because I don’t like the side effects of medication, physical, wasting away. It just changes your body. I have been weighing the consequences and I think the medication would do more harm to me than good at this point. Actually, I’m pretty healthy.”*
- A 44-year-old Caucasian homosexual single man, living on disability, has been diagnosed with HIV 15 years ago (CD4 nadir 60 CD4 cells/ μ l). He had HIV associated Category B symptoms in the past (but not over the last 6 months). At the interview he had 534 CD4 cells/ μ l and an undetectable viral load. Due to treatment failure he changed ART 6 months ago based on resistance testing and continued ART despite he did not tolerate the new treatment well: *“It (ART) was killing me. I was health bound from the stomach up so I had diarrhea and I lost twenty pounds. And the problem was that it was working, because prior to that I had gone through five other combinations, which weren’t working, they had horrible side effects and they weren’t working. So this one had horrible side effects, but it was working, so I had to find a way with my doctor that I could tolerate this.*

d) Associations between the importance of an easy-to-take regimen and the decisions about ART

The decision about ART (i.e., to maintain, change, restart, stop or not to start ART) was not significantly associated with the importance of an easy to take regimen ($F_{4,74} = 1.69$, $p = .16$). Some participants emphasized that it was especially important to them to have a regimen that is easy to take:

- In the decision to maintain ART in 11 (50%) of 22 participants, in the decision to change ART in 17 (61%) of 28 participants, in the decision to restart ART in 7 (88%) of 8 participants, in the decision to stop ART in 10 (63%) of 16 participants and in the decision not to start ART in one (20%) of 5 participants.

It is important to note that most of the participants were already on an easy to take regimen (see chapter 3.3.1., p. 200).

e) Associations between the resistance testing and the decisions made about ART

The decision about ART (i.e., to maintain, change, restart, stop or not to start ART) was not significantly related to the performance of resistance testing ($F_{3,70} = 1.52, p = .22$) (see figure 35). According to the interviews none of the ART naïve participants was tested for resistance. Of the 74 ART experienced participants resistance testing was not performed in 45 (61%) participants:

- In the decision to maintain ART in 15 (68%) of 22 participants, in the decision to change ART in 13 (46%) of 28 participants, in the decision to restart ART in 3 (38%) of 8 participants, and in the decision to stop ART in 11 (69%) of 16 participants.

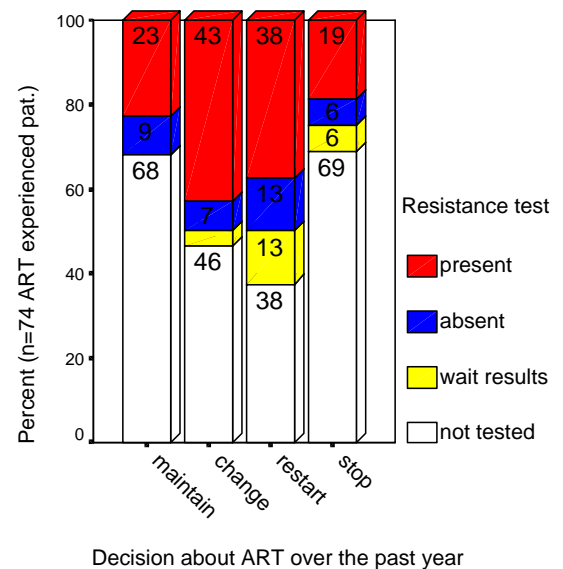


Figure 35: Relationship between the decisions made about ART over the past year and the status of resistance testing in ART-experienced participants (n=74).

According to the DHSS guidelines (2002) resistance testing was recommended over the past year in 33 participants, as they had a viral load of more than 1000 copies/ml after more than 16 weeks on an antiretroviral regimen. Also in the 33 participants in which resistance testing was recommended over the past year according to treatment guidelines the decision about ART was also not significantly related with performance of resistance testing ($F_{3,29} = .43, p = .73$).

Nevertheless the presence of drug resistance (79%, 23 of the 29 participants who had the results of a resistance test) had an enormous impact on the treatment decision in all participants who had drug resistance:

- Five (23%) of the 23 participants reported presence of drug resistance and had already changed their treatment according to the resistance profile more than a year ago and maintained an ART regimen tailored to results of resistance testing over the past year.
- Twelve (43%) of the 23 participants changed ART over the past year because resistant mutations were identified in geno- or phenotypic testing.

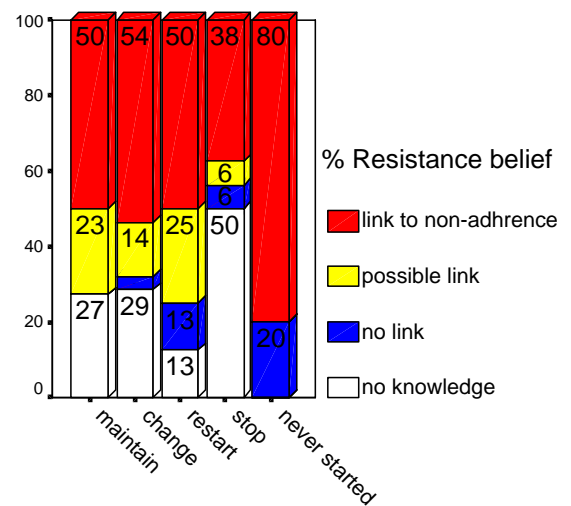
- Three 3 (38%) of the 23 participants restarted ART according to results of a resistance testing. Two of the 3 did interrupt their treatment because of drug resistance. Another participant restarted ART, while he was waiting for the result of the resistance test and had interrupted treatment in assumption of drug resistance.
- Three (19%) of the 23 participants stopped ART because of the presence of drug resistance.

f) Association between the knowledge and beliefs about resistance and the decisions made about ART

Although the participants stopping ART had least knowledge about resistance and believed less in the link between non-adherence and resistance, taking ART or not was not significantly associated with knowledge/beliefs about resistance ($r = .12, p = .30$). The differences in knowledge/beliefs about resistance between the decisions about ART (i.e., to maintain, change, restart, stop or not to start ART) were not statistically significant ($F_{4,74} = 1.23, p = .30$) (see figure 36).

- Of the 16 participants stopping ART 8 (50%) had no knowledge about resistance, compared to 8 (29%) of 28 participants in the decision to change, 6 (27%) of 22 participants in the decision to maintain, one (13%) of 8 participants in the decision to restart and nobody in the ART naïve participants.
- A belief that non-adherence is a cause of resistance was rated in 4 (80%) of 5 ART naïve participants, 15 (54%) of 28 participants changing Art, 11 (50%) of 22 participants maintaining ART, 4 (50%) of 8 participants restarting ART and 6 (38%) of 16 participants

stopping ART.



Decision about ART over past year
 Figure 36: Relationship between the decisions made about ART over the past year and the knowledge/beliefs about resistance (n=79).

The following case presentation illustrates that individuals sometimes go on multiple treatment interruptions without sharing this decision with their doctor and despite that they know that non-adherence is linked to resistance.

- A 44-year-old Hispanic heterosexual single man, living on disability but additionally working full-time in a heavy physical job, has been diagnosed with HIV 9 years ago (CD4 nadir 137 CD4 cells/ μ l). His family lives in Cuba and he has no social support so that he feels very depressed and rated severe clinical depression on the Beck Depression Index. He describes that he “*feels like a candle, which light is getting thinner and thinner and just goes out.*” Also, he consumes about 100 cans beer/week and several joints daily. He had never AIDS defining events in the past but presented with oral thrush at the interview, with 182 CD4 cells/ μ l and 205,333 viral load copies/ml. He just **stopped ART** two weeks ago and over the past year he took his treatment off and on without telling his Latino doctor, whom he visits once or twice a month. “*I know that I am doing wrong, right now that I am not taking it (ART). I just did it, because I did not want to depend on pills. If something is going to happen, it is going to happen. I kept missing doses. I forgot to take it in the morning. Or I just don't take it, because I don't want to take it. I better stop, because somebody told me, if you keep playing like that, taking and not taking and taking, they are going to stop working. So if you don't want to take it, just don't take it.*” His doctor asks a lot of questions where he sometimes does not give a straight answer, sometimes he lies: “*Because he's going to lock me up. He is going to pull me into hospital. So I don't talk to him. I don't go to a Psychiatrist either. The only place where I am going to talk to somebody is when I come here, every six months. I don't talk to anybody.*”

g) Association between the impact on quality of life and the decisions made about ART

According to the interviews, taking ART or not taking ART was not significantly correlated with an improvement of health and physical function as a domain of quality of life ($r = .20$, $p = .08$). There were no significant associations between the impact on physical quality of life and the decisions about ART (i.e., to maintain, change, restart, stop or not to start ART) ($F_{4,74} = 1.56$, $p = .19$).

- An improvement of health and physical function was rated in 16 (73%) of 22 participants maintaining ART, in 24 (86%) of 28 participants changing ART, in 6 (75%) of 8 participants restarting ART, in 8 (50%) of 20 participants stopping ART and in 4 (80%) of 5 participants who never started ART.
- A deterioration of health and physical function was rated in one (5%) of 22 participants maintaining ART, one (4%) of 28 participants changing ART, one (13%) of 8 participants restarting ART, in 8 (50%) of 5 participants not starting ART and 2 (13%) of 16

participants stopping ART. None of the ART naïve participants perceived that the decision not to start ART had a negative impact on health and physical function. On the other hand, participants taking ART were significantly less likely to perceive an improvement of psychosocial quality of life than participants not taking ART ($r = -.32^{**}$). Differences on impact on psychosocial function between the decisions about ART (i.e., to maintain, change, restart, stop or not to start ART) were statistically significant ($F_{4,74} = 5.43^{***}$) (see figure 37).

- In the 21 participants not taking ART a positive impact on the psychosocial function was perceived in 14 (88%) of 16 participants for the decision to stop ART and in 4 (80%) of 5 participants for the decision not to start ART.
- In the 58 participants taking ART a positive impact on the psychosocial function was perceived in 18 (64%) of 28 participants for the decision to change, whereas only 7 (32%) of 22 participants perceived maintaining ART and 2 (25%) of 8 participants restarting ART perceived a positive impact of the decision on psychosocial function.

Conversely a negative impact of the decision on psychosocial function was perceived by:

- None of the 5 ART naïve patients and only 1 (6%) of the 16 participants stopping ART.
- Of the participants taking ART a negative of the decision impact on psychosocial function was perceived in only 2 (7%) of the 28 participants changing ART, compared to 5 (12%) of the 22 participants maintaining ART and 4 (50%) of the 8 participants restarting ART.

In summary, better psychosocial function was an important factor for participants not to start or to stop or to change ART, whereas participants maintained or restarted ART despite perceiving deteriorating psychosocial function.

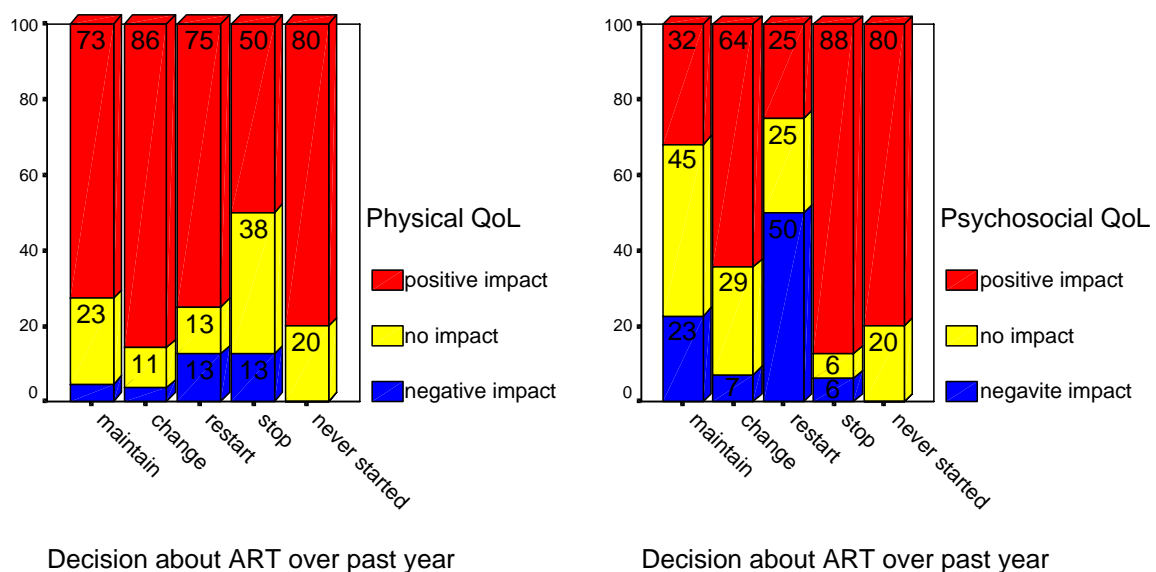


Figure 37: Relationship between the decisions made about ART over the past year and impact of this decision of the physical and psychosocial domain of quality of life (n=79).

The following citations illustrate the discordance between the impact on physical and psychosocial function as two domains of quality of life in the decision to take ART and not to take ART.

- A 44-year-old Hispanic homosexual single man, who has been diagnosed with HIV 11 years ago (CD4 nadir 110 cells/ μ l), has experienced HIV associated symptoms in the past but not over the last 6 months. At the interview he had 302 CD4 cells/ μ l and 8,337 viral load copies/ml. More than a year ago he changed ART according to the results of a resistance test and decided to **maintain** this ART regimen, which had a positive impact on his health (mainly the surrogate markers) but a negative impact on his psychosocial function: *“Actually, I’ve never had one of the defining illnesses, I’ve never had opportunistic pneumonia, I’ve had bacterial pneumonia, it’s been mainly a lot smaller cumulative things. I’ve had oral thrush, but not esophageal thrush. The severe diarrhea. I’ve had wasting. I got down to 135 pounds at one point. But I have not had KS. I have not had PCP. I’ve never had anything like toxoplasmosis or cytomeglovirus. It’s always been a collection of smaller things that make me feel pretty miserable. To me it becomes a quality of life issue, and if I’m feeling miserable because of the drugs, it’s not a good quality of life. I mean I know basically they’re probably keeping me alive, and that’s why I keep taking them. But if I stop them, I just feel so much better. I have more energy. So I know the medicines have an effect on me, and I know I need them to keep the virus in check, but it also, they just don’t make me feel good. They make me feel pretty crappy most of the time. The nausea made me do a lot less than I wanted to do, and for example right now I’ve this fairly severe diarrhea for three months. I don’t go out nearly as much as I used to ... because I know every time I eat, I’m going to be sick, and I hate that. I know within half an hour I’m going to have to find a bathroom.”*
- A 47-year-old Caucasian man, working full-time as a realtor, who lives with his 12-year-old dog since 10 years and has no real close friends, has been diagnosed with HIV 18 years ago (CD4 nadir 75 cells/ μ l) and has experienced HIV associated category B symptoms in the past but not over the last 6 months. At the interview he had 362 CD4 cells/ μ l and 64,380 viral load copies/ml. With respect to quality of life, his decision to stop ART 6 months ago had a positive psychosocial impact but a negative physical impact: *“Well, I started to do an experiment myself, without doctor’s approval, which was to eliminate one of the three meds that I was on. It gave me a strange kind of freedom again that I was in control of my life, physically, emotionally, spiritually, and it felt wonderful to believe all of that, which just put me on a different planet, I was high that I could be back to living with HIV all natural, which I had done for 16 years before going on meds and I very much wanted to believe that I was back to that place. There is that 6*

months mark that I was off everything, am, I came down with a horrible head, chest respiratory of kind cold flu whatever. Like which I have never had, which knocked me for a little, so health-wise that is the only thing that I can say that manifested from that experience. Other one might blame my loss of hearing on that as well.” The interview was difficult to perform as he had lost 80% of his hearing capacity through this event. “The doctor told me pinot blanc you have got to do something, if the viral load is way up again, way up for me not by normal standards, I mean it is only by 66.000, but the highest my viral load had ever been detected was 33.000, so it was double my highest mark and now I would do all about logically, and said, well, we need to do something.” Besides he also perceived a negative financial impact: His health deteriorated and he could make less money working as a realtor (see below).

Looking at the impact of the decision about ART on physical and psychosocial function four major groups have been identified: (see table 9).

- For 11 (52%) of the 21 participants not taking ART the decision improved both, physical and psychosocial function.
- For 25 (43%) of the 58 participants taking ART the decision improved both, physical and psychosocial function.
- For 13 (22%) of the 58 participants taking ART the decision improved physical function but had no impact on psychosocial function.
- For 8 (14%) of the 58 participants taking ART the decision improved physical function but deteriorated psychosocial function.

Table 9: Cross-tabulation of counts (percent of total) of the impact of the decision about ART on quality of life (health/physical function x psychological/social function) in the decision not to take (n =21) and to take ART (n=58).

Decision about ART	Impact of the decision on quality of life		Psychosocial function			Total
			negative impact	no impact	positive impact	
Not taking ART	Physical function	negative impact	0 (.0%)	0 (.0%)	2 (9.5%)	2 (9.5%)
		no impact	1 (4.8%)	1 (4.8%)	5 (23.8%)	7 (33.3%)
		positive impact	0 (.0%)	1 (4.8%)	11 (52.4%)	12 (57.1%)
	Total	1 (4.8%)	2 (9.5%)	18 (85.7%)	21 (100.0%)	
Taking ART	Physical function	negative impact	1 (1.7%)	2 (3.4%)	0 (.0%)	3 (5.2%)
		no impact	2 (3.4%)	5 (8.6%)	2 (3.4%)	9 (15.5%)
		positive impact	8 (13.8%)	13 (22.4%)	25 (43.1%)	46 (79.3%)
	Total	11 (19.0%)	20 (34.5%)	27 (46.6%)	58 (100%)	

A directly perceived positive impact of the decision on the financial situation was rated in one participant taking ART: *“I think it is a good thing (to restart), because I am trying to get a viatical supplement”*. Another participant not taking ART was rated as perceiving a negative impact of the decision to stop ART on his financial situation. His health deteriorated and he could make less money working as a realtor (see above). This participant lost health insurance covering the cost of medication, but he did not stop for this reason: *“As it turned out, the decision wasn’t made as a financial one, but as it came out full circle, it was a financial one in the end because I got disqualified for the Adopt program, I had still then, even if I’d not gone off the meds, I was still filling my prescriptions every month and stock-piling them.”* Although, as table 10 illustrates, 7 (9%) of 79 participants reported that they had no health insurance covering the cost of HIV-related medications. Three (4%) of 79 participants took ART and had to pay for their medication, but did not report the high cost of the medication as a financial burden due to high income, whereas 4 (5%) of 79 participants who did not have insurance covering the cost of ART did not take ART. It is important to note that only one participant reported a financial benefit of not taking ART, because he did not have to pay for his medication.

Table 10: Cross-tabulation of counts (percent of total) of health insurance covering the cost of HIV-related medications and the decision not to take (n =21) and to take ART (n=58).

Health insurance covers cost of HIV-related medications	Decision about ART		Total
	Not taking	Taking	
no	4 (5.1%)	3 (3.8%)	7 (8.9%)
some	1 (1.3%)	4 (5.1%)	5 (6.3%)
yes	16 (20.3%)	51 (64.6%)	67 (84.8%)
Total	21 (26.6%)	58 (73.4%)	79 (100.0%)

h) Association between spirituality/worldview and taking ART

According to the rating the decision to take ART or not was not significantly associated with considering spirituality/worldview as important in the decision or not ($r = .20, p = .08$). There were no significant differences in the importance of spirituality/worldview in the decision between the decisions made about ART (i.e., to maintain, change, restart, stop or not to start ART) ($F_{4, 74} = .87, p = .48$).

- Of the 58 participants taking ART 29 (50%) were rated as considering spirituality as important, 6 (10%) worldview and 23 (40%) were rated as neither considering worldview not spirituality as important in the decision to take ART.
- Of the 21 participants not taking ART 10 (48%) were rated as considering spirituality as important, 2 (10%) worldview and 9 (43%) were rated as neither considering worldview not spirituality as important in the decision to take ART.

If spirituality/worldview is considered as important in the decision about ART this may be both, a reason to take ART or not to take ART as the following case presentations on the involvement of spirituality in the decision to restart and to stop ART illustrate:

- A 56-year-old African-American heterosexual woman, married, living on disability, diagnosed with HIV 8 years ago (CD4 nadir 17 cells/ μ l) and still asymptomatic, reported: *" I'm taking them long, when I started taking the Kaletra, my viral load went from 85000 to 71000, the medication didn't seem to be working. And I've seen my doctor every 2 or 3 month, so until I see my doc again, I just stopped taking it to see what she says."* Despite a being on a failing regimen she reported that she was not offered resistance testing and she had no knowledge of resistance. But considering her spiritual view she decided to **restart ART**: *"I wanted to start something new and it is about the third time starting something over and if I don't feel it working I couldn't take it, I feel like I needed to wait ... (hesitates). I don't know how to explain that, it's just that every time I was taking meds it didn't seem to be working for me, and when I wait to see my doc again and explain to her, I want to take the meds, ... I just have to maintain taking it, I mean my spiritual believes and all that is good for me, it helps me getting through the day."* She had 46 CD4 cells/ μ l and 29,956 viral load copies/ml at the interview.
- A 43-year-old African-American heterosexual woman, divorced, living on disability, diagnosed with HIV 11 years ago and also with Hepatitis C one year ago, has had a pneumocystic carinii pneumonia (doctor verified report) 3 years ago and oral candidacies over the past month. Remarkably she reported that she never experienced HIV/AIDS symptoms during the interview. At the interview, she was at her CD4 nadir with 34 cells/ μ l and a viral load of 65,663 copies/ml after she had **stopped ART** for ten month without informing her doctor: *"I knew he was going to cuss me out, like he did yesterday."* She attended regularly a spiritual group and was asked, if that played a role in her decision to stop ART: *"In a sense, yeah, because I know I had to do my part, but I believe that Jesus can heal me. But then I still have to do my part. I can't sit back and let him do everything. That's my belief!"*

i) Association between the belief in body-mind connection and the decisions made about ART

The spontaneous statement in the interview about a belief in body-mind connection was not significantly associated with taking ART or not ($r = -.004$, $p = .97$). There were no significant differences in belief in body-mind connection between the decisions made about ART (i.e., to maintain, change, restart, stop or not to start ART) ($F_{4, 74} = .79$, $p = .54$).

- Of the 58 participants taking ART 25 (43%) participants stated spontaneously a body-mind belief, and another 13 (22%) a partial body-mind belief, whereas 20 (34%) did not state spontaneously a body-mind belief.
- Of the 21 participants not taking ART 10 (48%) participants stated spontaneously a body-mind belief, and another 3 (14%) a partial body-mid belief, whereas 8 (38%) did not state spontaneously a body-mind belief.

The belief in body-mind connection can be a reason to take ART or not to take ART, as the following case presentations illustrate:

- A 43-year-old African-American heterosexual woman, involved in a monogamous relationship, currently unemployed, diagnosed with HIV 4 years ago and still asymptomatic explained why she believed that she had to **change ART**: *“My viral load was getting higher, because my grandmother just passed away in June, and that took an extra stress effect on me.”* At the interview, she had her CD4 nadir with 65 cells/ μ l and 115,161 viral load copies/ml, despite she had already changed ART more than 12 weeks ago. She had no knowledge of resistance and reported that a resistance test was never performed despite that she was taking a failing regimen.
- A 42-year-old African-American heterosexual man, single, living on disability diagnosed with HIV 14 years ago had started ART despite his lowest CD4 count was exactly 350 cells/ μ l. He had HIV associated symptoms in the past (diarrhea, oral candida, fever) according to the interview and also oral candida over the past 6 months according to the Physical Symptoms Checklist) but never AIDS defining events. Over the past year he performed at least 3 treatment interruptions (according to 4 ACTG-adherence questionnaires in 3 monthly follow-ups) and decided to **stop ART** 2 months before the interview: At the interview he had 530 CD4 cells/ μ l and 1008 viral load copies/ml. *“My viral load? My decisions is to just stop living the promiscuous life, and eat good healthy food, and live a clean life, I think it would adjust itself. With me, I think that. My CD4 is going up. Well it used to be a thousand, and then it dropped down to three hundred. And now I’m going to make it go up to a thousand. I’m going to eat good food. I’m going to get my rest, and I’m going to take vitamins, and exercise. Well, the lifestyle that I used to live, I tried to change because the things that I used to do, that played a big part in the way that I should have died.”*

j) Association between the preference for complementary or alternative medicine and the decisions made about ART

According to the interviews participants taking ART were significantly less likely to mention spontaneously a preference for complementary or alternative medicine (CAM) than participants not taking ART ($r = -.43^{***}$). There were significant differences on preference for CAM between the different decisions about ART (i.e., to maintain, change, restart, stop or not to start ART) ($F_{4,74} = 6.89^{***}$) (figure 38).

- Of the participants not taking ART 4 (80%) of 5 ART naïve participants and 5 (31%) of 16 participants who had stopped ART preferred CAM.
- Of the participants taking ART none of the 8 participants who restarted ART stated a preference for complementary medicine and only 2 (7%) of 28 participants changing ART and 2 (9%) of 22 participants maintaining ART preferred CAM.

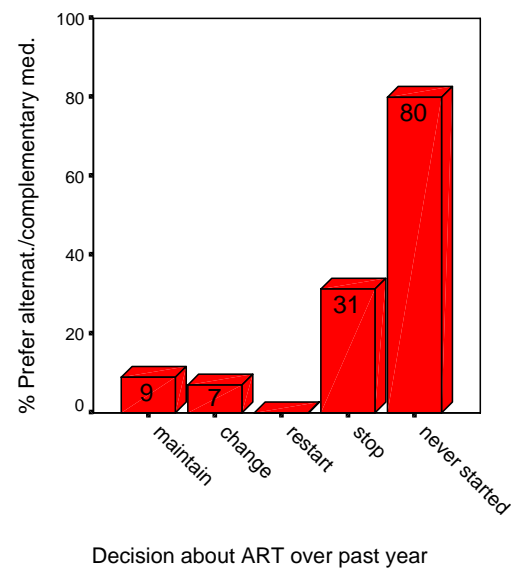


Figure 38: Relationship between the decisions made about ART over the past year and the preference for complementary/alternative medicine (n=79).

It is important to note, that the participants reported spontaneously in the interview that they had a preference for CAM. In the questionnaire use of complementary or alternative treatments (e.g., yoga, nutritional supplements, relaxation, biofeedback, visual imagery, massage etc.) was reported in 40 (51%) of the 79 participants and use of CAM was not significantly correlated with taking ART or not ($r = .04$, $p = .75$). Half of the 79 participants used CAM whether they took ART or not. Nevertheless for 8 (80%) of 10 participants not taking ART and using CAM the preference for CAM did play a role in the decision not to take ART. In contrast only 3 (10%) of 30 participants who were taking ART and using CAM emphasized spontaneously that a preference for CAM did play a role in their decision about ART (see table 11).

Table 11: Cross-tabulation of counts (percent of total) of preference for complementary/alternative medicine and use of complementary/alternative treatments in the decision not to take (n =21) and to take ART (n=58).

Decision about ART			Use of complementary/alternative treatments		
			No	Yes	Total
Not taking	Preference for complementary/alternative medicine	No	10 (90.9%)	2 (20.0%)	12 (57.1%)
		Yes	1 (9.1%)	8 (80.0%)	9 (42.9%)
		Total	11 (100.0%)	10 (100.0%)	21 (100.0%)
Taking	Preference for complementary/alternative medicine	No	27 (96.4%)	27 (90.0%)	54 (93.1%)
		Yes	1 (3.6%)	3 (10.0%)	4 (6.9%)
		Total	28 (100.0%)	30 (100.0%)	58 (100.0%)

The following case presentations illustrate the preference for CAM in two participants, one taking and one not taking ART at the interview.

- A 43-year-old Hispanic homosexual single man, part-time working as an HIV service-provider, was diagnosed with HIV 12 years ago (CD4 nadir 67 cells/ μ l) and remained still asymptomatic. At the interview he had 121 CD4 cells/ μ l and 152,522 viral load copies/ml 6 months after **restarting ART**. He had interrupted ART for 11 months in a shared decision with his doctor because of presence of drug resistance and elevated triglycerides. *“Over the last, I would say, 20 months, I’ve been volunteering in an educational program for AIDS people over UM Jackson Memorial Hospital. And I’ve learned that I thought adherence was everything I thought I was doing, and I was not. One of the things that were interfering with my adherence was that I always used to do acupuncture with natural herbs and also I was taking some natural supplements. Then realized that the garlic I was taking, 5000mg of garlic in capsules, that was making my metabolism so fast that the medication that I was taking, instead of being in my bloodstream for 9 or 12 hours, it would be staying less, so the garlic was interfering with the medication. And, not only the garlic, but I think it was mostly the garlic in pills and the amount. I didn’t know there was an interaction with the garlic pills with the current medication that I was taking. It was after again another result of resistance test that showed that the period of time that I was off the medication, the wild type of the virus came back and I was not resistant to the medication that I was taking before. Well, now that I restarted therapy, I do think that I’m not taking anything else that I would check with my doctor.”*

- The **ART-naïve** 37-year old Caucasian heterosexual single woman, who just attended the World AIDS Conference in Barcelona and did not start treatment despite 279 CD4 cells/ μ l, (see chapter 2.2.4., p. 96) is the founder of a self-support group providing complementary/alternative treatments for PWHA. *"I can buy time doing it naturally and that is what I did: Everything. Everything possibly naturally. I became like wonder-woman. Too much though. I mean I was taking way too many vitamins and minerals and I was shopping at the health food stores, spending a lot of money and knocking all the bad things out of my diet. And I was quite obsessed. And then I started taking a break from that. I started just living my life normally with moderation and consideration of whatever I put in my body. But I have surrounded myself with a bunch of healers. So I have been doing alternative, complementary therapy vigorously since that time period when I found out. I have been doing acupuncture weekly! Since 1995. And I have also incorporated Craniotherapy and Reiki on a regular basis. Energy work, bodywork is important. I have been a vegetarian, I believe in spirituality. I believe in lessons and learning experiences and ability to cope and handle the stress and not increase my cortisol levels and I am just going with the flow."*

2.2.5. Relationship between reasons for decision and socio-demographic, medical and behavioral parameters

Each reason for the decision about ART was analyzed for special characteristics with respect to gender, ethnicity, sexual orientation, age, income, education, employment status, health insurance, partnership status, health related behavior, alcohol and recreational drug use, as well as for years since HIV diagnosis, CD4 nadir, CD4 cells, viral load log, changes in CD4 cells and viral load, and CDC category B and C symptoms. In the following all the significant relationships between the reasons for decision and socio-demographic, medical and behavioral parameters will be presented.

a) Associations between the importance of CD4 counts and viral load and medical, socio-demographic, and behavioral parameters

The importance of surrogate markers is significantly inversely correlated with viral load copies/ml ($r = -.24^*$) but not with viral load log ($r = -.16, p = .17$). *Participants who consider surrogate markers as important have lower viral load copies/ml but not a lower viral load log.* The importance of surrogate markers load was not associated with any other medical parameters (CD4 count below 200 cells/ μ l, absolute CD4 count, CD4 cell nadir, changes in CD4 cells or viral load, years since HIV diagnosis, and category B or C symptoms). For African American participants surrogate markers were significantly less important in the decision about ART (mean 1.39, SD .86) than Hispanics, Caucasians and other ethnic

groups (mean 1.83, SD .45) ($t = 2.83^{**}$, $df = 77$). The importance of surrogate markers was not associated with any other socio-demographic or behavioral parameters.

b) Associations between the reported experience of HIV/AIDS-symptoms and medical, socio-demographic, and behavioral parameters

The experience of HIV/AIDS-symptoms was assessed qualitatively using a probe question in the interview (“*Have you ever experienced symptoms of HIV/AIDS?*”) and quantitatively using the Physical Symptoms Checklist over the past six months. The reports of symptoms in the interview were significantly correlated with the participants’ answers in the Psychological Symptom Checklist for the category B symptoms over the past (including diarrhea and peripheral neuropathy) ($r = .29^{**}$). However, the reports of HIV/AIDS symptoms in the interview were not significantly correlated with the doctor verified category C symptoms ($r = .13$, $p = .27$) and were not significantly correlated with category B symptoms over the past 6 months when diarrhea and peripheral neuropathy were excluded ($r = .13$, $p = .27$).

- Of the 11 participants with doctor verified category C symptoms 5 (45%) did not report that they had AIDS symptoms in the past, when they were asked: “*Did you ever have symptoms of HIV/AIDS?*” These 5 participants had a history of HIV-wasting ($n=3$), pneumocystis carinii pneumonia ($n=1$) and cryptosporidiosis ($n=1$).
- Of the 16 participants reporting category B symptoms (excluding peripheral neuropathy and diarrhea) over the past 6 months 7 (44%) stated in the interview that they never had HIV symptoms. The potentially HIV related symptoms in these 7 participants (2 reported 2 symptoms) were oral hairy leukoplakia ($n=2$), oral candida ($n=2$), cervical dysplasia ($n=2$), fever ($n=2$) and idiopathic thrombocytopenic purpura.

The reported experience of HIV/AIDS symptoms in the interviews was also significantly negatively weakly correlated with the CD4 nadir ($r = -.25^*$). *Participants with a lower CD4 nadir reported more experience of HIV/AIDS associated symptoms in the interview.*

Other than that the reported experience of HIV/AIDS symptoms in the interviews was not correlated with any other medical variable (present CD4 counts/stage, viral load or changes in viral load, and years since HIV diagnosis).

With respect to socio-demographic and behavioral parameters participants reporting experience of HIV/AIDS symptoms in the interviews were also significantly more unemployed/on disability ($F_{1, 77} = 8.79^{**}$) and had a lower income ($F_{1, 77} = 4.44^{**}$). They also made significantly less use of complementary/alternative treatments ($F_{1, 77} = 7.68^{**}$). Also controlled for the CD4 nadir participants reporting previous experience of HIV/AIDS symptoms in the interview were significantly less likely to use complementary/alternative treatments ($F_{1, 76} = 4.76^*$) although the partial eta squared of .073 indicates a weak relationship controlling for CD4 nadir. Similarly participants with previous doctor verified

category C symptoms in the past reported significantly less use of complementary/alternative treatments at the interview ($F_{1,77} = 9.68^{**}$, controlled for CD4 nadir $F_{1,76} = 9.34^{**}$, partial eta squared = .109)

c) Associations between the side effects of ART and medical, socio-demographic, and behavioral parameters

Experience and tolerance of side effects were not significantly associated with the medical, socio-demographic and behavioral parameters. The sum of side effects of ART was significantly correlated with the sum of category B symptoms (excluding diarrhea and peripheral neuropathy) ($r = .34^{**}$). *Participants, who reported more side effects of ART in the interview, also reported more HIV/AIDS related symptoms in the Physical Symptom Checklist over the past 6 months.*

d) Associations between the importance of an easy-to-take regimen and medical, socio-demographic, and behavioral parameters

In the interviews the statement about the importance of an easy-to-take regimen was significantly more common in heterosexual participants (31 of 42 heterosexual participant, 74%), than in homo-/bisexual participants (15 of 37 homo-/bisexual participants 41%) ($t = -3.14^{**}$, $df = 77$).

e) Associations between the resistance testing and medical, socio-demographic, and behavioral parameters

In the 33 participants in which resistance testing was recommended over the past year according to DHSS guidelines (2002) as their viral load exceeded 1000 copies/ml after 24 weeks on ART, performance of resistance testing was significantly correlated with the level of education ($r = .64^{***}$) and income ($r = .54^{**}$). *The higher the level of education and income, the more participants had a resistance test performed.* Resistance testing was more often performed in participants who needed resistance testing if they were homosexual/bisexual ($t = 5.34^{***}$, $df = 31$), male ($t = 3.19^*$, $df = 31$) and not African American ($t = 2.79^{**}$, $df = 31$). Heterosexual African American women were significantly less likely to be tested for drug resistance than homo/bisexual men of Hispanic, Caucasian or other ethnic origin if they needed resistance testing ($\chi^2 = 15.23^{***}$, $df = 1$, OR 19.81^{***}).

- Three (25%) of 12 heterosexual African American women reported to be tested for drug resistance, compared to all 13 (100%) homosexual men of Hispanic, Caucasian or other ethnic origin.

Further, in the 33 patients who needed resistance testing, knowledge of resistance testing was significantly correlated with performance of resistance testing ($r = .37^*$).

f) Association between the knowledge and beliefs about resistance and medical, socio-demographic, and behavioral parameters

Having knowledge of resistance was significantly associated with the level of education ($r = .37^{**}$) and income ($r = .31^{**}$). Socioeconomic status (education and income) was significantly associated with knowledge of resistance ($F_{2,77} = 6.77^{**}$). Significant differences were found on knowledge of resistance between African American and other ethnic groups ($t = 3.40^{**}$, $df = 77$) and between male and female gender ($t = 3.18^{**}$, $df = 77$), but not between heterosexual and homo/bisexual orientation. African American women were less likely to have knowledge of resistance than men who are not African American (chi-square 13.20^{**}, $df = 1$, OR 12.98^{**}).

- Nine (43%) of 21 African American women had knowledge of resistance, compared to 34 (87%) of 39 men of Hispanic, Caucasian or other ethnic origin.

For the 55 participants with knowledge of resistance there was no significant relationship between the beliefs about the cause of drug resistance and medical, socio-demographic or behavioral parameters.

g) Association between the impact on quality of life and medical, socio-demographic, and behavioral parameters

Regarding the impact of the decision about ART on quality of life there was a significant negative correlation with the psychosocial benefit and changes in CD4 cells ($r = -.27^{**}$) but not with the physical benefit. *Participants with a decline in CD4 cells over the past year perceived a psychosocial benefit of their decision.*

According to the interviews the perception that the decision about ART had a positive impact on health and physical function as a domain of quality of life was significantly negatively correlated with the use of alcohol ($r = -.24^*$). *Participants who perceived a health benefit of their decision about ART used less alcohol than participants who did not perceive a health benefit.*

Alternatively the decision about ART was perceived as beneficial for the psychosocial function as a domain of quality of life was significantly associated with smoking ($r = .32^{**}$). *Smokers perceived a greater psychosocial benefit of their decision about ART than non-smokers.*

There were no further significant associations between the impact of the decision on quality of life and the medical, socio-demographic, and behavioral parameters.

h) Association between spirituality and worldview and medical, socio-demographic, and behavioral parameters

The importance of spirituality/worldview in the decision about ART was significantly negatively associated with the use of alcohol ($r = .34^{**}$). *Participants who considered spirituality/worldview as important in their decision about ART reported less use of alcohol than participants who did not consider spirituality/worldview as important in their decision about ART.*

Further, importance of spirituality/worldview was significantly associated with the use of complementary/alternative treatments ($r = .29^{**}$). *Participants who considered spirituality/worldview as important in their decision about ART made more use of complementary or alternative treatments than participants who did not consider spirituality/worldview as important in their decision about ART.*

i) Association between the belief in body-mind connection and medical, socio-demographic, and behavioral parameters

The spontaneous statement about a belief in body mind connection was no significantly associated with the medical, socio-demographic, and behavioral parameters.

j) Association between preference for complementary/alternative medicine and medical, socio-demographic, and behavioral parameters

According to the interviews the preference for complementary or alternative medicine (CAM) was significantly correlated with the use of complementary or alternative treatments ($r = .40^{***}$) and vitamins ($r = .27^{**}$) as stated in the questionnaires. Further, the preference for CAM is significantly associated with a higher level of education ($r = .24^*$). Participants who did not have health insurance covering the cost for ART also reported a higher preference for CAM in the interview ($r = -.26^*$).

2.2.6. Summary of the reasons for the decision about ART

a) Reasons for the decision about ART

Generally 10 criteria were relevant in the decision about ART according to the ratings of the interviews (see figure 39):

- Surrogate markers: 69 (87 %) of 79 participants considered surrogate markers as important (61 of 79, 77%) or partially important (8 of 79, 10%).
- Better quality of life: 67 (85 %) of 79 participants improved in physical/psychosocial function (note: 36 (46%) of 79 participants improved in both, physical and psychosocial function).
- Beliefs about resistance: 62 (66%) of 79 participants believe in a link (40 of 79, 51%) or possible (12 of 79, 15%) link between adherence and drug resistance (note: 23 (29%) of 79 participants have no knowledge of resistance).
- Body-mind belief: 51 (65%) of 79 participants mention a belief (35 of 79, 44.5%) or partial belief (16 of 79, 20.5%) in body-mind connection.¹
- Side effects: 47 (59%) of 79 participants consider changing (24 of 79, 30%) or to stop (23 of 79, 29%) ART for experienced/anticipated side effects.
- Easy to take regimen: 46 (58%) of 79 participants mention the importance of an easy to take regimen.¹
- Spirituality/worldview: 46 (58%) of 79 participants consider spirituality (38 of 79, 48%) or worldview (8 of 79, 10%) in their decision about ART.
- Drug resistance: 32 (41%) of 79 participants reported the performance of drug resistance testing (note: 19 (58%) of 33 participants in which resistance testing was recommended over the past year (viral load > 1000 copies/ml after 6 months ART) reported resistance testing).
- Experience of HIV/AIDS symptoms: 31 (39%) of 79 participants reported the experience of HIV/AIDS symptoms (note: HIV/AIDS symptoms were underreported in the interviews).
- Preference for complementary/alternative medicine: 13 (17%) of 79 participants mention a preference for complementary/alternative medicine.¹ (note: 40 (51%) of 79 participants use complementary/alternative treatments according to the behavioral questionnaire)

There was high consensus between three raters in the rating of the relevance of these reasons in the decision about ART (100 % consensus for 7 reasons, and κ or τ_b ranging between .97*** and .98*** for 3 reasons).

¹ Spontaneously stated

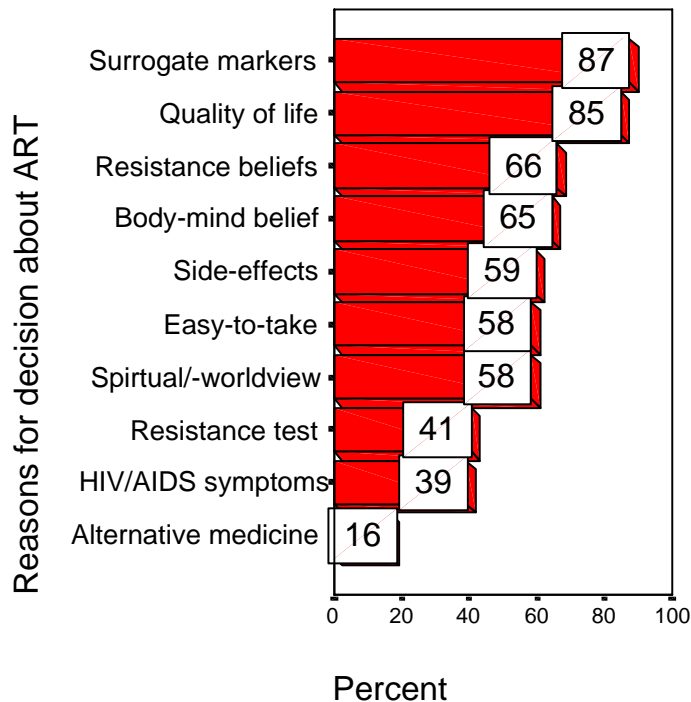


Figure 39: Reasons for the decision about ART: Important/partial important surrogate markers, better physical/psychosocial quality of life, belief/partial belief in body mind connection¹, belief in link/possible link between adherence and resistance, change/stop ART for side effects, easy-to-take regimen important¹, consider spirituality/worldview, drug resistance test performed, experience of HIV/AIDS symptoms, preference for complementary/alternative medicine¹ (n= 79).

Individual reasons for the decision about ART that were not captured in the categorization were: communication problems with the doctor, social comparison, loss of health insurance, the “mom-factor”, the empowerment of saying no, the attitude towards death, US immigration restrictions, being a parent, being a peer educator, social stigma through ART related to body shape changes, running out of treatment options and treating a progressing hepatitis B co-infection with ART.

b) Relationships between the reasons for the decision and the decisions made about ART

Four reasons (HIV/AIDS symptoms, side effects of ART, quality of life and preference for complementary/alternative medicine) were more prevalent in one decision as opposed to the other. Conversely, the other 6 reasons (surrogate markers, easy-to-take regimen, resistance testing, knowledge/belief about resistance, spirituality/worldview, and body-mind belief) were not more prevalent in one decision as opposed to the other.

- The experience of HIV/AIDS symptoms was significantly weakly inversely correlated with taking ART or not ($r = -.22^*$), despite symptoms were underreported in the interviews.

¹ Spontaneously stated

Participants taking ART experience less HIV/AIDS symptoms than participants not taking ART.

- All 5 ART naïve participants never started ART because of anticipated side effects. In the 74 ART experienced participants the decision to take ART or not was significantly correlated with the experience and tolerance of side effects ($r = -.26^*$). *Participants taking ART did tolerate side effects better and reported less experience of side effects than participants stopping ART.*
- With respect to quality of life, taking ART or not was significantly associated with a psychosocial benefit ($r = -.32^{**}$). *The decision not to take ART had a positive impact on psychosocial quality of life.* Better psychosocial function was an important factor for participants not to start or to stop or to change ART, whereas participants maintained or restarted ART despite they perceived a deteriorated psychosocial function. Surprisingly the decision to take ART or not was not significantly associated with a perception of a health benefit. Looking at the impact of the decision about ART on physical and psychosocial function four major groups have been identified:
 - For 11 (52%) of the 21 participants not taking ART both physical and psychosocial function improved.
 - For 25 (43%) of the 58 participants taking ART both physical and psychosocial function improved.
 - For 13 (22%) of the 58 participants taking ART physical function improved but psychosocial function did not change.
 - For 8 (14%) of the 58 participants taking ART physical function improved but psychosocial function deteriorated.
- Taking ART was significantly inversely correlated with a preference for complementary/alternative medicine ($r = -.43^{***}$). *Participants not taking ART preferred more complementary/alternative medicine than participants taking ART.*

c) Relationship between reasons for decision in the interviews and socio-demographic, medical and behavioral parameters in the questionnaires

Four reasons (surrogate markers, experience of HIV/AIDS symptoms, side effects and quality of life) in the interviews were related with medical parameters in the questionnaires.

- The importance of surrogate markers is significantly inversely correlated with viral load copies/ml ($r = -.24^*$) but not with viral load log ($r = -.16$, $p = .17$). *Participants who consider surrogate markers as important have lower viral load copies/ml but not a lower viral load log.*
- The experience of HIV/AIDS symptoms reported in the interviews was significantly associated with a lower CD4 nadir ($r = -.25^*$) and category B symptoms over the past 6

months (including diarrhea and peripheral neuropathy) ($r = .29^{**}$) in the Physical Symptoms Checklist, but not with doctor verified category C symptoms. The experience of HIV/AIDS symptoms was underreported in the interviews.

- The sum of side effects of ART reported in the interviews was significantly correlated with category B symptoms over the past 6 months (excluding diarrhea and peripheral neuropathy) in the Physical Symptoms Checklist ($r = .34^{**}$). *Participants, who reported more side effects of ART in the interview, also reported more HIV/AIDS related symptoms on the Physical Symptoms Checklist.*
- The positive impact of the decision on psychosocial quality of life reported in the interviews was significantly correlated with a decline in CD4 cells over the past year ($r = -.27^{**}$). *Participants with a decline in CD4 cells over the past year perceived a psychosocial benefit of their decision.*

Six reasons (surrogate markers, experience of HIV/AIDS symptoms, easy-to-take regimen, resistance testing, knowledge about resistance and preference for complementary/alternative medicine) in the interviews were related with socio-demographic parameters in the questionnaires.

- Surrogate markers were considered less important for African American participants than for Hispanics, Caucasians and other ethnic groups ($t = 2.83^{**}$, $df = 77$).
- Participants who reported experience of HIV symptoms were significantly more unemployed/on disability ($F_{1,77} = 8.79^{**}$) and had a lower income ($F_{1,77} = 4.44^{**}$).
- An easy-to-take regimen was stronger emphasized in homo-/bisexual participants ($t = -3.14^{**}$, $df = 77$).
- In the 33 participants in which resistance testing was recommended over the past year according to DHSS guidelines (2002) (viral load > 1000 copies/ml after 16-24 weeks ART) performance of resistance testing was correlated with education ($r = .64^{***}$), income ($r = .54^{**}$), sexual orientation ($t = 5.34^{***}$, $df = 31$), ethnicity ($t = 2.79^{**}$, $df = 31$), and gender ($t = 3.19^{**}$, $df = 31$). Heterosexual African American women (who had a lower income and education) were significantly less likely to be tested for resistance if they required testing than their homo-/bisexual male counterpart of Hispanic, Caucasian or other ethnic origin ($\chi^2 = 15.23$, $p_f = .000$, $df = 1$, $OR = 19.18^{***}$). Only 3 (25%) of 12 heterosexual African-American women reported to be tested for drug resistance, whereas all 13 (100%) homosexual men of Hispanic, Caucasian or other ethnic origin reported to be tested for drug resistance if resistance testing was recommended.
- Knowledge about resistance was related to education ($r = .37^{**}$), income ($r = .31^{**}$), ethnicity ($t = 3.40^{**}$, $df = 77$) and gender ($t = 3.18^{**}$, $df = 77$). African American women (who had lower income and education) were less likely to have knowledge of resistance than

men of Hispanic, Caucasian or other ethnic origin (chi-square = 10.16, df 1, $p_f = .003$, OR 9.60***). Further, in the 33 patients who needed resistance testing, knowledge of resistance testing was significantly correlated with performance of resistance testing ($r = .37^*$).

- Preference for complementary/alternative medicine was significantly positively correlated with education ($r = .24^*$) and negatively correlated with having health insurance covering costs of ART ($r = -.26^*$).

Four reasons (experience of HIV/AIDS symptoms, quality of life, spirituality/worldview and preference for complementary/alternative medicine) in the interviews were related to behavioral parameters in the questionnaires.

- Experience of HIV/AIDS symptoms was inversely associated with use of complementary /alternative medicine ($F_{1,77} = 7.68^{**}$, controlled for CD4 nadir $F_{1,76} = 4.76^*$). *Participants who had already experienced more HIV/AIDS symptoms made less use of alternative medicine.*
- Participants who perceived a health benefit of their decision about ART used less alcohol than participants who did not perceive a health benefit ($r = -.24^*$). Conversely smokers perceived a greater psychosocial benefit of their decision about ART than non-smokers ($r = .32^{**}$).
- Participants who considered spirituality/worldview in their decision about ART used significantly less alcohol ($r = -.34^{**}$) and more complementary/alternative treatments ($r = .29^{**}$).
- Preference for complementary/alternative medicine was significantly correlated with the use of complementary/alternative treatments ($r = .40^{***}$) and vitamin's ($r = .27^{**}$).

2.3. Motives for sharing or not sharing the reasons for the decision about ART and reasons for non-adherence with doctors (aim 3)

2.3.1. Sharing or not sharing the reasons for the decision about ART with the doctor

a) Motives for sharing the reasons for the decision about ART with the doctor

Of the 79 participants 62 (78%) did share the reasons for the decision about ART with their doctor and 17 (22%) did not (see figure 40).

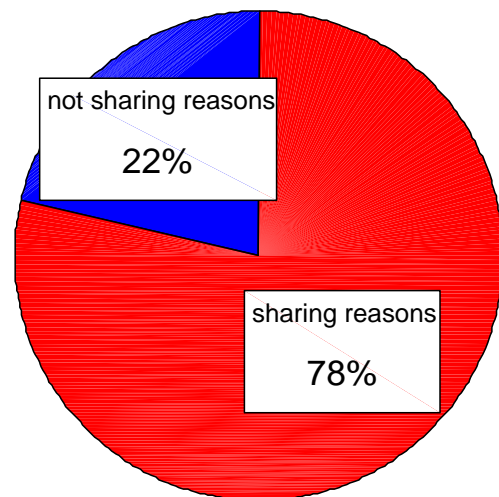


Figure 40: Frequency distribution of sharing the reasons for the decision about ART with the doctor (n=79).

The 62 participants reported the following six categories of motives to share their reasons for their decision with their doctor (multiple motives possible) (see figure 41):

- The most frequent motive, accounting for 53 (85%) of 62 participants, was that patients reported they *want to inform their doctor*.
- This was closely followed by patients who *want or trust doctor's opinion*, which was the motive for 50 (81%) of 62 participants.
- *Presence of concerns* was the motive in 42 (68%) of 62 participants.
- Thirty (48%) of 62 participants shared their reasons in order *to maintain a good relationship* with their doctors.
- Twenty (32%) of 62 participants shared their reasons because their *doctor asked* them.
- Five (8%) of 62 participants shared their reasons because the *laboratory reports alerted the doctor*.

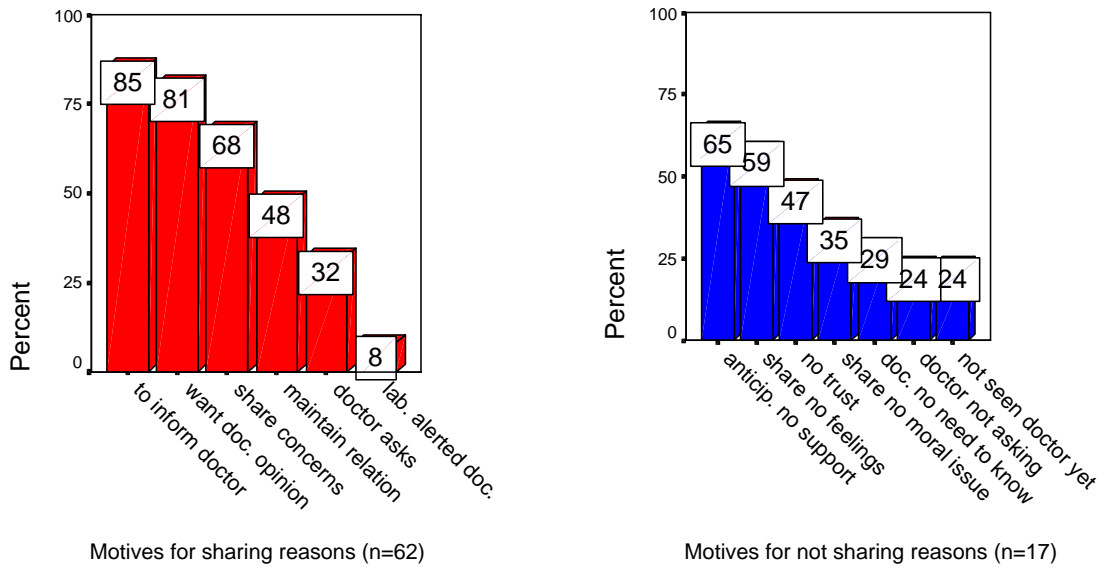


Figure 41: Frequency distributions of the motives of the participants for sharing or not sharing the reasons for the decision about ART with the doctor (n=79).

b) Motives for not sharing the reasons for the decision about ART with the doctor

The motives of 17 participants who did not share their reasons for their decisions with their doctor were grouped in seven categories (multiple motives possible) (see table 12):

- Anticipating that the *doctor would not support decision* was the motive for 11 (64%) of the 17 participants.
- Ten (59%) of 17 participants said they did not share their reasons for the decision because they *cannot discuss feelings* with their doctor,
- further 8 (47%) of 17 participants because they *cannot trust their doctor's opinion*,
- and six (35%) of 17 participants because they *cannot discuss spiritual or moral issues with their doctor*.
- Five (29%) of 17 participants felt that their *doctor does not need to know*.
- Four (24%) of 17 participants did not share their reasons because their *doctor did not ask* them,
- and 4 (24%) of 17 participants because they *have not seen their doctor yet*.

There was clear consensus (100%) in the categorization of the motives why participants shared their reasons for their decision about ART with their doctor and the motives why they did not share their reasons. The categorization was easy to perform as the category definitions and anchor examples demonstrate (see table 12).

Table 12: Meta-matrix of motives to share or not to share the reasons for the decision about ART with the doctor: Category definitions of the motives, frequencies (multiple motives possible), consensus and anchor examples (n=79).

Category definition of the motives to share	Frequency (%) (n=62)	Consensus	Anchor examples
Wants to inform doctor	53 (85%)	100%	I always inform them, but I am the one who takes the decision.
Wants/trusts doctors opinion	50 (81%)	100%	I believe in her decisions. She is very good and she is a specialist.
Presence of concerns	42 (68%)	100%	I was scared to take it (because of hepatitis C). I even have shown him a pamphlet, that was saying that it will re-infect the liver
To maintain a good relationship with doctor	30 (48%)	100%	My doctor and I have had a special relationship for eleven years now, so he basically is like one of my closest friends.
Doctor asks	20 (32%)	100%	If she brings it up and talks about it, we talk about it.
Category definition of the motives not to share	Frequency (%) (n=17)	Consensus	Anchor examples
Anticipates doctor would not support decision	11 (64%)	100%	I told him that it's just something that dwells inside me. He didn't think it (<i>stopping ART</i>) will agree with me in the long run.
Cannot discuss feelings with doctor	10 (59%)	100%	When it comes to concerns, I can communicate better with my case managers, who many are either gay or HIV, so they have a deeper understanding of what it means to swallow 15 pills a day or change.
Cannot trust their doctor's opinion	8 (47%)	100%	I don't really know if I can really trust a medication or a doctor's opinion.
Cannot discuss spiritual/moral issues with doctor	6 (35%)	100%	As far as what my moral believes, no ...I don't think it is pertinent for him.
Doctor does not need to know.	5 (29%)	100%	I don't think she (<i>doctor</i>) needs to know about that (<i>reasons for decision to restart</i>).
Doctor did not ask	4 (24%)	100%	He didn't ask.
Have not seen doctor yet	4 (24%)	100%	I have not seen him.

Participants were significantly less likely to share the reasons of their decision with their doctor, if they anticipated that the *doctor would not support decision* ($r = .77^{***}$), *cannot discuss feelings with their doctor* ($r = .73^{***}$), *cannot trust their doctor's opinion* ($r = .61^{***}$), *cannot discuss spiritual or moral issues with their doctor* ($r = .55^{***}$), *doctor does not need to know* ($.50^{***}$), *doctor did not ask them* ($r = .44^{***}$), and if they *have not seen their doctor yet* ($r = .44^{***}$).

In contrast, participants were significantly more likely sharing the reasons of the decision for the following motives: *want to inform doctor* ($r = .75^{***}$), *want/trust doctor's opinion* ($r = .69^{***}$), *presence of concerns* ($r = .56^{***}$), to *maintain a good relationship* ($r = .41^{**}$) and *doctor asked* ($r = .31^{**}$).

Regression analysis with stepwise exclusion revealed that seven motives (6 motives not to share and 1 motive to share) explained 93% of variance in telling the doctor the reasons for the decision ($F_{7,71} = 139.99^{***}$):

- *doctor does not need to know* ($\beta = -.37^{***}$, explaining alone 59% of the variation),
- *have not seen their doctor yet* ($\beta = -.30^{***}$, explaining another 15% of the variation),
- *cannot trust their doctor's opinion* ($\beta = -.29^{***}$, explaining additional 8% of the variation),
- anticipate that *doctor would not support decision* ($\beta = -.25^{**}$, explaining another 5% of the variation),
- *cannot discuss spiritual or moral issues with their doctor* ($\beta = -.18^{***}$, explaining additional 4% of the variation),
- *doctor did not ask them* ($\beta = -.13^{***}$, explaining another 1% of the variation),
- *wants to inform doctor* ($\beta = .12^*$, explaining additional 1% of the variance in telling the doctor the reasons for the decision).

c) Associations between the decisions made about ART and sharing the reasons for the decision with the doctor

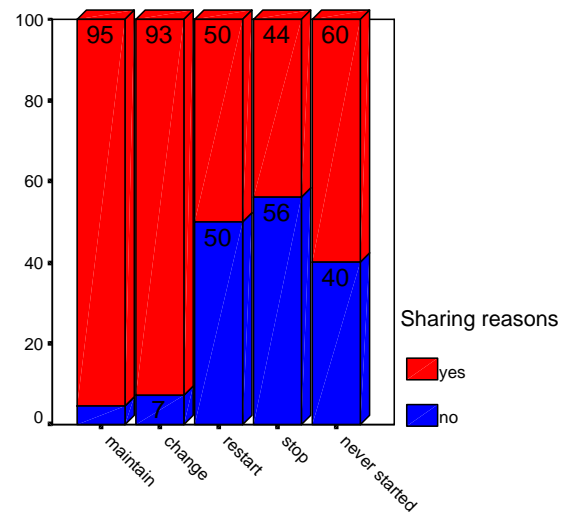
The decision to take ART or not was significantly correlated with sharing/not sharing the reasons for the decision with the doctor ($r = .38^{**}$). *Participants taking ART are more likely to share the reasons for their decision with their doctor than participants not taking ART are.*

- Of the 58 participants taking ART 51 (88%) did share the reasons for their decision with their doctor and seven (12%) did not. Of the 21 participants not taking ART 11 (52%) did share the reasons for their decision with their doctor and 10 (48%) did not.

Further, there were significant differences in sharing the reasons for the decision with the doctor between the decisions to maintain, change, restart, and stop or not to start ART ($F_{4,74} = 7.34^{***}$) (see figure 42). *Participants taking ART continuously over the past year shared more the reasons for their decision with their doctor, whereas ART naive participants and*

participants who interrupted ART over the past year shared less the reasons for their decision with their doctor.

- The reasons for the decision were shared with the doctor in the decision to maintain ART in 21 (95%) of 22 participants, in the decision to change ART in 26 (93%) of 28 participants, compared to only 3 (60%) of 5 participants in the decision not to start ART, 6 (50%) of 8 participants in the decision to restart and 7 (44%) of 16 participants in the decision to stop ART.



Decision about ART over past year
 Figure 42: Relationship between the decisions made about ART over the past year and sharing the reasons for the decision about ART with the doctor (n=79).

d) Relationship between the motives for sharing the decision with the doctor and the decision to take ART or not

The decision to take ART or not was significantly positively correlated with three motives to tell the doctor the reasons of the decision: *wants to inform doctor* ($r = .37^{**}$), *presence of concerns* ($r = .35^{**}$) and *wants/trusts doctor's opinion* ($r = .31^{**}$) (see table 13) (see figure 43).

- Of the 58 participants, taking ART 45 (78%) wanted to inform their doctor and of the 21 participants, not taking ART 8 (38%) wanted to inform their doctor.
- Presence of concerns was a motive for 37 (64%) of the 58 participants taking ART and for 5 (24%) of the 21 participants not taking ART.
- Of the 58 participants, taking ART 42 (72%) gave the motive that they wanted/trusted doctor's opinion and 8 (38%) of the 21 participants taking ART reported this motive for sharing the reasons for their decision with their doctor.

No relationship was found between the decision to take ART or not and the motives *to maintain a good relationship with doctor* and *laboratory results alerted doctor*.

In the 58 participants taking ART regression analysis with stepwise exclusion revealed that the 3 motives to share the reasons for the decision explained together 63 % of variance in telling the doctor why they took ART ($F_{3,54} = 30.12^{***}$):

- *want to inform doctor* ($\beta = .45^{***}$, explaining alone 48% of variance),
- *wants/trusts doctor's opinion* ($\beta = .37^{***}$, explaining another 12% of variance) and
- *presence of concerns* ($\beta = .19^*$, explaining additional 3% of variance in telling the doctor why they took ART).

e) Relationship between the motives for not sharing the reasons for the decision with the doctor and the decision to take or not to take ART

For three motives participants not taking ART were more likely not to share the reasons of their decision with their doctor than participants taking ART: *anticipation that the doctor would not support the decision* ($r = .50^{**}$), *having no trust in doctor's opinion* ($r = .46^{**}$) and *not being able to discuss spiritual or moral issues with the doctor* ($r = .37^{**}$) (see table 13) (see figure 43).

- According to the rating of the 21 participants not taking ART 9 (42%) did not share the decision with their doctor because they anticipated that their doctor would not support the decision, seven (33%) because they reported that they could not trust doctors opinion and 5 (24%) had the motive that they could not discuss spiritual or moral issues with their doctor.
- Of the 58 participants not taking ART only 2 (3%) anticipated that their doctor would not support the decision, and one (2%) each had the motive not to trust doctors opinion or not discussing spiritual or moral issues with the doctor as a reason for not sharing the reasons for the decision with the doctor.

No associations were found between the decision to take or not to take ART and the motives *doctor does not ask*, *doctor does not need to know* and *has not seen doctor yet*.

Table 13: Pearson's Correlations: Motives to share/not to share the reasons for the decision with the doctor and the decision to take ART (n=79).

Motives to share reasons for decision with doctor (scale 0=no, 1= yes)	Decision to take ART (scale 0=no, 1= yes)	Motives to not to share reasons for decision with doctor (scale 0=no, 1= yes)	Decision to take ART (scale 0=no, 1= yes)
Wants to inform doctor	.371**	Anticipates doctor would not support decision	-.503**
Presence of concerns	.354**	Cannot trust doctor's opinion	-.463**
Wants/trusts doctor's opinion	.315**	Cannot discuss spiritual or moral issues with doctor	-.368**

** Correlation is significant at the 0.01 level (2-tailed).

In the 21 participants not taking ART regression analysis with stepwise exclusion revealed that the anticipation that the doctor would not support the decision explained 82% of variance in telling the doctor why they did not take ART ($r = -.91^{***}$, $F_{1,19} = 89.57^{***}$) (see figure 43).

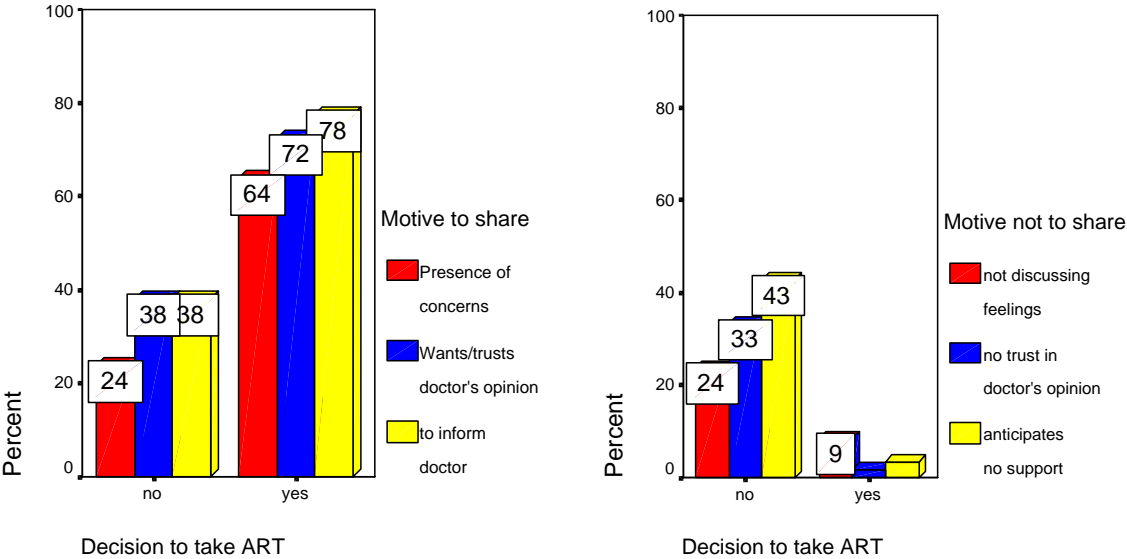


Figure 43: Relationship between taking ART (n=58) /not taking ART (n=21) and the motives to share/not to sharing the reasons for the decision about ART with the doctor

f) Associations between sharing the reasons for the decision about ART with the doctor and medical, socio-demographic and behavioral parameters

Sharing/not sharing the reasons for the decision about ART with the doctor was significantly inversely correlated with viral load ($r = -.30^{**}$) but not with viral load log ($r = -.12$, $p = .28$) and an undetectable viral load ($r = .02$, $p = .89$). *Participants with a lower viral load were more*

likely to share the reasons for their decision with their doctor than participants with higher viral load copies/ml. Further, sharing/not sharing the reasons of the decision was significantly negatively correlated with e changes in viral load copies/ml ($r = -.22^*$) but not with changes in viral load log ($r = .11$, $p = .33$) over the last year. *Participants with a decrease in viral load over the past year were more likely to share the reasons for their decision with their doctor than participants with an increase in viral load.* Sharing/not sharing the reasons for the decision with the doctor was not associated with years since HIV diagnosis, CD4 nadir, CD4 cells, changes in CD4 cells and CDC category B/C symptoms.

Sharing/not sharing the reasons for the decision with the doctor was significantly associated with employment status ($r = .28^*$). *Participants who were unemployed or on disability were more likely to share the reasons for their decision with their doctor than participants who were employed.*

No significant relationships were found between sharing/not sharing the reasons for the decision about ART with the doctor and gender, ethnicity, sexual orientation, age, income, education, health insurance, partnership status, health related behavior, alcohol and recreational drug use.

2.3.2. Sharing the reasons for non-adherence with the doctor

a) Motives for sharing the reasons for non-adherence with the doctor

Of the 58 participants taking ART 46 (79%) reported sharing their reasons for non-adherence with their doctor and 12 (20%) reported not sharing their reasons for non-adherence with their doctor (see figure 44).

Participant shares reasons for non-adherence with doctor

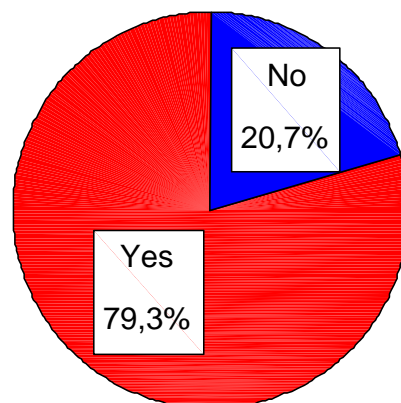


Figure 44: Frequency distribution of sharing the reasons for non-adherence to ART with the doctor (n=79).

The motives why the 46 participants shared their reasons for non-adherence with their doctor were classified into six categories (multiple motives possible) (see figure 45).

- The motive that it *was important to talk to the doctor* about adherence was rated in 33 (72%) of the 46 participants.

- Seventeen (37%) of 46 participants shared their reasons for non-adherence with the doctor because the *doctor asked*,
- nine (20%) of 46 participants because they wanted to be honest and *keep up a friendly relationship* with their doctor,
- eight (17%) of 46 participants because it “*showed up on the blood work*”,
- seven (15%) of 46 participants because it *rarely/never happens*,
- and 2 (4%) of 46 participants because they *ran out of prescriptions*.

b) Motives for not sharing the reasons for non-adherence with the doctor

The motives of the 12 participants for not sharing the reasons for non-adherence with their doctor were classified into five categories (multiple motives possible) (figure 45)

- The most frequent motive was that 7 (58%) of 12 participants did *not* feel that it was *important to talk to the doctor* about adherence.
- The motive that the *doctor did not ask* was rated in 4 (33%) of 12 participants.
- Four (33%) of 12 participants had *not seen their doctor yet*,
- three (25%) of 12 participants reported that it *rarely/never happened*,
- and one (8%) of 12 participants because it *showed up on blood-work*.

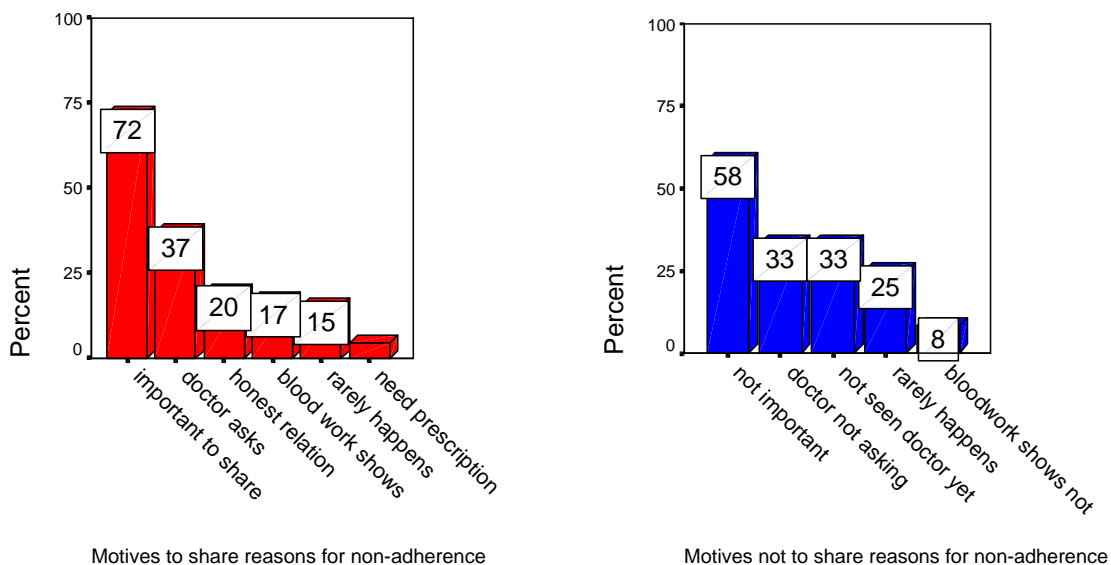


Figure 45: Frequency distributions of the motives for sharing (n=46) or not sharing (n=12) the reasons for non-adherence to ART with the doctor in participants taking ART.

Again, there was clear consensus (100%) in the categorization of the motives why participants taking ART shared their reasons for non-adherence to ART with their and the motives why they did not share their reasons. Table 14 gives an overview of the

categorization of the motives to share or not to share the reasons for non-adherence to ART with the doctor.

Table 14: Meta-matrix of motives to share (n = 46) or not to share (n=12) the reasons for non-adherence to ART with the doctor: Category definitions of the motives, frequencies (multiple motives possible), consensus and anchor examples.

Category definitions of the motives to share	Frequency (%) (n=46)	Consensus	Anchor examples
Important to talk to the doctor about adherence	33 (72%)	100%	It is extremely important for the doctor to know (<i>the reasons for non-adherence</i>).
Doctor asks	17 (37%)	100%	Because there were times that he (<i>the doctor</i>) asked me: "Are you sure that you are taking the medications at the correct time?"
To keep honest/friendly relationship with doctor	9 (20%)	100%	It teaches me to be honest with myself and therefore be honest with someone else (<i>the doctor</i>).
Showed up on blood work	8 (17%)	100%	When he got the genotype back, he knew I was resistant to the medication. What I was going to say? I couldn't lie.
Rarely/never happens	7 (15%)	100%	It happens so rarely, but when it does, I tell him.
Ran out of prescriptions	2 (4%)	100%	I told my doctor that I need a prescription for my medication: "If I don't have a prescription, I can't take the medication until I get the prescription from you."
Category definitions of the motives not to share	Frequency (%) (n=12)	Consensus	Anchor examples
Not important to talk to the doctor about adherence	7 (58%)	100%	I thought this was none of his business.
Doctor does not ask	4 (33%)	100%	She never asks me specifics.
Not seen doctor yet	4 (33%)	100%	I need to. I haven't been to an appointment yet to talk to him about it.
Rarely/never happens	3 (25%)	100%	I don't think it is worth bothering him about. I think that my compliance is pretty good.
Does not show up on blood work	1 (8%)	100%	We did not talk about it (<i>reasons for non-adherence</i>). We do talk about other things. I mean, she sees the lab work and she sees I am doing stable.

c) Correlates of sharing or not sharing the reasons for non-adherence with the doctor

Table 15 summarizes the Pearson’s correlations of sharing/not sharing the reasons for non-adherence to ART with the doctor and the motives why.

- Sharing/not sharing the reasons for non-adherence to ART with the doctor was significantly positively associated with three motives: the patient finds it *important to talk to the doctor about adherence* ($r = .75^{***}$), the *doctor asks* ($r = .51^{***}$) and laboratory results indicate that there might be non-adherence ($r = .28^*$).
- Sharing/not sharing the reasons for non-adherence was significantly inversely associated with the motive that the participant has *not seen the doctor yet* ($r = -.53^{***}$).

Table 15: Pearson’s correlations: Sharing/not sharing reasons for non-adherence to ART with the doctor and the motives why (n=58).

Motive	Sharing reasons for non-adherence with doctor (scale 0=no, 1= yes)
Important to talk about adherence (scale -1= no to 1=yes)	.754**
Doctor asks (scale -1= no to 1=yes)	.510**
Not seen doctor yet (scale 0=no, 1= yes)	-.533**
Shows up on bloodworm (scale -1= no to 1=yes)	.278*

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Regression analysis with stepwise exclusion revealed that three motives explained together 78% of variance in patients telling the doctor why they miss doses ($F_{3,54} = 62.61^{***}$):

- *important to talk to the doctor* ($\beta = .58^{***}$, explaining alone 57% of variance),
- *doctor asks* ($\beta = .37^{***}$, explaining another 14% of variance),
- *not seen doctor yet* ($\beta = -.28^{***}$, explaining additional 7% of variance in communication with the doctor about non-adherence).

c) Associations between sharing the reasons for non-adherence with the doctor and medical, socio-demographic and behavioral parameters

Sharing/not sharing the reasons for non-adherence with the doctor or not was significantly positively correlated with viral load log ($r = .32^*$) and negatively correlated with an undetectable viral load ($r = -.36^{**}$) and absolute CD4 cells/ μ l ($r = -.27^*$). *Participants with a detectable viral load, a higher viral load log or lower the CD4 counts were more likely to communicate with their doctor about non-adherence.* No significant correlations were found between sharing/not sharing the reasons for non-adherence and viral load copies/ml, changes in viral load (copies/log) or CD4 cells, CD4 nadir, years since HIV diagnosis, and CDC category B/C symptoms.

There was a significant negative relationship between income ($r = -.34^*$) and sharing/not sharing the reasons for non-adherence with the doctor. *The lower the income, the more the participants shared their reasons for non-adherence with their doctor.*

No association was found with gender, ethnicity, sexual orientation, age, education, health insurance, partnership status, health related behavior, alcohol and recreational drug use and sharing/not sharing the reasons for non-adherence with the doctor.

d) Associations between sharing the reasons for non-adherence with the doctor and knowledge/beliefs about drug resistance

There was no significant association between sharing/not sharing the reasons for non-adherence with the doctor and the knowledge of resistance. In the 43 participants with knowledge of resistance, there was no significant association between sharing/not sharing the reasons for non-adherence with the doctor and the beliefs about resistance.

2.3.3. Summary of the motives for sharing or not sharing the reasons for the decision about ART and the reasons for non-adherence with doctors (*aim 3*)

a) Sharing or not sharing the reasons for the decision about ART with the doctor

Six motives were identified, why most participants (62 of 79, 78%) shared the reasons for their decision about ART with their doctor: *want to inform their doctor* (53 of 62, 85%), *want or trust doctor's opinion* (50 of 62, 81%), *presence of concerns* (42 of 62, 68%), *to maintain a good relationship* with their doctors (30 of 62, 48%), *the doctor asked* (20 of 62, 32%) and *the laboratory reports alerted the doctor* (5 of 62, 8%).

Seven motives were identified, why some participants (17 of 79, 22%) did not share the reasons for their decision with their doctor: *Anticipation that the doctor would not support decision* (11 of 17, 65%), *cannot discuss feelings* with their doctor (10 of 17, 59%), *cannot trust their doctor's opinion* (8 of 17, 47%), *cannot discuss spiritual or moral issues* with their doctor (6 of 17, 35%), *doctor does not need to know* (5 of 17, 29%), *doctor did not ask* (4 of 17, 24%) and *have not seen their doctor yet* (4 of 17, 24%).

Regression analysis with stepwise exclusion revealed that 7 motives explained 93% of variance in telling the doctor the reasons for the decision ($F_{7,71} = 139.99^{***}$), which includes 6 motives not to share (*doctor does not need to know, have not seen their doctor yet, cannot trust their doctor's opinion, anticipate that doctor would not support decision, cannot discuss spiritual or moral issues with their doctor, doctor did not ask* them) and one motive to share (*wants to inform doctor*).

Participants taking ART were more likely to share the reasons of their decision with their doctor than participants not taking ART ($r = .38^{**}$): Most (47 of 50, 94%) participants taking ART continuously over the past year shared the reasons for their decision with their doctor, followed by ART naive participants (3 of 5, 60%), whereas participants who interrupted ART (started/restarted) over the past year did less share the reasons for their decision with their doctor (12 of 24, 50%).

The participants taking ART were more likely than participants not taking ART to report 3 motives to share the reasons of the decision with the doctor: *wants to inform doctor* ($r = .37^{**}$), *presence of concerns* ($r = .35^{**}$) and *wants/trusts doctor's opinion* ($r = .31^{**}$).

In the 58 participants taking ART 3 motives explain together 63 % of variance in telling the doctor why they took ART ($F_{3,54} = 30.12^{***}$), which includes *want to inform doctor, wants/trusts doctor's opinion, and presence of concerns*.

The participants taking ART were less likely than participants not taking ART to report 3 motives not to share the reasons of the decision with the doctor: the *anticipation that the doctor would not support the decision* ($r = -.50^{**}$), *having no trust in doctor's opinion* ($r = -.46^{**}$) and *not being able to discuss spiritual or moral issues with the doctor* ($r = -.37^{**}$). In the 21 participants not taking ART the anticipation that the doctor would not support the decision explains 82% of variance in telling the doctor why they did not take ART ($F_{1,19} = 89.57^{***}$).

Sharing/not sharing the decision about ART with the doctor was associated with medical and socio-demographic parameters, but not with behavioral parameters. The participants with lower viral load copies/ml ($r = -.30^{**}$) and a greater decrease in viral load copies/ml over the past year ($r = -.22^*$) were more likely to share the reasons for their decision with their doctor than participants with a higher viral load (although for viral load log and changes in viral load log this correlation was no longer significant). In addition, participants who were unemployed/on disability were more likely to share more the reasons for their decision with their doctor than participants who were employed ($r = .28^*$).

b) Sharing or not sharing the reasons for non-adherence with the doctor

Six motives were identified, why most participants on ART (46 of 58, 79%) shared the reasons for non-adherence with their doctor: *importance to talk to the doctor* (33 of 46, 70%), *doctor asked* (17 of 46, 36%), to *keep up a friendly relationship* with the doctor (9 of 46, 19%), it "*showed up on the blood work*" (8 of 46, 17%), it *rarely/never happens* (7 of 46, 15%) and *running out of prescriptions* (2 of 46, 4%).

Five related motives were identified, why some participants on ART (12 of 58, 21%) did not share the reasons for non-adherence with their doctor: *not important to talk to the doctor* (7 of 12, 58%), *doctor did not ask* (4 of 12, 33%), *not seen doctor yet* (4 of 12, 33%), it *rarely/never happens* (3 of 12, 25%), and it did not "*show up on the blood work*" (one of 12, 8%).

The participants who told their doctors why they missed doses were significantly more likely to report motives *importance to talk to the doctor about adherence* ($r = .75^{***}$), *doctor asks* ($r = .51^{***}$), and "*showing up on blood-work*" ($r = .28^*$) and significantly less likely to report the motive *has not seen the doctor yet* ($r = .53^{***}$).

Regression analysis with stepwise exclusion revealed that three motives explained together 78 % of variance in patients telling the doctor why they miss doses ($F_{3,54} = 62.61^{***}$):

2 motives to share reasons for non-adherence (*importance to talk to the doctor about adherence, doctor asks*) and one motive not to share the reasons for non-adherence (*has not seen the doctor yet*).

Further, sharing/not sharing the reasons for non-adherence with the doctor was significantly correlated with medical and socio-demographic parameters but not with behavioral parameters or the knowledge/beliefs about resistance (as rated from the interview).

Surrogate markers and socioeconomic characteristics were important: Participants with an undetectable viral load were less likely than participants with a detectable viral load to communicate with their doctor about non-adherence ($r = -.36^{**}$). The higher viral load log ($r = .32^*$) and the lower the CD4 counts ($r = -.27^*$) the more participants communicated with their physician about non-adherence. The lower the income ($r = -.34^*$), the more the participants shared their reasons for non-adherence with their doctor.

2.4. Sources of information used in the decision about ART (aim 4)

2.4.1. Variety of information sources used in the decision about ART

The groups of sources for information were the treating HIV physician, publications, and other people living or not living with HIV. The doctor was the most frequently used source of information, used by 73 (92%) of the 79 participants to make a decision about ART. This was followed by 69 (87%) of 79 participants using publications, 44 (56%) of 79 participants using other people living with HIV and 35 (44%) of 79 participants using other people not living with HIV as a source of information in their decision about ART (see figure 46).

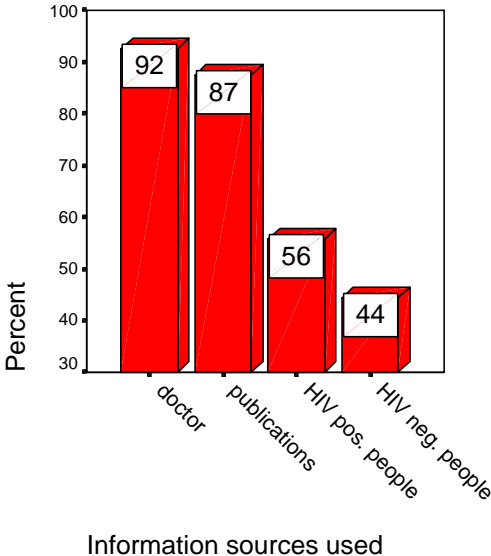


Figure 46: Frequency distribution of sources of information used in the decision about ART (n=79).

a) Publications

Publication as sources for information in the decision about ART subsisted mainly of so-called “positive magazines” (particularly the *poz magazine*), which are magazines especially written to address the information needs of people living with HIV (56 of 79, 71%). This was followed by drug advertising (41 of 79, 52%), Internet (36 of 79, 46%), seminars/conferences/symposia (35 of 79, 44%) and expert literature (such as CDC-newsletter or medical journals) (31 of 79, 39%). One participant also reported using spiritual literature as information source for the decision about ART (see figure 47).

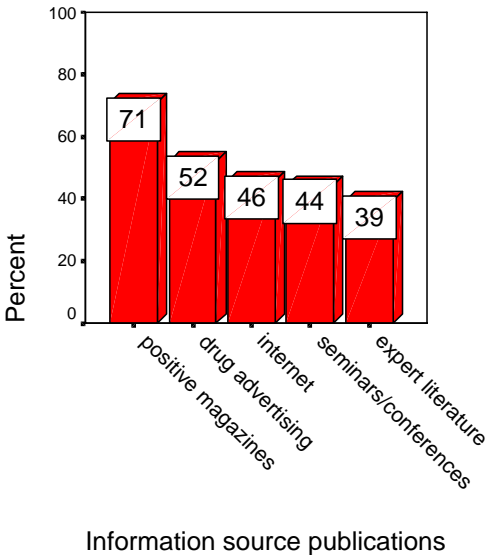


Figure 47: Frequency distribution of the use of publications as a source of information in the decision about ART (n=79).

b) Other people living or not living with HIV

Figure 48 illustrates the frequency of the use of other people living or not living with HIV as a source of information in the decision about ART.

- People living with HIV as sources for information subsisted of: HIV positive friends (44 of 79, 56%), peer educators (22 of 79, 28%), other patients (14 of 79, 18%) and HIV positive partners (10 of 79, 13%).
- People not living with HIV included other medical experts (25 of 79, 32%), naturopaths or nutritionists (21 of 79, 27%), HIV negative friends (11 of 79, 14%), HIV negative family members (6 of 79, 8%) and one used information of his case manager.

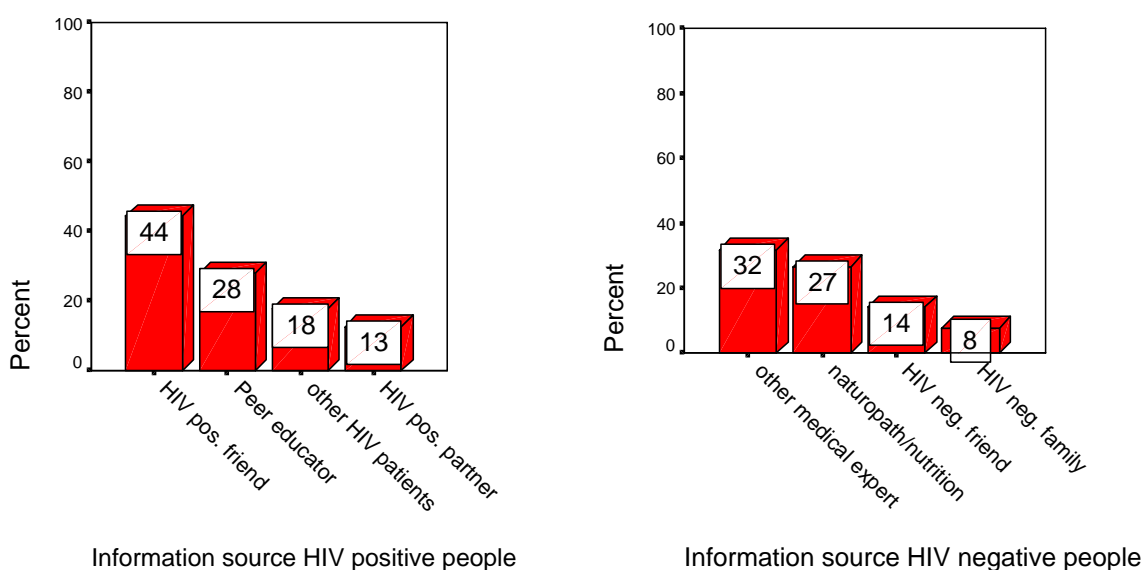


Figure 48: Frequency distribution of the use of other people living or not living with HIV as a source of information in the decision about ART (n=79).

2.4.2. Importance of the information sources used in the decision about ART

The participants rated the importance of the information sources on a 6 point Likert scale ranging from 0 = *not at all*, 1 = *very little*, 2 = *little* to 5 = *very much*. The doctor was rated as the most important source of information for the decision about ART (mean 4.00, SD 1.55), followed by publications (mean 3.44, SD 1.76). *Little* important was the information of other people living with HIV (mean 1.92, SD 2.04) or not living with HIV (mean 1.72, SD 2.15) (see figure 49.)

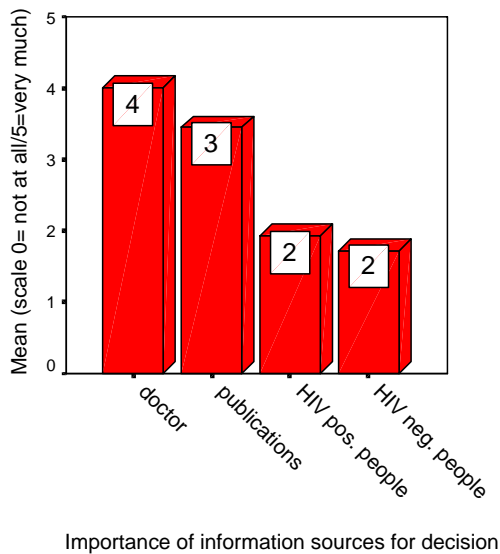


Figure 49: Mean importance of the sources of information in the decision about ART (scale 0 =not at all to 5 = very much).

a) Associations between the importance of the information sources and the decisions made about ART

The decision to take ART or not was significantly correlated with the importance of the doctor as a source of information ($r = .59^{***}$), but there was no significant correlation with the importance of the information from publications, or other people living or not living with HIV.

- Participants taking ART rated the information from the doctor as more important (mean 4.55, SD .73) than participants not taking ART (mean 2.48, SD 2.14).

Between the decisions about ART there were significant differences in the importance of the doctor ($F_{4,74} = 5.94^{***}$) and other people not living with HIV as a source of information ($F_{4,74} = 3.07^*$) (see figure 50), but there were no significant differences in the importance of publications and other people living with HIV.

- On average the doctor as a source of information was rated *very much* important in participants with the decision to change ART (mean 4.57, SD .69), to maintain ART (mean 4.55, SD .74) and to restart ART (mean 4.50, SD .93), and *much* in the decision not to start ART (mean 3.80, SD 2.17), whereas the importance of the information from the doctor was *little* in the decision to stop ART (mean 2.06, SD 2.02).
- In contrast the information from other people not living with HIV was on average *much* important in participants with the decision not to start ART (mean 4.00, SD 2.24), but of *little* importance in the decision to maintain ART (mean 1.95, SD 2.26) and to change ART (mean 1.93, SD 2.16), and *very little* in the decision to stop ART (mean 1.00, SD 1.79) and *not at all* important in the decision to restart ART (mean .38, SD 1.06).

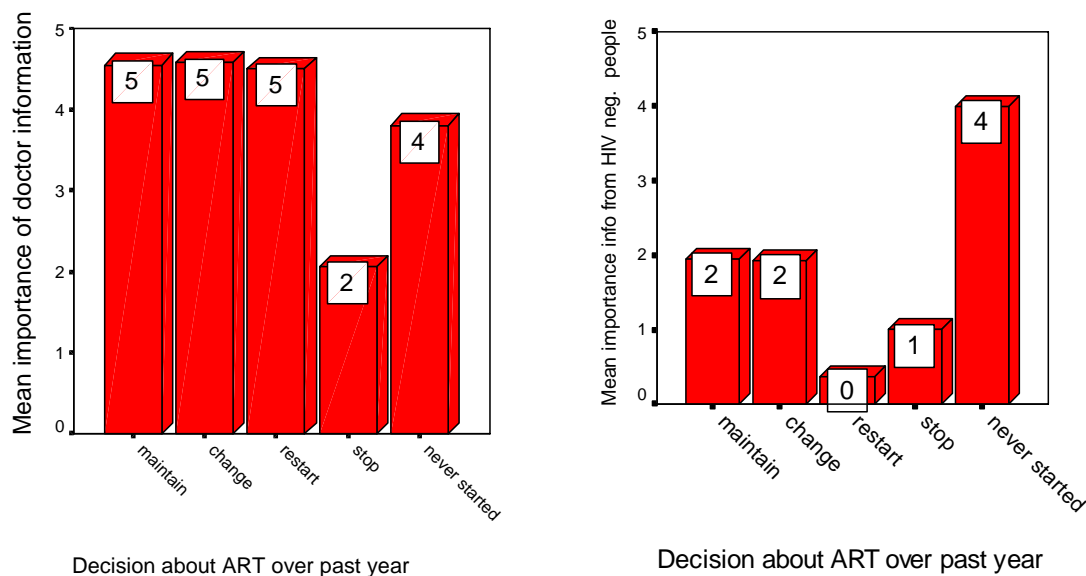


Figure 50: Relationship between the decisions made about ART over the past year and the importance (scale 0 =not at all to 5 = very much) of the information from the doctor and other people living with HIV in the decision (n=79).

b) Association between the importance of the information sources and the importance of the decision made about ART

The importance of the decision about ART was significantly correlated with the importance of three various information sources: the doctor ($r = .37^{**}$), other people living with HIV ($r = .24^*$) and publications ($r = .23^*$) ($F_{3,75} = 5.41^{**}$). *The more participants considered the decision about ART as important, the more they considered the information from the doctor, of other people living with HIV and of publications as important.* There was no significant correlation between the importance of the decision about ART and the importance of people not living with HIV as a source of information.

c) Associations between the importance of the information sources and medical, socio-demographic and behavioral parameters

The importance of the information from the doctor was significantly negatively with viral load copies/ml ($r = -.36^{**}$), viral load log ($r = -.26^*$) and smoking ($r = -.25^*$). *The more important participants rated the information from the doctor, the lower viral load and viral load log and the less they were smokers.*

The importance of information from other people living with HIV was significantly negatively correlated with heterosexual orientation ($r = -.24^*$), African American ethnicity ($r = -.31^{**}$) and female gender ($r = -.25^*$).

- The 19 heterosexual African American women did not consider other people living with HIV as less important source of information (mean .095, SD 1.81) than the 39 homo-/bisexual men of Hispanic, Caucasian or other ethnic origin (mean 2.47, SD 2.02) ($t = 2.70^{**}$, $df 49$).

In addition, the importance of information from other people living with HIV in the decision about ART was significantly positively correlated with use of alcohol ($r = .26^*$). *The more participants considered information from other people living with HIV as important, the more frequently they consumed alcohol.*

Further, the importance of publications as a source of information was significantly positively correlated with the use of complementary or alternative treatments ($r = .27^*$). *The more participants considered publications as important, the more they used complementary or alternative treatments.*

No significant correlations were found between the importance of the various information sources and years since HIV diagnosis, changes in surrogate markers, CD4 nadir, category B/C symptoms, age, partnership, socioeconomic status, health insurance, and recreational drug use.

2.4.3. Associations between sources of information and the decisions about ART

a) Associations between the doctor as a source of information and the decisions about ART

Taking ART or not was significantly correlated with using the doctor as a source of information ($r = .48^{***}$).

- All 58 participants on ART used information from their doctor in their decision to take ART, whereas of the 21 participants who did not take ART 15 (71%) did use information from their doctor and 6 (29%) did not.

Between the decisions about ART there were significant differences in the use of the doctor as a source of information ($F_{4,74} = 5.71^{***}$) (see figure 51).

- In the decision to maintain ($n=22$), change ($n=28$) and restart ART ($n=8$) all participants used the doctor as a source of information, compared to 4 (80%) of 5 participants in the decision not to start and 11 (69%) of 16

participants in the decision to stop ART.

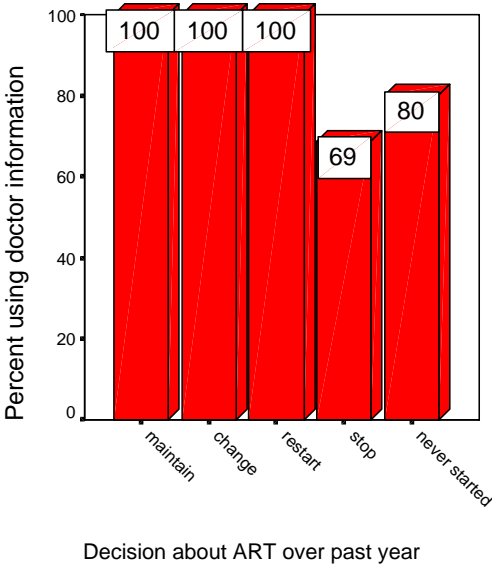


Figure 51: Relationship between the decisions made about ART over the past year and using the doctor as a source of information in the decision ($n=79$).

b) Associations between publications and other people living or not living with HIV as a source of information and the decisions about ART

Taking ART or not was not significantly associated with any use of publications or other people living or not living with HIV as a source of information.

Between the decisions about ART, there were no significant differences in any use of publications or people living or not living with HIV as a source of information.

2.4.4. Associations between sources of information and medical, socio-demographic, and behavioral parameters

In the following, all significant associations between the sources of information and medical, socio-demographic, and behavioral parameters will be presented.

a) Associations between the doctor as source of information and medical, socio-demographic and behavioral parameters

The use of the doctor as a source of information was inversely correlated with viral load ($r = -.43^{**}$), although this correlation was no longer significant for viral load log ($r = -.21$, $p = .07$).

- The 6 participants who did not use the doctor as a source of information had a higher viral load (but no viral load log), but also all participants who did not use the doctor as a source of information either decided to stop or not to start ART.

b) Associations between other people living with HIV as source of information and medical, socio-demographic and behavioral parameters

The longer participants were diagnosed with HIV, the more they used information from other people living with HIV in their decision about ART ($r = .37^{**}$). This correlation was significant.

- The 44 participants who used information from other people living with HIV were diagnosed with HIV in mean 12.50 years (SD 3.71) prior to the interview, compared to mean 9.42 years (SD 4.10) in the 35 participants who did not use information from other people living with HIV.

Conversely there was a significant negative correlation between doctor verified category C symptoms in the past and the use of information from other people living with HIV ($r = -.23^*$).

- Only 3 (27%) of 11 participants who had category C symptoms in the past used information from other people living with HIV, compared to 41 (60%) of the 68 participants who did not have category C symptoms in the past.

African American participants used significantly less information from other people living with HIV than participants of Hispanic, Caucasian or other ethnic origin ($t = 3.06^{**}$, $df = 77$). In addition, women were less likely to use information from other people living with HIV than men (chi-square = 7.02^{**} , $df = 1$, OR 7.07^{**}).

- Only 6 (29%) of 21 African American women used information from other people living with HIV, compared to 28 (72%) of 39 men of Hispanic, Caucasian or other ethnic origin.

c) Associations between other people not living with HIV as source of information and medical, socio-demographic and behavioral parameters

No significant associations were found between other people not living with HIV as sources of information and medical, socio-demographic, and behavioral parameters.

d) Associations between publications as sources of information and medical, socio-demographic and behavioral parameters

HIV symptoms over the past 6 months (including diarrhea and peripheral neuropathy) were significantly correlated with the use of seminars, conferences, symposia ($r = .34^*$), positive magazines ($r = .27^*$), and expert literature ($r = .26^*$) but excluding diarrhea and peripheral neuropathy the correlations were not significant. *The more participants reported symptoms related to HIV (or ART) the more they used these publications as sources of information.*

On the other hand, there was a significant negative correlation between doctor verified category C symptoms in the past and using of positive magazines as a source of information ($r = -.23^*$, controlled for CD4 nadir $r = .22^*$, $df = 76$). *Participants using positive magazines as a source of information were less likely to have experienced AIDS defining events in the past than participants not using positive magazines.*

- Of the 56 participants using positive magazines as a source of information only 5 (9%) had category C symptoms in the past, compared to 6 (26%) of the 23 participants who did not use positive magazines.

Changes in viral load log over the past year were inversely significantly associated with using expert literature ($r = -.25^*$) and the Internet ($r = -.25^*$) but for changes in viral load copies the associations with expert literature ($r = .21$, $p = .069$) and Internet ($r = .22$, $p = .050$) were only close to significant. *Participants using expert literature and the Internet were more likely to have a decrease in viral load log over the past year than participants not using expert literature and the Internet as a source of information.*

- The 31 participants using expert literature had a decrease in viral load log (mean $-.602$, SD 1.448) and viral load copies/ml (mean $-43,698.16$, SD $133,754.01$) compared to no decrease in the 48 participants not using expert literature (changes in viral load log mean $.003$, SD $.961$ and viral load copies mean $13,3382.23$, SD $134,880.79$)
- The 36 participants using Internet had a decrease in viral load log (mean $-.555$, SD 1.412) and viral load copies/ml (mean $-41,773.00$, SD $89,157.53$) compared to no decrease in the 43 participants not using Internet (changes in viral load log mean $.003$, SD $.924$ and viral load copies mean $18,414.20$, SD $89,157.53$).

Time since HIV diagnosis was also significantly correlated with the use of drug advertising as a source of information ($r = .23^*$).

- The 41 participants who used in drug advertising were in mean 12.05 years (SD 3.99) diagnosed with HIV compared to the 38 participants not using drug advertising (mean 10.16, SD 4.15).

Education was significantly correlated with using Internet ($r = .40^{**}$), positive magazines ($r = .25^*$), and seminars, conferences, or symposia ($r = .23^*$). *The higher the education level, the more these publications were considered in the decision about ART.*

The use of Internet as a source of information was further significantly associated with income ($r = .31^{**}$) and African American ethnicity ($t = 2.87^{**}$, $df = 77$). *Participants with a lower socioeconomic status or African American ethnicity used less the Internet than participants with a higher socioeconomic status or participants with Hispanic, Caucasian or other ethnic origin.*

- Of the 43 participants less than \$10,000 annual income 30 (70%) did not use Internet as a source of information and 13 (30%) did use Internet. Of the 35 participants with an annual income of more than \$10,000 use of Internet was reported in 22 (63%) and 13 (37%) did not report use of Internet.
- Of the 47 participants with college education 27 (57%) reported using Internet for information to decide about ART and 20 (43%) did not. Of the 31 participants who had no college education 23 (74%) did not use Internet and 8 (26%) reported using Internet to decide about ART.

In addition, the use of complementary or alternative medicine was significantly positively correlated with the use of Internet ($r = .29^{**}$), as well as with the use of expert literature ($r = .22^*$), but negatively correlated with the use of drug advertising ($r = -.24^*$). *Participants using complementary or alternative treatment considered more the Internet and expert literature as sources of information, and less drug advertising than participants who did not use complementary or alternative treatments.*

2.4.5. Associations between sources of information and knowledge/beliefs about resistance

There was no significant association between using the HIV treating physician as a source of information and having knowledge of resistance ($r = .13$, $p = .25$). However, this interpretation is limited, because 73 (92%) of the 79 participants used the doctor as a source of information, so that there was no variability. The Pearson's correlations between the sources of information other than the HIV-treating physician in the decision about ART and knowledge of resistance are summarized in table 16. Knowledge of resistance was significantly positively associated with using the Internet as a source of information ($r = .42^{**}$), followed by attending seminars, conferences or symposia ($r = .35^{**}$), reading expert literature ($r = .34^{**}$) and consulting HIV positive patients ($r = .30^{**}$). Further, a significant positive correlation was found between knowledge of resistance and consulting peer educators ($r = .28^*$), reading of positive magazines ($r = .26^*$) and consulting additional medical experts (*other doctors*) for information ($r = .26^*$).

Table 16: Pearson's correlations: Sources of Information other than HIV treating physician in the decision about ART and knowledge of resistance (n=79).

Information source: HIV negative people	Other doctor	Naturopath/ Nutritionist	HIV negative partner	HIV negative friend	HIV negative family
Knowledge of resistance	.256*	.196	.148	.097	-.027
Information source: HIV positive people	HIV positive patients	Peer educator	HIV positive partner	HIV positive friend	
Knowledge of resistance	.297**	.274*	.160	.067	
Information source: Publications	Internet	Seminars/ Conferences	Expert literature	Positive magazines	Drug advertising
Knowledge of resistance	.419**	.347**	.344**	.264*	.108

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

2.4.6. Summary of the sources of information used in the decision about ART

The most frequent and important source of information for the decision about ART was the doctor. The ten most frequently used sources of information comprised of (see figure 52):

- Doctor (73 of 79, 92%)
- “Positive magazines” (e.g., *poz magazine*) (56 of 79, 71%)
- Drug advertising (41 of 79, 52%)
- Internet (36 of 79, 46%)
- HIV-positive friends (35 of 79, 44%)
- Seminars/conferences/symposia (35 of 79, 44%)
- Expert literature (31 of 79, 39%)
- Other medical experts (25 of 79, 32%)
- Peer educator (22 of 79, 28%)
- Naturopath/nutritionist (21 of 79, 27%)

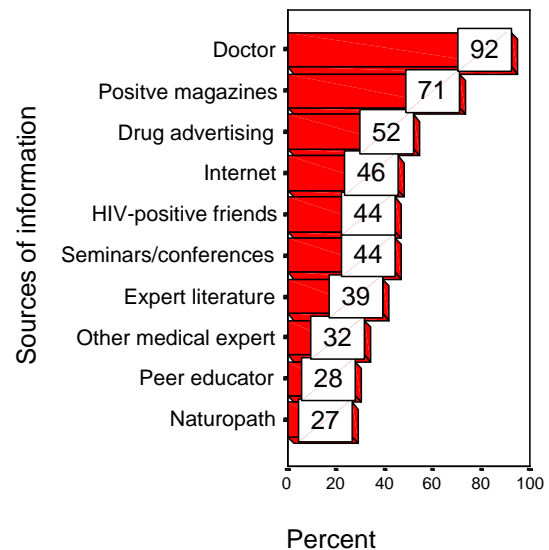


Figure 52: Frequency distribution of the ten most frequent sources of information used in the decision about ART (n=79).

The doctor as a source of information was considered on average as *much* important, followed by an on average *moderate* importance of publications (positive magazines, drug advertising, Internet, seminars/conferences/symposia, expert literature, spiritual literature). On average *little* important sources of information were other people living with HIV (friends, peer educators, other patients, and partners) and other people not living with HIV (other medical experts, naturopaths/nutritionists friends, family members, case manager).

The importance of the information from the doctor was significantly positively correlated with the decision to take ART or not ($r = .59^{***}$). On average participants taking ART rated the information from the doctor as *very much* important, whereas the information from the doctor was *little* important in the decision not to take ART. The more participants considered the decision about ART as important, the more they considered the information from the doctor, other people living with HIV and publications as important ($F_{3,75} = 5.41^{**}$).

The more important participants rated the information from the doctor, the lower viral load copies/ml ($r = -.36^{**}$) and viral load log ($r = -.26^*$) and viral load log and the less they were smokers ($r = -.25^*$). Information from other people living with HIV was least important in heterosexual African American women ($t = 2.70^{**}$, $df = 49$).

Medical parameters were significantly associated with the sources of information used. The longer participants were diagnosed with HIV, the more they used information from other people living with HIV ($r = .37^{**}$) and drug advertising ($r = .23^*$) in their decision about ART. The more participants reported symptoms related to HIV (or ART) the more they used seminars, conferences, symposia ($r = .34^*$), positive magazines ($r = .27^*$), and expert literature ($r = .26^*$) as sources of information. On the other hand participants using positive magazines as a source of information were less likely to have experienced AIDS defining events in the past than participants not using positive magazines ($r = -.23^*$). Interestingly, participants using expert literature ($r = -.25^*$) and the Internet ($r = -.25^*$) were more likely to have a decrease in viral load log over the past year than participants not using expert literature and the Internet as a source of information

In addition, socio-demographic and behavioral characteristics were associated with the sources of information used. Participants with a lower socio-economic status and African American participants made significantly less use of Internet. The higher the education level, the more participants used Internet ($r = .40^{**}$), positive magazines ($r = .25^*$), and seminars, conferences, or symposia ($r = .23^*$) as sources of information. Participants considering publications (especially Internet and expert literature, but not drug advertising) as important made more use of complementary or alternative treatments ($r = .27^*$).

Knowledge of resistance was significantly associated with using the Internet ($r = .42^{**}$), seminars, conferences or symposia ($r = .35^{**}$), expert literature ($r = .34^*$), HIV positive patients ($r = .30^{**}$), peer educators ($r = .28^*$), positive magazines ($r = .26^*$), and other medical experts ($r = .26^*$) as a source of information.

2.5. Models of decision-making about treatment (aim 5)

2.5.1. Meta-matrix of the models of decision-making about treatment

The following assignment is rated from the perspective of the patient. The raters categorized the participant's responses in the interview according to the models of decision-making about treatment (including the intermediate models) as described by Charles et al. (1999) (see introduction chapter 1.1., pp. 8-10). Table 17 summarizes the categorization of the models of decision-making about treatment, including category definitions, frequencies, and anchor examples. There was 99% consensus (78 of 79 ratings, $\alpha = .979^{***}$, $df=78, 156$).

Table 17: Meta-matrix of models of decision-making about treatment: Categories, category definitions, frequencies, and anchor examples (n=79).¹

Categories	Category definitions	Frequencies (%) (n=79)	Anchor examples
Pure paternalistic model	Doctor decides without considering patient's opinion and with minimal transfer of information.	9 (11%)	Because doctor says, I have to take them. I take it as prescribed. ...I've heard about drug resistance. I think it comes from your body just not being able to take a certain drug.
Intermediate paternalistic model	Doctor decides considering patient's opinion, but with minimal transfer of information.	14 (18%)	That is what she (<i>her doctor</i>) said, would be the best ones. ... If it is a new medication, I want to know the side effects and the different types of what happens.
Shared decision-making model	Doctor and patient make a joint decision with a two-way exchange of medical and personal information.	28 (35%)	We are friends; we talk like friends. So I share this with Dana, who is my doctor, and she is going to present the pros and cons, and I will say okay this has more pros, less cons, what do you think about it, well let's stick with this.
Intermediate informed choice model	Patient decides considering doctor's opinion and doctor transfers all relevant medical information.	18 (23%)	My doctors become very frustrated because I tell them that I listen to myself more than I listen to them. So I do things according to how I feel how I should do them more than clinical studies would show.
Pure informed choice model	Patient decides without considering doctor's opinion and doctor transfers all relevant medical information.	10 (13%)	It seems to me that the health deteriorates with the medication and mine hasn't. ... I don't really have a doctor. They all think I'm crazy, they gave me from six months to two years to live, and ... I'm in top shape (<i>living 17 years with HIV and ART naïve</i>).

¹ (Consensus in 78 of 79 ratings (99%), $\alpha = .979^{***}$, $df=78, 156$)

The most frequently rated model was shared decision-making, which was rated in 28 (35%) of the 79 participants. The intermediate informed choice model followed with 18 (23%) and the intermediate paternalistic model with 13 (18%) of 79 participants. The pure informed choice model was rated in 10 (13%) and the pure paternalistic model in 9 (11%) of 79 participants (see figure 53).

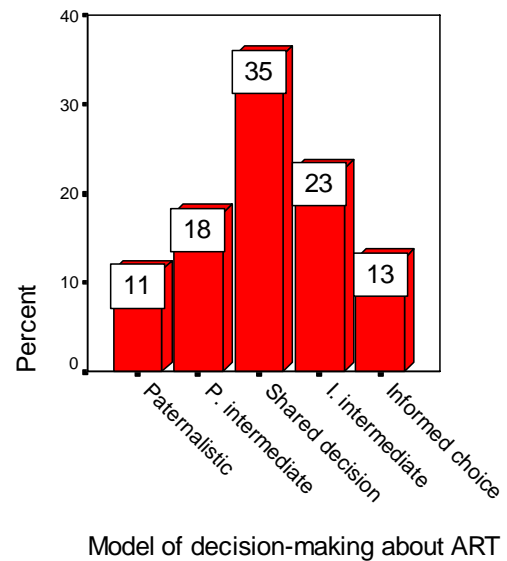


Figure 53: Frequency distribution of the models of decision-making about treatment rated from the interviews (n=79).

Charles et al. (1999) assume increasing levels of patient's participation and information in the decision-making about ART from the pure paternalistic to the pure informed choice model, suggesting that the models of medical decision-making about treatment can be used as a continuous variable to calculate correlations (i.e., with knowledge of resistance). Associations between the five models of decision-making about treatment and the decisions about ART, the reasons for decisions, sharing the reasons for the decisions and for non-adherence with the doctor, the sources of information, as well as for the medical, socio-demographic and behavioral parameters will be examined using ANOVA.

On the other hand, there may not be much difference between the pure and intermediate form of the paternalistic and informed choice models, so that they can be treated as one category. The paternalistic, shared decision-making and informed choice models might have special characteristics (e.g., Patients might be more prepared to share their reason for their decision in the shared decision-making model, compared to the paternalistic/informed choice models). Therefore such associations will be examined (using independent t-tests, chi-square tests and Fisher's exact significance tests or Mann-Whitney U-tests respectively, see methods, chapter 4.2.3., pp. 43-44) between pairs of models of decision-making about treatment, comparing

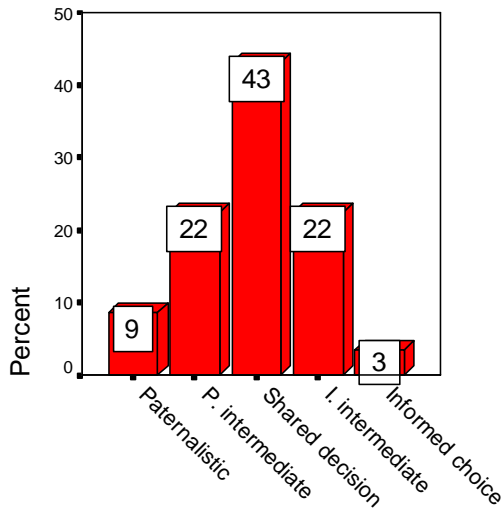
- paternalistic (pure/intermediate) vs. shared decision-making/informed choice
- shared decision-making vs. paternalistic/ informed choice
- and informed choice (pure/intermediate) vs. shared decision-making/paternalistic

for the decisions about ART, the reasons for decisions, sharing the reasons for the decisions and for non-adherence with the doctor, the sources of information, as well as for the medical, socio-demographic and behavioral parameters. All significant results will be presented.

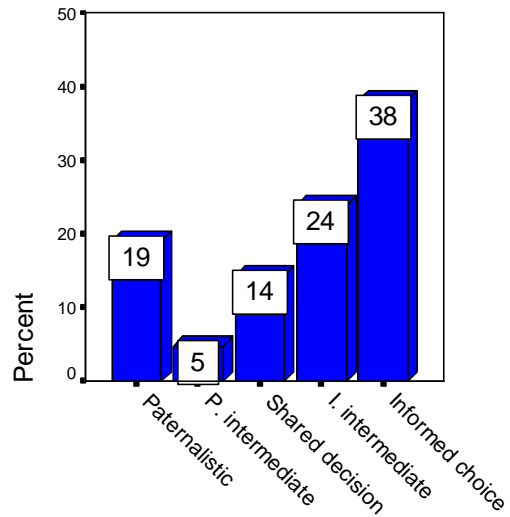
2.5.2. Associations between the models of decision-making about treatment and the decisions about ART

There were significant differences regarding the decision about ART between the models of decision-making about treatment ($F_{4, 74} = 7.34^{***}$) (see figure 54).

- In the shared decision-making model participants were significantly more likely to take ART than in the paternalistic/informed choice models (chi-square = 5.60, $p_f = .019$, df_1 , OR 6.20*). The shared decision-making model was rated in 25 (43%) of 58 participants with the decision to take ART vs. 3 (14%) of 31 participants with the decision no to take ART. Shared decision-making was significantly associated with the decision to change ART (chi-square = 5.31*, df_1 , OR 4.24*). The decision to change treatment was classified in 15 (54%) of 28 participants as a shared decision-making model, compared to 13 (25%) of 51 participants deciding to maintain, restart, stop or not to start.
- In the informed choice models (pure/intermediate) participants were significantly more likely not to take ART than in the paternalistic/ shared decision-making models (chi-square = 8.75, $p_f = .007$, df_1 , OR 8.5**). This accounts especially for the decision not to start ART (chi-square = 9.72, $p_f = .004$, df_1 , OR 11.00**). The decision of the participants not to take ART was mostly rated as a pure informed choice (8 of 21, 38%) vs. only 2 (3%) of 58 participants deciding to take ART, whereas the intermediate informed choice model was relatively equally distributed in the decision to take ART (13 of 58, 22%) and the decision not to take ART (5 of 21, 24%). All 5 ART naïve participants had made an informed choice not to start ART: 2 (40%) were classified in the intermediate and 3 (60%) in the pure informed choice model.
- The paternalistic models (pure/intermediate) were not significantly associated with any decision about ART. Although, participants deciding not to take ART were more likely to follow the pure paternalistic model (4 of 58, 19%) than in the participants deciding to take ART (9 of 21, 11%). On the other hand the intermediate paternalistic model was more prominent in the decision to take ART (14 of 58, 18%) than in the decision not to take ART (1 of 21, 5%).



Taking ART: model of decision-making



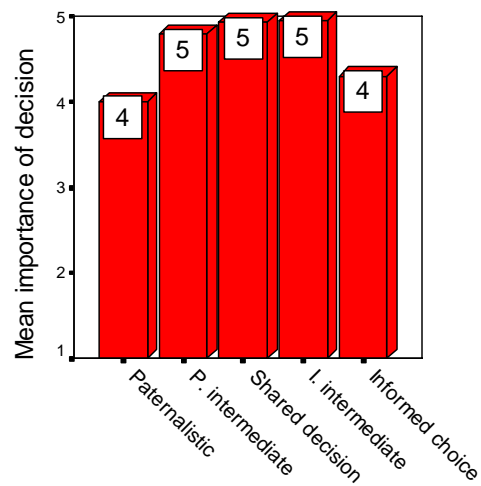
Not taking ART: model of decision-making

Figure 54: Frequency distributions of the models of decision-making about ART in the decision to take ART (n=58) and in the decision not to take ART (n=21).

a) Associations between the models of decision-making about treatment and the importance of the decision about ART

Further, the importance of the decision made about ART was a significantly different between the models of decision-making about treatment ($F_{4,74} = 3.52^{**}$) (see figure 54).

The importance of the decision was rated as *very much* in the intermediate informed choice model (mean 4.94, SD .24), closely followed by the shared decision-making model (mean 4.93, SD .26) and the intermediate paternalistic model (mean 4.79, SD .58). The importance of the decision was lower, but still *much* in the pure informed choice model (mean 4.30, SD 1.25) and the pure paternalistic model (mean 4.00, SD 1.73).



Model of decision-making about ART

Figure 55: Relationship between the models of decision-making about treatment and the importance (scale 1 = *very little* to 5 = *very much*) of the decision about ART (n=79).

2.5.3. Associations between the models of decision-making about treatment and the reasons for the decision

a) Associations between the models of decision-making about treatment and the importance of CD4 counts and viral load in the decision

There were no significant associations between the models of decision-making about treatment and the importance of CD4 cells and viral load as a criterion for the decision ($F_{4, 74} = 1.06$, $p = .38$).

b) Associations between the models of decision-making about treatment and the experience of HIV-symptoms

There were also no significant associations between the models of decision-making about treatment and the experience of HIV/AIDS symptoms as stated in the interviews ($F_{4, 74} = .88$, $p = .48$). Again, it has to be noted, that symptoms were underreported in the interviews.

c) Associations between the models of decision-making about treatment and the side effects of ART

According to the interviews there were no significant associations between the models of decision-making about treatment and the experience of side effects of ART ($F_{4, 74} = 1.58$, $p = .19$). However, there was a significant difference between the models of decision-making about treatment on the sums of side effects reported in the interviews ($F_{4, 74} = 2.60^*$). Especially the mean sum of reported side effects in the interviews was significantly lower in the paternalistic models (pure/intermediate) than in the shared decision-making/informed choice models ($z = -2.71^*$).

- In the paternalistic models (pure/intermediate) ($n=23$) the sum of side effects reported was a mean of 0.74 (SD 1.01), compared to a mean of 1.75 (SD 1.97) in the shared decision-making/informed choice models ($n=56$).

In case when side effects were experienced ($n=59$), they were better tolerated in the shared decision-making model than in the paternalistic/informed choice models ($z = -2.07$).

Also, if side effects were experienced or anticipated ($n=67$), they were significantly less a reason to change or even stop ART in the shared decision-making model than in the paternalistic/informed choice models ($z = -2.55^*$).

- In the shared-decision-making model only 12 (30%) of 28 participants tolerated side effects poorly, compared to 28 (70%) of 51 participants in the paternalistic/informed choice models.

- In the shared-decision-making model 11 (44%) of 28 participants were prepared to maintain ART despite experienced or anticipated side effects, compared to only 9 (21%) of 51 participants in the paternalistic/informed choice models.

In the informed choice models (pure/intermediate) participants were more likely to consider anticipated side effects in their decision about ART than in the paternalistic/shared decision-making models (chi-square = 6.76, $p_f = .012$, df_1 , OR 6.62**).

- In the informed choice model (pure/intermediate) 8 (52%) of 28 participants anticipated side effects of ART were important in the decision, compared to 14 (32%) of 51 participants in the paternalistic/shared decision-making models.

d) Associations between the models of decision-making about treatment and the importance of an easy-to-take regimen

There were no significant associations between the models of decision-making about treatment and the importance of an easy-to-take regimen ($F_{4, 54} = .25$, $p = .91$).

e) Associations between the models of decision-making about treatment and resistance testing

In the 74 ART experienced patients resistance testing was significantly associated with the models of decision-making about ART ($F_{4, 69} = 2.58^*$) (see figure 56). Shared decision-making was significantly associated with a greater likelihood of resistance testing (chi-square = 10.17***, $p_f = .002$, df_1 , OR 10.21***) in ART-experienced participants.

Particularly shared decision-making was also significantly associated with the performance of resistance testing in the 33 participants in which a resistance test was recommended over the past year according to the treatment guidelines, as their viral load was > 1000 copies/ml after taking ART longer than 6 months participants (chi-square = 5.13***, $p_f = .04$, df_1 , OR 5.27*).

- According to the interviews geno- or phenotypic drug resistance testing was most frequently performed in the shared decision-making model (18 (64%) of 28 participants), followed by the pure paternalistic model (4 (44%) of 9 participants), the intermediate informed choice model (5 (31%) or 16 participants) and the intermediate paternalistic model (4 (29%) of 14 participants). The pure informed choice model had the lowest percentage of resistance tests performed, (one (14%) of 7 participants).

f) Association between the models of decision-making about treatment and the knowledge/beliefs about resistance.

Against expectation the models of decision-making were not significantly correlated with having knowledge of resistance or not ($r = .14^*$, $p = .23$). However there were significant differences between the models of decision-making about treatment and the knowledge about resistance ($F_{4, 74} = 3.29^*$) (see figure 56). Shared decision-making vs.

paternalistic/informed choice models was significantly positively associated with knowledge about resistance (chi-square = 10.17, $p_f = .009$, $df 1$, OR 7.92**). *Participants in the shared decision-making model had more knowledge of resistance than participants in the paternalistic/informed choice models.*

- Of the 28 participants rated as perceiving a shared decision-making model 25 (89%) had knowledge of resistance, compared to 31 (61%) in the paternalistic/informed choice models ($n = 51$).
- In contrast, the paternalistic models (pure/intermediate) vs. shared decision-making /informed choice models were significantly associated with not having knowledge of resistance (chi-square = 8.36, $p_f = .006$, $df1$, OR 7.97**). *Participants in the paternalistic models (pure/intermediate) had less knowledge of resistance than participants in the shared decision-making /informed choice models.* In the paternalistic models (pure/intermediate) (12 (52%) of 23 participants had no knowledge of resistance, compared to only 11 (20%) of 56 participants in the shared decision-making/informed choice models ($n=56$). Although, in the pure paternalistic model knowledge of resistance was rated relatively more frequent (5 (56%) of 9 participants) than in the intermediate paternalistic model (6 (43%) of 14 participants).
- Against expectation, knowledge of resistance was not significantly associated with the informed choice models (pure/intermediate) vs. shared decision-making /informed choice models. Knowledge of resistance was even higher in the intermediate choice model (14 (78%) of 18 participants) than in the pure informed choice model (6 (60%) of 10 participants).

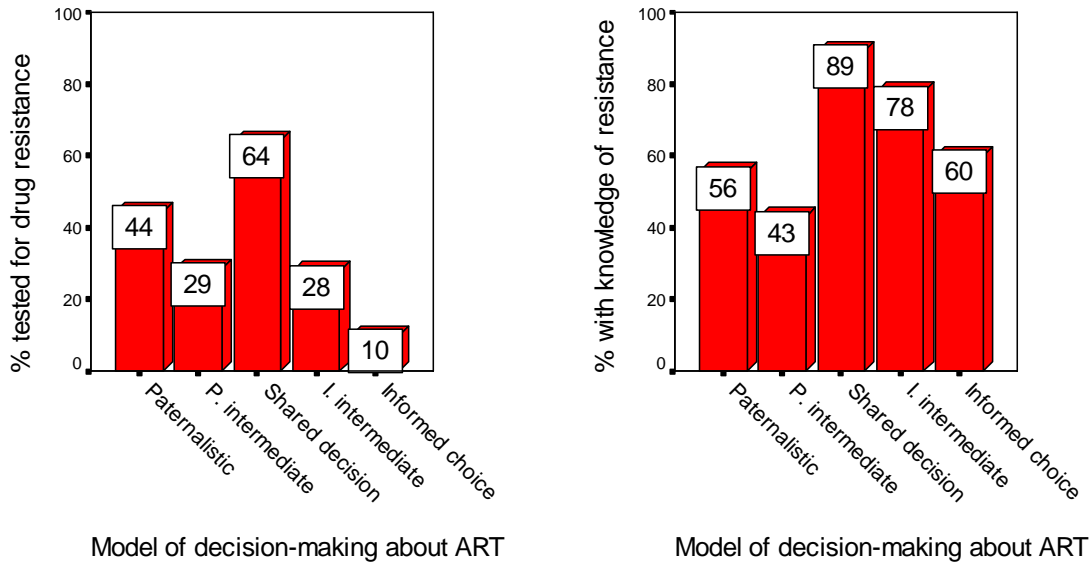


Figure 56: Relationship between the models of decision-making about treatment and performance of drug resistance testing and participants knowledge of drug resistance (n=79).

g) Association between the models of decision-making about treatment and the impact on quality of life

In the 79 participants there were no significant associations between the impact of the decision on quality of life (health/physical function $F_{4, 74} = 2.38$, $p = .06$, psychosocial function $F_{4, 74} = .95$, $p = .44$, and financial situation $F_{4, 74} = 1.72$, $p = .16$) and the models of decision-making about treatment.

h) Association between the models of decision-making about treatment and spirituality/worldview

There was a significant difference between the models of decision-making about treatment and the importance of spirituality/worldview in the decision about ART ($F_{4, 74} = 2.96^*$) (see figure 57).

Spirituality/worldview was significantly less important in making decisions in participants in the paternalistic models (pure/intermediate) than in the shared decision-making/informed choice models (chi-square = 7.33, $p_f = .011$, $df = 1$, OR 7.32**).

- In the paternalistic models (pure/intermediate) 8 (35%) of 23 participants considered spirituality/worldview as important, compared to 38 (68%) of 56 in the shared decision-making/informed choice models. In the intermediate paternalistic model the importance of spirituality/worldview was rated less commonly (6 (44%) of 14 participants) and least commonly in the pure paternalistic model (2 (22%) of 9 participants).

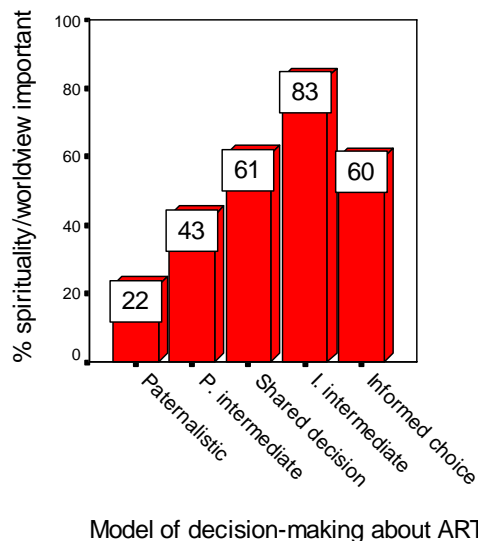


Figure 57: Relationship between the models of decision-making about treatment and the importance of spirituality/worldview in the decision (n=79).

In contrast, spirituality/worldview were significantly more important in making decisions for participants in the informed choice models (pure/intermediate) than in the paternalistic/shared decision-making models (chi-square = 5.02, $p_f = .033$, OR = 5.12*).

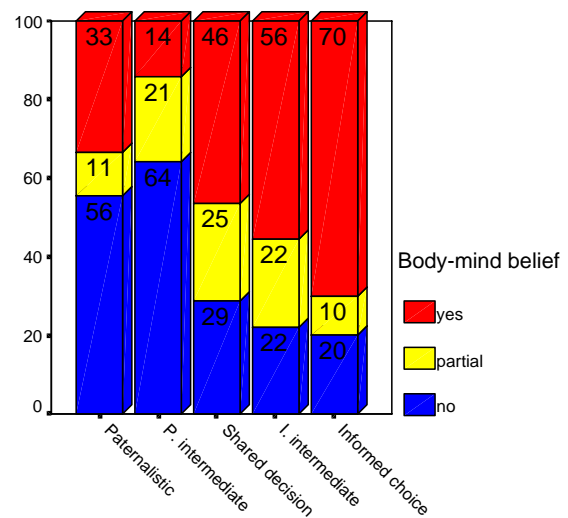
- In the informed choice models (pure/intermediate) 21 (75%) of 28 participants considered spirituality/worldview as important, compared to 25 (49%) of 51 in the paternalistic/shared decision-making models. The intermediate informed choice model had the highest percentage of participants considering spirituality/worldview as important in their decision (15 (83%) of 18 participants), compared to 6 (60%) of 10 participants in the pure informed choice model.

The shared decision-making model vs. the paternalistic/informed choice models was not significantly associated with importance of spirituality/worldview in the decision, although in the shared decision-making model 17 (61%) of 28 participants considered spirituality/worldview as important.

i) Association between the models of decision-making about treatment and belief in body-mind connection

Belief in body-mind connection was significantly different between the models of decision-making about treatment on ($F_{4, 74} = 3.01^*$) (see figure 58). Again, participants in the paternalistic models (pure/intermediate) were significantly less likely to state a body-mind belief than participants in the shared decision-making /informed choice models were (chi-square = 9.78, df 2, OR 9.78**).

- In the paternalistic models (pure/intermediate) 16 (61%) of 23 participants did not state a body-mind belief, compared to only 14 (25%) of 56 in the shared decision-making/informed choice models. In the intermediate paternalistic model 9 (64%) of 14 did not state a belief in resistance, and in the pure paternalistic model 5 (56%) of 9 participants.



Model of decision-making about treatment
 Figure 58: Relationship between the models of decision-making about treatment and belief in body-mind connection (n=79).

The belief in body-mind connection was more prominent in informed choice models (pure/intermediate) (17 (59%) of 28 participants) than in the paternalistic/shared decision-making models (18 (35%) of 51 participants) ($z = -2.25^*$). The highest percentage of body-mind belief was in the pure informed choice model (7 (70%) of 10 participants). The shared decision-making model vs. paternalistic/informed choice models was not significantly associated with body-mind belief. Thirteen (61%) of 28 participants stated a body-mind belief.

j) Association between the models of decision-making about treatment and the preference for complementary or alternative or medicine

The informed choice models (pure/intermediate) vs. paternalistic/shared decision-making models were significantly associated with the preference for complementary or alternative medicine (CAM) ($\chi^2 = 4.63$, $p_f = .054$, $df1$, OR 4.43*).

- In the informed choice models (pure/intermediate) 8 (29%) of 28 participants stated spontaneously a preference for CAM, compared to 5 (10%) of 51 in the paternalistic/shared decision-making models.

2.5.4. Relationships between the models of decision-making about treatment and sharing the reasons for the decision with the doctor

There were significant differences between the models of decision-making about treatment and whether the reasons for the decision were shared with the doctor ($F_{4,74} = 6.41^{***}$) (see figure 59). The shared decision-making model vs. paternalistic/informed choice models was significantly associated with sharing the reasons for the decision with the doctor (chi-square = 5.31, $p_f = .024$, $df1$, OR 6.08*).

- The reasons for the decision were shared with the doctor predominantly in the shared decision-making (26 of 28, 93%) and the intermediate paternalistic model (13 of 14, 93%), followed by the intermediate informed choice model (15 of 18, 83%). Less than half of the participants shared the reasons for their decision with their doctor in the pure informed choice model (4 of 10, 40%) and the pure paternalistic model (4 of 9, 44%).

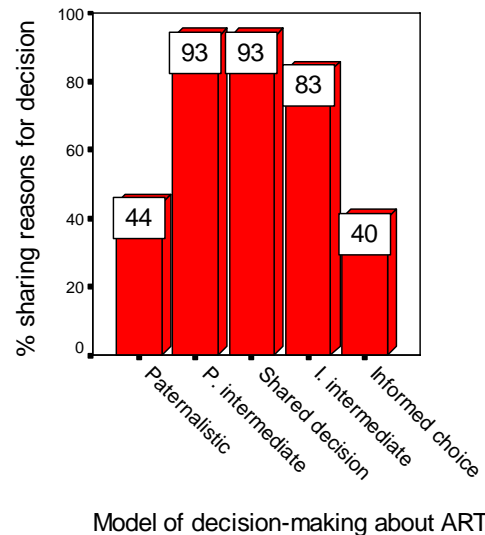


Figure 59: Relationship between the models of decision-making about treatment and sharing the reasons for the decision with the doctor (n=79).

Of the six motives why participants shared their reasons for their decision with their doctor there were significant associations between the motives *to maintain a good relationship* ($F_{4,74} = 4.33^{**}$), *wants/trusts doctor's opinion* ($F_{4,74} = 3.48^*$) and *wants to inform doctor* ($F_{4,74} = 3.01^*$) with the models of decision-making about treatment (see figure 60).

- All three reasons were reported mostly in the shared decision-making model and more commonly in the intermediate paternalistic and intermediate informed choice models, but less commonly in the pure paternalistic and pure informed choice models.

The shared decision-making model vs. paternalistic/informed choice models was significantly associated with the motives to *maintain a good relationship* (chi-square = 9.52, $p_f = .003$, $df1$, OR 9.48**), and *wants/trusts doctor's opinion* (chi-square = 4.36, $p_f = .051$, $df1$, OR 4.56*). In the paternalistic models (pure/intermediate) participants were significantly less likely than in the shared decision-making /informed choice models to share the reasons for the decision with the doctor because of the motive to *maintain a good relationship* (chi-square = 8.56, $p_f = .004$, $df1$, OR 9.53**). No significant associations were found between the other 3 motives

(presence of concerns, doctor asked or laboratory reports alerted doctor) and the models of decision-making about treatment.

Of the seven motives why participants did not share the reasons for their decision with their doctor there were significant associations between 4 motives and the models of decision-making about treatment: *cannot trust doctor's opinion* ($F_{4, 74} = 6,30^{***}$), *anticipates doctor would not support decision* ($F_{4, 74} = 5,69^{**}$), *cannot discuss spiritual or moral issues with doctor* ($F_{4, 74} = 5,59^{**}$) and *cannot discuss feelings with doctor* ($F_{4, 74} = 4,37^{**}$) (see figure 60).

- All these motives not to share the reasons for the decision with the doctor (except for *cannot discuss spiritual or moral issues with doctor*) were common in the pure paternalistic and pure informed choice models, but none of these motives were present in the intermediate paternalistic model. The *anticipation that the doctor would not support the decision* and *not being able to discuss feelings with the doctor* were motives for 2 (11%) of 18 participants in the intermediate informed choice model and one (4%) of 28 participants in the shared decision-making model. In addition, *no trust in doctor's opinion* was reported in one (4%) of 28 participants in the shared decision-making model. *Cannot discuss spiritual or moral issues with doctor* was a motive in 2 (7%) of 28 participants in the shared decision-making model and 4 (40%) of 10 participants in the pure informed choice model.

In the informed choice models (pure/intermediate) participants were significantly more likely than in the paternalistic/shared decision-making models not to share the reasons for their decision with their doctor, because of the motive *anticipates doctor would not support decision* (chi-square = 4.44, $p_f = .046$, df_1 , OR 4.23*). No significant differences were seen on the other motives between the models of decision-making about treatment: *doctor does not ask*, *doctor does not need to know*, and *has not seen doctor yet*.

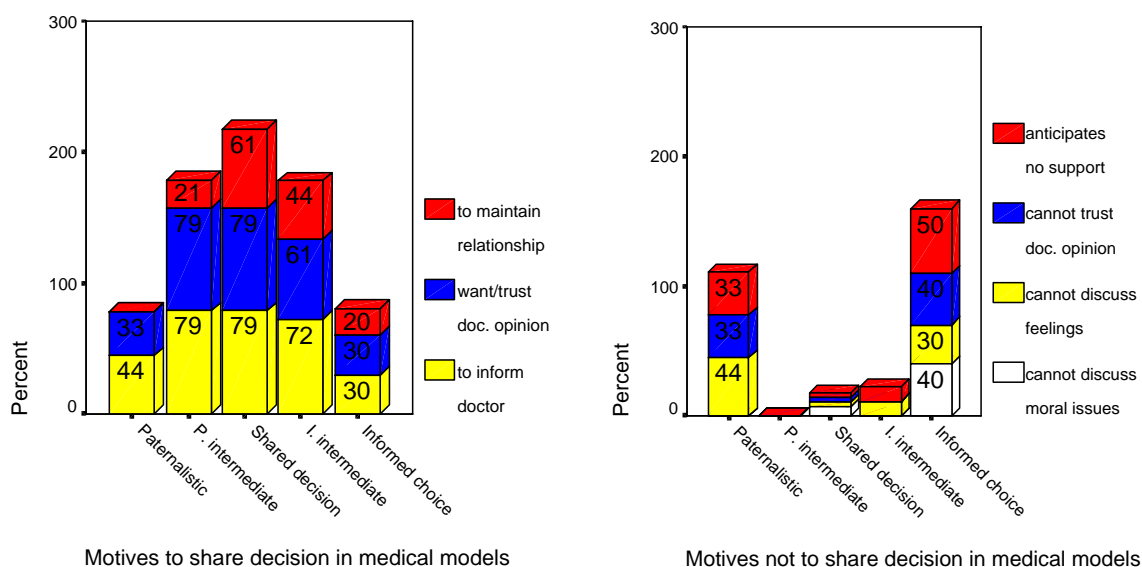


Figure 60: Relationship between the models of decision-making about treatment and the motives to share or not to share the reasons for the decision with the doctor (n=79).

2.5.5. Relationship between the models of decision-making about treatment and sharing the reasons for non-adherence with the doctor

In the 58 participants taking ART there were significant differences between the models of decision-making about treatment and whether the reasons for non-adherence were shared with the doctor ($F_{4,53} = 3.53^*$) (see figure 61). This relationship was significant despite the small number of participants taking ART who were assigned to the pure paternalistic and pure informed choice model.

- In the pure paternalistic (n=5) and pure informed choice model (n=2) all participants reported sharing their reasons for non-adherence with their doctor. In the intermediate paternalistic model 12 (92%) of 13 did share their reasons for non-adherence, followed by 21 (84%) of 25 participants in the shared decision-making model and 6 (46%) of 13 participants in the intermediate informed choice model.

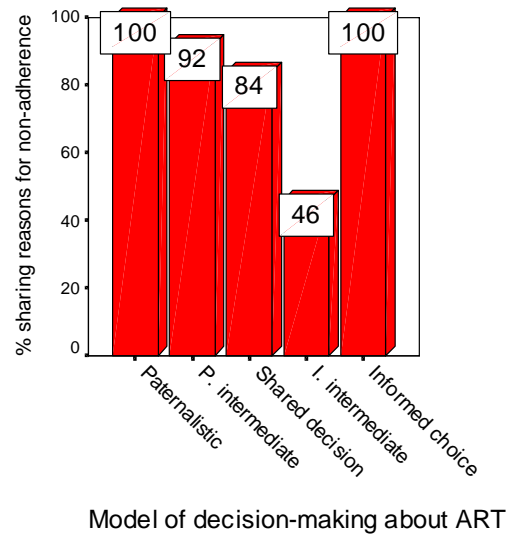


Figure 61: Relationship between the models of decision-making about treatment and sharing the reasons for the decision with the doctor (n=79).

In the informed choice models (pure/intermediate) vs. the paternalistic/shared decision-making models participants were less likely to share their reasons for non-adherence with their doctor (chi-square = 8.32, $p_f = .008$, df 1, OR 7.50**).

There were no significant associations between the models of decision-making about treatment and the motives to share the reasons for non-adherence with the doctor.

2.5.6. Associations between the models of decision-making about treatment and sources of information

a) Associations between the models of decision-making about treatment and the doctor as a source of information

The models of decision-making about treatment differed significantly on the use of the doctor as a source of information ($F_{4,74} = 6.05^{***}$) (see figure 62). In the informed choice models (pure/intermediate) participants made less use of the doctor a source of information, compared to the paternalistic/shared decision-making models ($z = -3.42^{**}$).

- All participants in the pure paternalistic (n=9), the intermediate paternalistic (n=14) and the shared decision-making model (n=28) used information from their doctor, whereas in the intermediate informed choice model 16 (89%) of 18 participants and in the pure informed choice model 6 (60%) of 10 used information from their doctor.

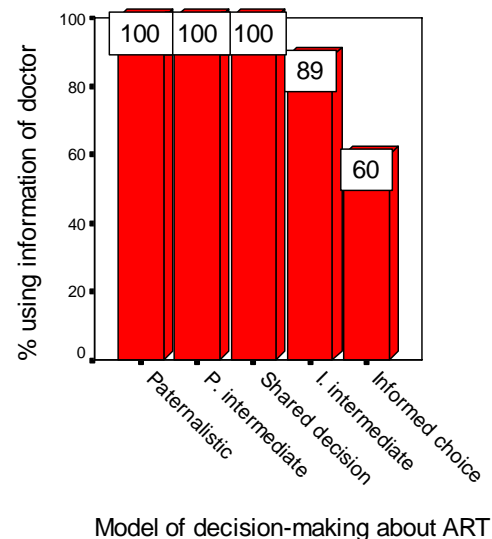


Figure 62: Relationship between the models of decision-making about treatment and using the doctor as a source of information in the decision (n=79).

b) Associations between the models of decision-making about treatment and publications as a source of information

Regarding publications as a source of information, between the models of decision-making about treatment significant differences were found on the use of seminars, conferences or symposia as a source of information ($F_{4,74} = 6.09^{***}$) (see figure 63). In the paternalistic models (pure/intermediate) participants were significantly less likely to use seminars, conferences or symposia as a source of information than in the shared decision-making/informed choice models (chi-square = 9.75, $p_f = .002$, df_1 , OR 9.88**).

- This information source was most prominent in the shared decision-making model (19 of 28, 68%) followed by the intermediate informed choice (10 of 18, 56%) and the pure informed choice model (4 of 10, 40%). Less use of seminars, conferences and symposia was reported in the intermediate paternalistic model (2 of 14, 14%) and no use at all in the pure paternalistic model (none of 9, 0%).

Further, there was a significant difference between the models of decision-making about treatment on the reported use of expert literature ($F_{4,74} = 4.40^{**}$) (see figure 63). In the paternalistic models (pure/intermediate) participants were significantly less likely to use expert literature as a source of information than in the shared decision-making/informed choice models (chi-square = 12.70, $p_f = .000$, df_1 , OR 14.68***).

- In the shared decision-making model 16 of 28 (57%) and in the intermediate informed choice model 10 of 18 (56%) reported the use of expert literature (see figure 63), followed by 3 of 10 (30%) in the pure informed choice model. Less use of expert literature was in the intermediate paternalistic model (1 of 14, 7%) and the pure paternalistic model (1 of 9, 11%).

Significant differences were found between the models of decision-making about treatment and on the reported use of the Internet as a source of information ($F_{4,74} = 3.45^*$) (see figure 63). In the paternalistic models (pure/intermediate) participants were significantly less likely to use Internet as a source of information than in the shared decision-making/informed choice models (chi-square = 10.39, $p_f = .001$, df_1 , OR 11.16**).

- In the shared decision-making model 18 of 28 (68%) reported use of the Internet, followed by 10 of 18 (56%) in the intermediate informed choice model and 4 of 10 (40%) in the pure informed choice model. Less use of the Internet was reported in the pure paternalistic model (1 of 9, 11%) and the intermediate paternalistic model (3 of 14, 21%).

Additionally the use of positive magazines was significantly different between the models of decision-making about treatment ($F_{4,74} = 2.88^*$) (see figure 63). Again, in the paternalistic models (pure/intermediate) participants were significantly less likely to use positive magazines as a source of information than in the shared decision-making/informed choice models (chi-square = 5.50, $p_f = .029$, df_1 , OR 5.26*).

- The highest percentage of lecture of positive magazines as a source of information was reported in the intermediate informed choice model (16 of 18, 89%) followed by the shared decision-making model (23 of 28, 82%). Less use of positive magazines as source of information was reported in the pure informed choice model (5 of 10, 50%), the intermediate paternalistic model (7 of 14, 50%) and the pure paternalistic model (5 of 9, 56%).

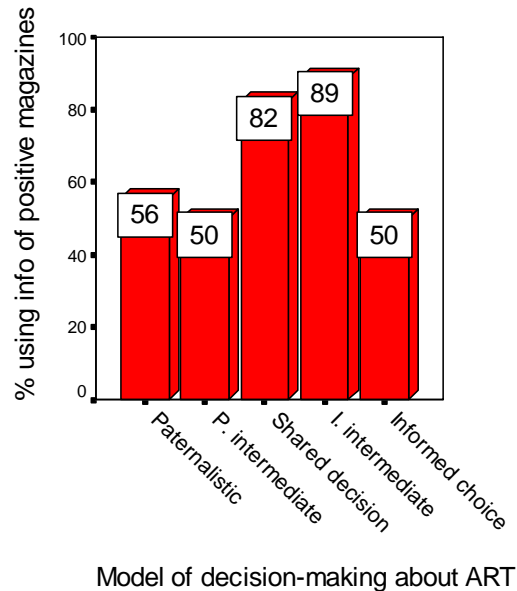
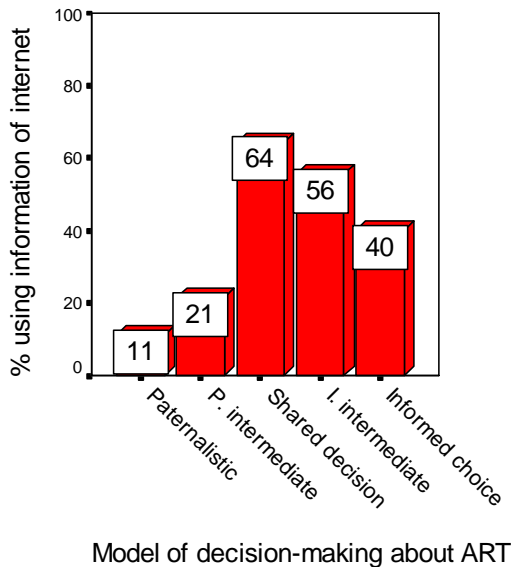
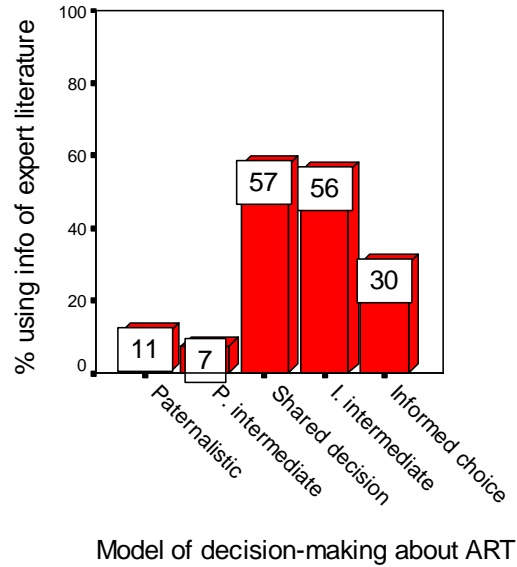
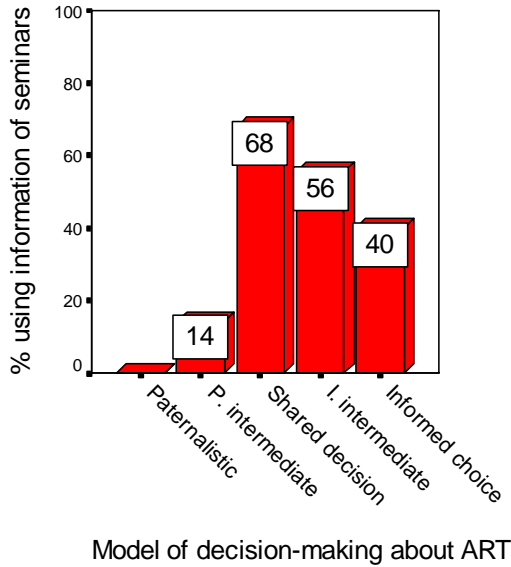


Figure 63: Relationship between the models of decision-making about treatment and the use of seminars (conferences/symposia), expert literature, internet and positive magazines as a source of information in the decision (n=79).

c) Associations between the models of decision-making about treatment and people living with HIV as a source of information

In the paternalistic models (pure/intermediate) participants were significantly less likely to use information from peer-educators in the decision about ART than participants in the shared decision-making/informed choice models ($z = -2.42^*$).

- In the paternalistic models (pure/intermediate) only 2 (9%) of 23 participants used information from peer-educators in their decision about ART compared to 20 (36%) of 56 participants in the shared decision-making/informed choice models

In addition, in the paternalistic models (pure/intermediate) participants were significantly less likely to use information from their HIV-positive partners than in the shared decision-making/informed choice models ($z = -2.25^*$).

- None of the 23 participants in the paternalistic models (pure/intermediate) considered their HIV positive partners as a source of information compared to 10 (18%) of 56 participants in the shared decision-making/informed choice models. However, it is not known how many participants at all had an HIV positive partner.

d) Associations between the models of decision-making about treatment and people not living with HIV as a source of information

Overall the use of people not living with HIV (other medical experts, naturopath/nutritionist, friends, partner, family members, case manager) as a source of information was significantly different among the models of decision-making about treatment ($F_{4,74} = 4.21^{**}$) (see figure 64).

- Other HIV negative people as a source of information were most frequently reported in the shared decision-making model (18 of 28, 64%), followed by the intermediate informed choice (10 of 18, 56%) and the pure informed choice model (4 of 10, 40%) and less frequently in the pure paternalistic (1 of 9, 11%) and the intermediate paternalistic model (2 of 14, 14%).

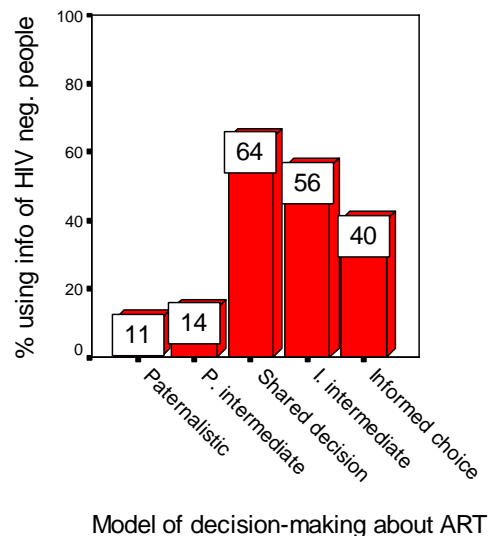


Figure 64: Relationship between the models of decision-making about treatment and the use of people not living with HIV as a source of information in the decision (n=79).

In the paternalistic models (pure/intermediate) participants were less likely to use information from people not living with HIV than in the shared decision-making/informed choice models

(chi-square = 12.85, $p_f = .000$, df_1 , OR 14.19***). This accounts particularly for consulting other medical experts (chi-square = 7.90, $p_f = .005$, df_1 , OR 9.19**) and a naturopath/nutritionist (chi-square = 5.32, $p_f = .025$, df_1 , OR 6.16***). Conversely in the shared decision-making model participants were more likely to use information from people not living with HIV than in the paternalistic/informed choice models (chi-square = 7.02, $p_f = .010$, df_1 , OR 7.07**). Contrary to expectation, the informed choice models (pure/intermediate) vs. the paternalistic/shared decision-making models were not significantly associated with the use of information from other people living with HIV as a source of information.

e) Associations between the models of decision-making about treatment and the importance of the sources of information

Focusing on the importance of the source of information rather than what kind of information is used, there was a significant difference between the models of decision-making about treatment on the importance of the doctor as a source of information ($F_{4, 74} = 9.34^{***}$) (see figure 65). The information from the doctor was significantly less important in the informed choice models (pure/intermediate) than in the shared decision-making/paternalistic models ($z = -3.91^{***}$). On the other hand the information from the doctor was significantly more important in the shared decision-making model than in the paternalistic/informed choice models ($z = -2.93^{**}$).

- The information from the doctor was *very much* important in the shared decision-making model (mean 4.71, SD .60), followed by the intermediate paternalistic model (mean 4.64, SD 1.08). It was *much* important in the pure paternalistic (mean 3.67, SD 1.41) and the intermediate informed choice model (mean 3.67, SD 1.68). Rather *little* importance of the information from the doctor in the decision about ART was reported in the pure informed choice model (mean 2.0, SD 2.0).

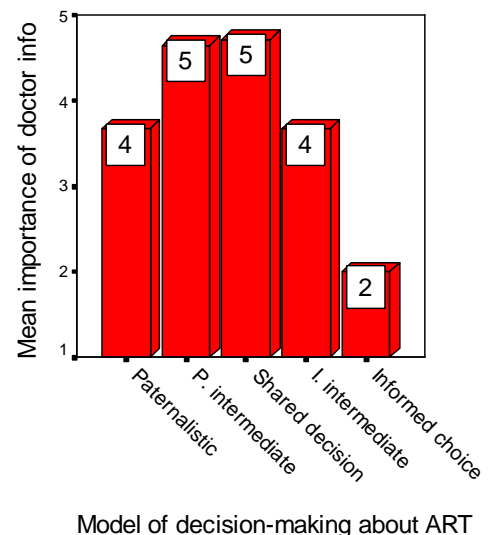


Figure 65: Relationship between the models of decision-making about treatment and the importance of the information from the doctor in the decision (scale from 0 = *not at all* to 5 = *very much*) (n=79).

Further, in the paternalistic models (pure/intermediate) the 23 participants considered the information from other people not living with HIV as significantly less important (mean .61, SD 1.62) than the 56 participants in the shared-decision-making/informed choice models (mean 2.18, SD 2.18) ($z = -3.23^{***}$).

2.5.7. Associations between the models of decision-making about treatment and medical, socio-demographic, and behavioral parameters

a) Associations between the models of decision-making about treatment and medical parameters

In the shared decision-making model the 28 participants in the shared decision-making model reported significantly more category B symptoms (including diarrhea and peripheral neuropathy) in the Physical Symptoms Checklist (mean 1.25, SD 1.04) than the 51 participants in the paternalistic/informed choice models (mean .76, SD .93) ($z = -2.12^*$). There are no significant associations between the models of decision-making about treatment and category B symptoms excluding diarrhea and peripheral neuropathy, or category C symptoms, CD4 stage (less than 200 cells/ μ l, absolute CD4 cells/ μ l, CD4 cell nadir, viral load copies/ml, viral load log, changes in CD4 cells or viral load over the past year, or time since diagnosis of HIV-infection).

b) Associations between the models of decision-making about treatment and socio-demographic parameters

In the paternalistic models (pure/intermediate) the 23 participants had a significantly lower income level (mean 2.13, SD 1.29, which is on average \$5,000-\$10,000), than the 51 participants in the shared decision-making/informed choice models (mean 3.07, SD 1.86, which is on average \$10,000-\$20,000) ($z = -2.18^*$).

No significant associations were found between the models of decision-making about treatment and education, health insurance, employment, age, ethnicity, gender, sexual orientation, or having a partner.

c) Associations between the models of decision-making about treatment and behavioral parameters

The models of decision-making about treatment differed significantly on the use of complementary or alternative therapies ($F_{4,74} = 2.51^*$) (see figure 66). Participants in the shared decision-making model were significantly more likely to use complementary or alternative therapies than participants in the paternalistic/informed choice models (chi-square = 7.50, $p_f = .009$, df_1 , OR 7.69**)

- In the shared decision-making model 20 (71%) of 28 participants reported use of complementary or alternative treatments, followed by 9 (50%) of 18 participants in the intermediate informed choice model, 4 (40%) of 10 participants in the pure informed choice model, 5 (36%) of 14 participants in the intermediate paternalistic model and 2 (22%) of 9 participants in the pure paternalistic model.

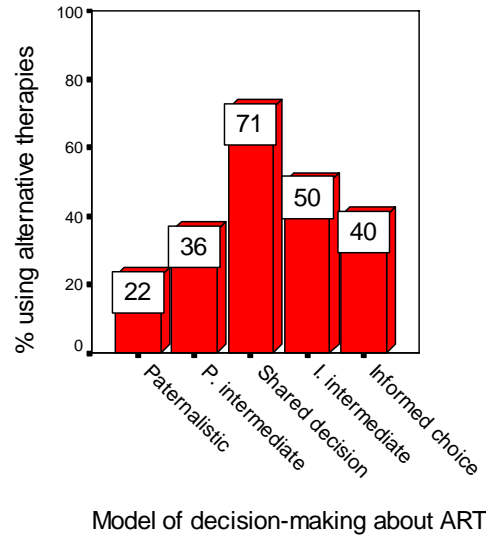


Figure 66: Relationship between the models of decision-making about treatment and using people not living with HIV as a source of information in the decision (n=79).

No significant associations were found between the models of decision-making about treatment and use of vitamins, smoking, or any use of alcohol or recreational drugs.

2.5.8. Summary of the models of decision-making about treatment (*aim 5*)

The raters categorized the participant's responses in the interview according to the models of decision-making about treatment as described by Charles et al. (1999): The most frequently rated was the shared decision-making model (28 of 79, 35%), followed by the intermediate informed choice model (18 of 79, 23%), the intermediate paternalistic model (14 of 79, 18%), the pure informed choice model (10 of 79, 13%), and the pure paternalistic model (9 of 79, 11%).

Significant differences were found between the models of decision-making about treatment on:

- The importance ($F_{4,74} = 9.34^{***}$) and use ($F_{4,74} = 6.05^{***}$) of the doctor as a source of information, as well as the decision to take ART ($F_{4,74} = 7.34^{***}$) (*most in shared decision-making models, less in informed choice models*)
- Sharing the reasons for the decision with the doctor ($F_{4,74} = 6.41^{***}$) (mainly because of the motives: *to maintain a good relationship* ($F_{4,74} = 4.33^{**}$), *wants/trusts doctor's opinion* ($F_{4,74} = 3.48^*$), *wants to inform doctor* ($F_{4,74} = 3.01^*$)) (*most in shared decision-making model, less in pure paternalistic/informed choice models*)
- Not sharing the reasons for the decision with the doctor because of the motives: *cannot trust doctor's opinion* ($F_{4,74} = 6.30^{***}$), *anticipates doctor would not support decision* ($F_{4,74} = 5.69^{**}$) *cannot discuss spiritual or moral issues with doctor* ($F_{4,74} = 5.59^{**}$) *cannot discuss feelings with doctor* ($F_{4,74} = 4.37^{**}$) (*most in pure informed choice/paternalistic models, less in intermediate paternalistic model*)
- The use the following sources of information: seminars, conferences or symposia ($F_{4,74} = 6.09^{***}$), expert literature ($F_{4,74} = 4.40^{**}$), people not living with HIV ($F_{4,74} = 4.21^{**}$), Internet ($F_{4,74} = 3.45^*$), and positive magazines ($F_{4,74} = 2.88^*$). The importance of the decision ($F_{4,74} = 3.52^{**}$), and the sum of side effects reported in the interviews ($F_{4,74} = 2.60^*$) (*less in paternalistic models*)
- Sharing the reasons for non-adherence with the doctor ($F_{4,53} = 3.53^*$) (*less in intermediate informed choice model*)
- The knowledge about resistance ($F_{4,74} = 3.29^*$), the performance of resistance testing ($F_{4,69} = 2.58^*$) and the use of complementary or alternative therapies ($F_{4,74} = 2.51^*$) (*most in shared decision making models, less in paternalistic models*)
- The belief in body-mind connection ($F_{4,74} = 3.01^*$) and the importance spirituality or worldview in the decision ($F_{4,74} = 2.96^*$) (*most in informed choice models, less in paternalistic models*)

In the paternalistic models (pure/intermediate), participants were significantly **less** likely than in the shared decision-making/informed choice models

- to use of people not living with HIV as a source of information (chi-square = 12.85, $p_f = .000$, df1, OR 14.19^{***}) (mainly not use other medical experts (chi-square = 7.90, $p_f = .005$, df1, OR 9.19^{**}) and naturopath/nutritionist (chi-square = 5.32, $p_f = .025$, df1, OR 6.16^{***}))
- to use expert literature (chi-square = 12.70, $p_f = .000$, df1, OR 14.68^{***}), Internet (chi-square = 10.39, $p_f = .001$, df1, OR 11.16^{**}), seminars, conferences or symposia (chi-square = 9.75, $p_f = .002$, df1, OR 9.88^{**}), or positive magazines (chi-square = 5.50, $p_f = .029$, df1, OR 5.26^{*}) as a source of information
- to state spontaneously a body-mind belief (chi-square = 9.78^{**}, df 2, OR 9.78^{**})
- to share the reasons for the decision with the doctor because of the motive to *maintain a good relationship* (chi-square = 8.56, $p_f = .004$, df1, OR 9.53^{**})
- to have knowledge of resistance (chi-square = 8.36, $p_f = .006$, df1, OR 7.97^{**})
- to consider spirituality/worldview in the decision about ART (chi-square = 7.33, $p_f = .011$, df 1, OR 7.32^{**})

In the paternalistic models (pure/intermediate) compared to the shared decision-making/informed choice models participants reported a significantly **lower**

- importance of other people not living with HIV as a source of information ($z = -3.23$ ^{***})
- sum of side effects in the interviews ($z = -2.71$ ^{*})
- use of peer-educators ($z = -2.42$ ^{*}) or HIV-positive partners as a source of information ($z = -2.25$ ^{*})
- income level ($z = -2.18$ ^{*})

In the shared decision-making model, participants were significantly **more** likely than in the paternalistic/informed choice models

- to have a resistance test performed (chi-square = 10.17, $p_f = .002$, df1, OR 10.21^{***}) and to have knowledge about resistance (chi-square = 10.17, $p_f = .009$, df 1, OR 7.92^{**})
- to use complementary or alternative therapies (chi-square = 7.50, $p_f = .009$, df1, OR 7.69^{**})
- to use people not living with HIV as a source of information (chi-square = 7.02, $p_f = .010$, df1, OR 7.07^{**})
- to take ART (chi-square = 5.60, $p_f = .019$, df1, OR 6.20^{*})
- and to share the reasons for the decision with the doctor (chi-square = 5.31, $p_f = .024$, df1, OR 6.08^{*}) (mainly because of the motives to *maintain a good relationship* (chi-square = 9.52, $p_f = .003$, df1, OR 9.48^{**}), and *wants/trusts doctor's opinion* (chi-square = 4.36, $p_f = .051$, df1, OR 4.56^{*}))

In the shared decision-making model compared to the paternalistic/informed choice models, participants reported a significantly **higher**

- importance of the doctor as a source of information ($z = -2.93^{**}$)
- tendency not to change or even stop ART, if side effects were experienced or anticipated ($n=67, z = -2.55^*$)
- sum of category B symptoms (including diarrhea and peripheral neuropathy) in the physical symptoms checklist ($z = -2.12^*$).
- tolerance of side effects, if effects were experienced ($n=59, z = -2.07$)

In the informed choice models (pure/intermediate), participants were significantly **more** likely than in the paternalistic/shared decision-making models

- to be ART naïve (chi-square = 9.72, $p_f = .004$, df_1 , OR 11.00^{**})
- not to take ART (chi-square = 8.75, $p_f = .007$, df_1 , OR 8.5^{**})
- not to share their reasons for non-adherence with their doctor (chi-square = 8.32, $p_f = .008$, df_1 , OR 7.50^{**}), (but it has to be noted that this accounts particularly for the intermediate informed choice model)
- to consider anticipated side effects in their decision about ART (chi-square = 6.76, $p_f = .012$, df_1 , OR 6.62^{**})
- to consider spirituality/worldview in their decision about ART (chi-square = 5.02, $p_f = .033$, OR = 5.12^{*})
- to prefer complementary or alternative medicine (chi-square = 4.63, $p_f = .054$, df_1 , OR 4.43^{*}).
- not to share the reasons for their decision with their doctor, because of the motive *anticipates doctor would not support decision* (chi-square = 4.44, $p_f = .046$, df_1 , OR 4.23^{*})

In informed choice models (pure/intermediate) participants) compared to the paternalistic/shared decision-making models participants reported significantly

- a **higher** belief in body-mind connection ($z = -2.25^*$) and conversely significantly
- **less** use of the doctor a source of information ($z = -3.42^{**}$)
- **less** importance of the doctor as a source of information ($z = -3.91^{***}$).

2.6. Summary of the results of the qualitative study

Figure 67 (p. 174) summarizes the main results of the qualitative study on the decisions made about ART (**aim1**), the reasons why the participants made this decision (**aim 2**), the motives to share or not to share the reasons for the decision about ART and the reasons for non-adherence with the doctor (**aim 3**), and the sources of information used in the decision about ART (**aim 4**).

a) Reasons for the decision about ART

The primary intention of the qualitative part of the study was to investigate which medical decisions PLWH made over the past year (**aim 1**) and why they have made them (**aim 2**):

aim 1) Five different decisions made about ART over the past year were identified: to change (28 of 79, 35%), to maintain (22 of 79, 28%), to stop (16 of 79, 20%), to restart (8 of 79, 10%) and not to start (5 of 79, 6%) (see figure 67).

aim 2) Generally 10 criteria were relevant in the decision about ART (see figure 67):

- Surrogate markers: 69 (87%) of 79 participants considered surrogate markers as important (61 of 79, 77%) or partially important (8 of 79, 10%).
- Better quality of life: 67 (85%) of 79 participants improved in physical/psychosocial function (note: 36 (46%) of 79 participants improved in both, physical and psychosocial function)
- Beliefs about resistance: 62 (66%) of 79 participants believed in a link (40 of 79, 51%) or possible (12 of 79, 15%) link between adherence and drug resistance (note: 23 (29%) of 79 participants had no knowledge of resistance).
- Body-mind belief: 51 (65%) of 79 participants mentioned a belief (35 of 79, 44.5%) or partial belief (16 of 79, 20.5%) in body-mind connection.¹
- Side effects: 47 (59%) of 79 participants considered changing (24 of 79, 30%) or stopping ART (23 of 79, 29%) for experienced/anticipated side effects.
- Easy to take regimen: 46 (58%) of 79 participants mentioned the importance of an easy to take regimen.¹
- Spirituality/worldview: 46 (58%) of 79 participants consider spirituality (38 of 79, 48%) or worldview (8 of 79, 10%) in their decision about ART.
- Drug resistance: 32 (41%) of 79 participants reported the performance of drug resistance testing (note: 19 (58%) of 33 participants in which resistance testing was recommended over the past year (viral load > 1000 copies/ml after 6 months ART) reported resistance testing).

¹ Spontaneously stated

- Experience of HIV/AIDS symptoms: 31 (39%) of 79 participants reported the experience of HIV/AIDS symptoms (note: HIV/AIDS symptoms were underreported in the interviews).
- Preference for complementary/alternative medicine: 13 (17%) of 79 participants mentioned a preference for complementary/alternative medicine.¹ (note: 40 (51%) of 79 participants used complementary/alternative treatments according to the behavioral questionnaire)

Four reasons (HIV/AIDS symptoms, side effects of ART, quality of life and preference for complementary/alternative medicine) were more prevalent in one decision as opposed to the other:

- The experience of HIV/AIDS symptoms was significantly weakly inversely correlated with taking ART or not ($r = -.22^*$), despite symptoms were underreported in the interviews. *Participants taking ART experienced less HIV/AIDS symptoms than participants not taking ART.*
- All 5 ART naïve participants never started ART because of anticipated *side effects*. Of the 74 ART experienced participants the 58 participants taking ART did tolerate side effects better and reported less experience of side effects than the 16 participants stopping ART ($r = -.26^*$). *Avoidance of experienced/anticipated side effects was more prevalent in participants not taking ART than in participants taking ART.*
- With respect to *quality of life*, participants not taking ART (which includes to stop or not to start ART) were more likely to perceive a benefit in psychosocial quality of life than participants taking ART ($r = .32^{**}$). Participants who felt that the decision about ART was associated with a better psychosocial quality of life were also significantly more likely to have an associated decline in CD4 cells over the previous year ($r = -.27^{**}$). *It appears that participants not to taking ART feel better (i.e., perceive a better psychosocial quality of life) than participants taking ART, but their CD4 cells go down.* Surprisingly the decision to take ART or not was not significantly associated with a perception of a benefit in health-related quality of life. Looking at the impact of the decision about ART on physical and psychosocial function four major groups have been identified:
 - For 11 (52%) of the 21 participants not taking ART both physical and psychosocial function improved.
 - For 25 (43%) of the 58 participants taking ART both physical and psychosocial function improved.

¹ Spontaneously stated

- For 13 (22%) of the 58 participants taking ART physical function improved but psychosocial function did not change.
- For 8 (14%) of the 58 participants taking ART physical function improved but psychosocial function deteriorated.
- Overall participants taking ART was significantly less likely to state a *preference for complementary/alternative* medicine ($r = -.43^{***}$) than participants no taking ART.

One-third interrupted treatment within the last year, mainly for reasons for drug toxicity, drug resistance and preference for complementary/alternative medicine. Social problems (substance use, lack of insurance, homeless) or pill burden were only single motives for participants to interrupt treatment. A small subgroup of five participants was still ART naïve because they preferred alternative treatments and wanted to avoid anticipated side effects of ART.

Individual aspects with influence on the decision were communication problems with the doctor, social comparison, loss of health insurance, the “mom-factor”, the empowerment of saying no, the attitude towards death, US immigration restrictions, being a parent, being a peer educator, social stigma through body shape changes related to ART, running out of treatment options and treating a progressing hepatitis B co-infection with ART.

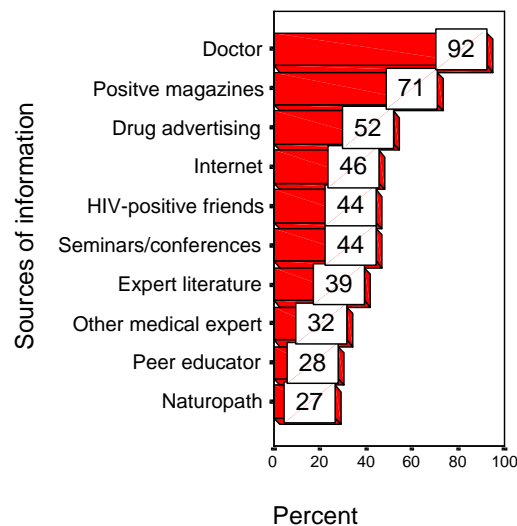
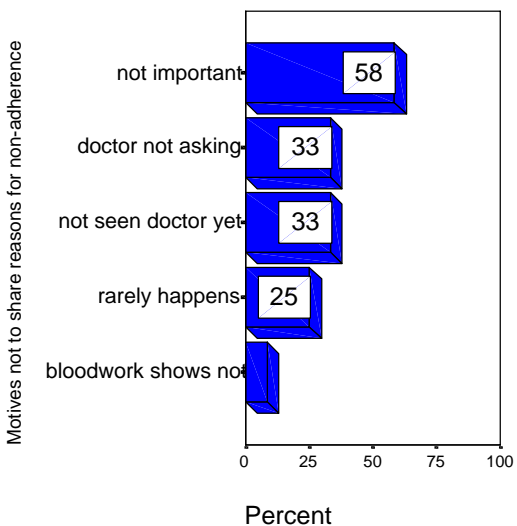
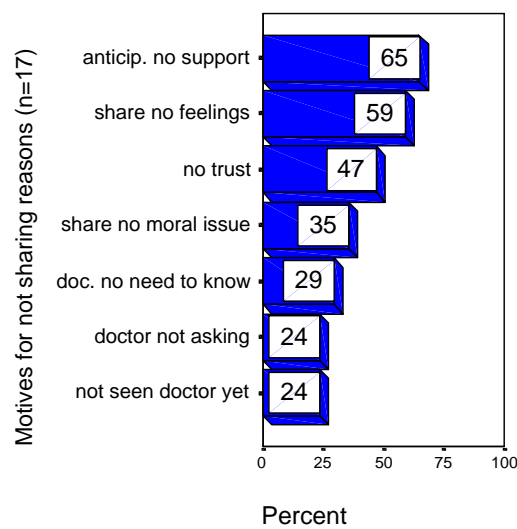
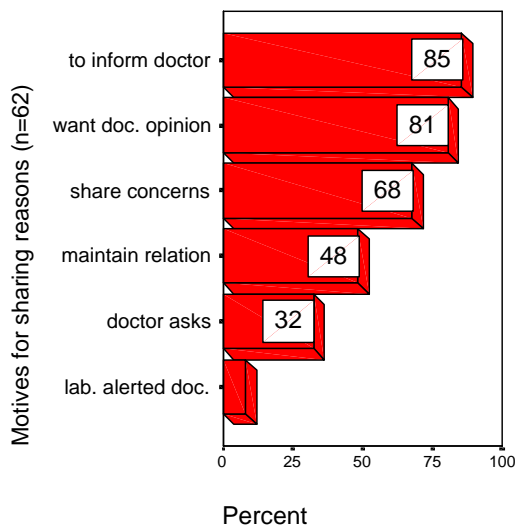
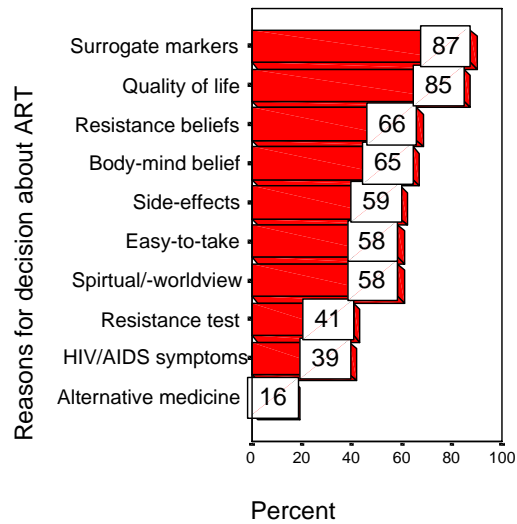
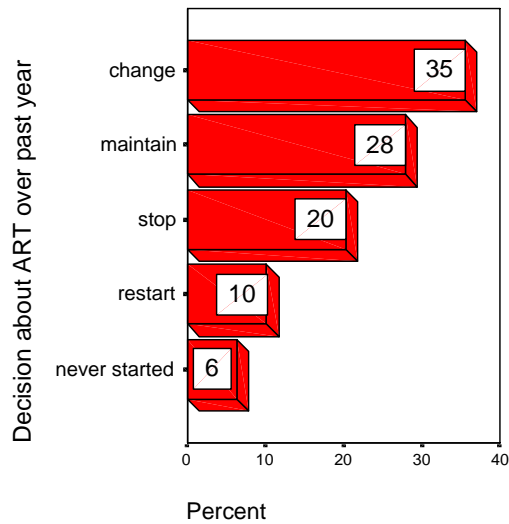


Figure 67: Overview of the results of the qualitative study: Frequency distributions of decisions made about ART, reasons for decision made about ART, motives for sharing reasons for decision about ART with doctor or not, sources of information used in the decision about ART (n=79) and motives not to share reasons for non-adherence with doctor (n=58).

b) Why did patients fail to discuss the reasons for their decision about ART and the reasons for non-adherence with their doctor?

Participants taking ART were more likely to share the reasons for their decision with their doctor than participants not taking ART ($r = .38^{**}$): Most participants taking ART continuously over the past year shared the reasons for their decision with their doctor (47 of 50, 94%), followed by ART naive participants (3 of 5, 60%), whereas participants who interrupted ART (started/restarted) over the past year did less share the reasons for their decision with their doctor (12 of 24, 50%). The next objective was to determine why patients failed to discuss the reasons for their decision about ART and the reasons for non-adherence with their doctors **(aim 3)**.

Seven motives were identified, why 17 (22%) of 79 participants failed to share the **reasons for their decision** with their doctor (see figure 67): *Anticipation that the doctor would not support decision* (11 of 17, 65%), *cannot discuss feelings with their doctor* (10 of 17, 59%), *cannot trust their doctor's opinion* (8 of 17, 47%), *cannot discuss spiritual or moral issues with their doctor* (6 of 17, 35%), *doctor does not need to know* (5 of 17, 29%), *doctor did not ask* (4 of 17, 24%) and *have not seen their doctor yet* (4 of 17, 24%). Participants taking ART were less likely than participants not taking ART to report the *anticipation that the doctor would not support the decision* ($r = -.50^{**}$), *having no trust in doctor's opinion* ($r = -.46^{**}$) and *not being able to discuss spiritual or moral issues with the doctor* ($r = -.37^{**}$). The anticipation that the doctor would not support the decision explains 82% of variance in telling the doctor why they did not take ART ($\beta = -.91^{***}$, $F_{1,19} = 89.57^{***}$)

Conversely, seven motives were identified, why 62 (78%) of 79 participants shared the reasons for their decision with their doctor (see figure 67): *want to inform their doctor* (53 of 62, 85%), *want or trust doctor's opinion* (50 of 62, 81%), *presence of concerns* (42 of 62, 68%), *to maintain a good relationship with their doctors* (30 of 62, 48%), *the doctor asked* (20 of 62, 32%) and *the laboratory reports alerted the doctor* (5 of 62, 8%). Participants taking ART were more likely than participants not taking ART to report the motives: *wants to inform doctor* ($r = .37^{**}$), *presence of concerns* ($r = .35^{**}$) and *wants/trusts doctor's opinion* ($r = .31^{**}$), which explain together 63 % of variance in telling the doctor why they took ART ($F_{3,54} = 30.12^{***}$).

Six motives not to share (*doctor does not need to know*, *have not seen their doctor yet*, *cannot trust their doctor's opinion*, *anticipate that doctor would not support decision*, *cannot discuss spiritual or moral issues with their doctor*, *doctor did not ask them*) and one motive to

share (*wants to inform doctor*) explain together 93% of variance in telling the doctor the reasons for the decision ($F_{7,71} = 139.99^{***}$).

Five motives were identified, why 12 (21%) of 58 participants taking ART did not share the **reasons for non-adherence** with their doctor (see figure 67): *no importance to talk to the doctor* (7 of 12, 58%), *doctor did not ask* (4 of 12, 33%), *not seen doctor yet* (4 of 12, 33%), *it rarely/never happens* (3 of 12, 25%), and it did not “*show up on the blood work*” (one of 12, 8%). Not sharing the reasons for non-adherence was significantly associated with the motive *has not seen the doctor yet* ($r = .53^{**}$).

Analogue 6 motives were identified, why most participants on ART (46 of 58, 79%) shared the reasons for non-adherence with their doctor: *importance to talk to the doctor* (33 of 46, 70%), *doctor asked* (17 of 46, 36%), *to keep up a friendly relationship* with the doctor (9 of 46, 19%), it “*showed up on the blood work*” (8 of 46, 17%), *it rarely/never happens* (7 of 46, 15%) and *running out of prescriptions* (2 of 46, 4%). Sharing the reasons for the decision with the doctor was significantly associated with the motives *importance to talk to the doctor about adherence* ($r = .75^{***}$), *doctor asks* ($r = .51^{***}$), and “*showing up on blood-work*” ($r = .28^*$).

Two motives to share reasons for non-adherence (*importance to talk to the doctor about adherence*, *doctor asks*) and one motive not to share the reasons for non-adherence (*has not seen the doctor yet*) explain together 78 % of variance in patients telling the doctor why they miss doses ($F_{3,54} = 62.61^{***}$).

c) Which sources of information did PWH use in their decision about ART?

A further objective was to list the sources of information PLWH have used to make their decision (**aim 4**).

The ten most frequently used sources of information comprised of: doctor (73 of 79, 92%), “positive magazines” (56 of 79, 71%), drug advertising (41 of 79, 52%), Internet (36 of 79, 46%), HIV-positive friends (35 of 79, 44%), seminars/conferences/symposia (35 of 79, 44%), expert literature (31 of 79, 39%), other medical experts (25 of 79, 32%), peer educators (22 of 79, 28%), and naturopaths/nutritionists (21 of 79, 27%) (see figure 67).

The doctor as a source of information was considered on average as *much* important, followed by an on average *moderate* importance of publications (e.g., positive magazines, drug advertising, Internet, seminars/conferences/symposia, expert literature). On average less important sources of information, were other people living or not living with HIV (e.g.,

(HIV positive friends, other medical experts, peer educators, naturopaths/nutritionists). The most frequent and important source of information for the decision about ART was the doctor. The importance of the information from the doctor was significantly correlated with the decision to take ART ($r = .59^{***}$).

d) Models of decision-making about ART

The raters categorized the participant's responses in the interview according to the models of decision-making about treatment as described by Charles et al. (1999) (**aim 5**): The most frequently rated was the shared decision-making model (28 of 79, 35%), followed by the intermediate informed choice model (18 of 79, 23%), the intermediate paternalistic model (14 of 79, 18%), the pure informed choice model (10 of 79, 13%), and the pure paternalistic model (9 of 79, 11%).

Table 18 (p. 180) summarizes the significant differences between the models of decision-making about treatment on the parameters of the qualitative study using ANOVAs and the pair comparisons of models (using the chi-square test and Fisher's exact test for significance, or Mann-Whitney-U-test respectively):

- paternalistic (pure/intermediate) vs. shared decision-making/informed choice
- shared decision-making vs. paternalistic/ informed choice
- in addition, informed choice (pure/intermediate) vs. shared decision-making/paternalistic.

Decisions made about ART

- The participants in the shared-decision making vs. other models were significantly more likely to take ART, whereas the participants in the informed choice vs. other models were significantly more likely not to take ART and to be ART naïve.
- The decision was less important in the pure paternalistic/informed choice models than in the other models.

Reasons for decision

- Participants in the paternalistic vs. other models were significantly less likely to report *side effects* of ART in the interview, whereas participants in the informed choice vs. other models were more likely to anticipate side effects. In the shared decision-making vs. other models participants showed better tolerance of side effects if side effects of ART were experienced, and they were less likely to change or stop ART for side effects.
- As expected, participants in the paternalistic vs. other models were significantly more likely to lack *knowledge of resistance*, but surprisingly the informed choice vs. other models was not significantly associated with comprising knowledge of resistance,

whereas participants in the shared decision-making vs. other models were more likely to encompass both, knowledge of resistance, as well *performance of a resistance test*.

- Participants in the paternalistic vs. other models were less likely to incorporate a *body-mind belief*, and *spirituality or worldview* in their decision about ART, in contrast to participants in the informed choice vs. other models, who included body-mind belief, and spirituality or worldview in their decision about ART. Further, participants in the informed choice vs. other models were more likely to *prefer complementary or alternative medicine*, although participants in the shared decision-making vs. other models were more likely to actually use complementary or alternative therapies.

Sharing reasons for decision and for non-adherence with doctor

- Participants in the shared decision-making vs. other models were more likely to share the reasons for their decision with their doctor, mainly because the motive to maintain a good relationship and to obtain doctor's opinion. In contrast, participants in the informed choice vs. other models were less likely to share the reasons for their decision with their doctor, mainly because they anticipated that the doctor would not support their decision not to take ART. The motive to share the reasons for the decision with the doctor to maintain a good relationship was less prominent in the paternalistic vs. other models.
- Participants in the informed choice models vs. other models were less likely to share the reasons for non-adherence with their doctors.

Sources of information

- As expected, participants in the paternalistic vs. other models made less use of other people living or not living with HIV or publications (except for drug advertising) as sources of information.
- Also information from other people not living with HIV (especially other medical experts, naturopaths or nutritionists) was less important for participants in the paternalistic vs. other models.
- Inevitably the information of the doctor was more important in the shared decision-making vs. other models. In contrast, in the informed choice vs. other models the information from the doctor was less important and also less used.
- Surprisingly other people living with HIV were a more frequent source of information for the participants in the shared decision-making vs. other models, although this was expected more in the informed choice vs. other models.

Medical, socio-demographic and behavioral parameters

- Regarding medical parameters participants in the shared decision-making vs. other models reported more category B symptoms (including diarrhea and peripheral neuropathy) in the Physical Symptoms Checklist.
- The lower income level was the only significant socio-demographic characteristic of the participants in the paternalistic vs. other models.
- Participants in the shared decision-making vs. other models were more likely to use complementary or alternative therapies.

Table 18: Significant associations between models of medical decision-making about ART (ANOVAs and pair comparisons using the chi-square test and the Fisher's exact significance test or the Mann-Whitney test) and decision about ART, reasons for decision, sharing reasons for decision or non-adherence with doctor, sources of information used, medical, socio-demographic and behavioral parameters

	Paternalistic models (pure/intermediate)	Shared decision making model	Informed choice models (pure/intermediate)
Decision about ART		more taking ART	more not taking ART
	less important (pure)		more ART naïve
Reasons for decision about ART	reporting less side effects	better tolerance of side effects	more anticipating side effects
		less changing /stopping ART for side effects	
	less knowledge of resistance	more knowledge of resistance	
		more tested for resistance	
	spirituality/worldview less important		spirituality/worldview more important
	less body-mind belief		more body-mind belief
		prefer more complementary/alternative medicine	
Sharing reasons for decision or non-adherence with doctor	less sharing reasons for decision with doctor to <i>maintain relationship</i>	more sharing reasons for decision with doctor (mainly because of motives to <i>maintain a good relationship</i> and <i>wants/trusts doctor's opinion</i>)	more not sharing reasons for decision with doctor, because they <i>anticipate that the doctor would not support their decision</i>
			less sharing reasons for non-adherence with doctor
Sources of information	less use of sources of information other than doctor	more use of people not living with HIV as a source of information	less use of the doctor as a source of information
	less importance of other people not living with HIV as a source of information	more importance of the doctor as a source of information	less importance of the doctor as a source of information
Medical, socio-demographic, and behavioral parameters		more category B symptoms (including diarrhea and peripheral neuropathy)	
	less income		
		more use of complementary/alternative therapies	

3. Overview of the results of the quantitative study (aims 6-9, hypotheses 1-6)

3.1. Assessment of decisional role preferences and perceptions using the Control Preference Scale (CPS) (aim 6) (hypotheses 1&2)

The Control Preference scale (CPS) (Degner et al. 1997 I) was used to assess decisional preferences as well as decisional perceptions (**aim 6**). As explained in the method section (chapter 4.1.1., pp.31-32), the CPS consists of five cards representing various degrees of patient's decisional control (depicting a scale ranging from 1= doctor deciding, 2 = doctor deciding considering patients opinion, 3 = shared responsibility in decision-making, 4 = patient deciding considering the 16 participants with the decision to stop ART preferred on average *shared responsibility in decision-making*, but perceived on average *deciding themselves about ART* (alone/considering the doctor's opinion). doctors opinion, to 5 = patient deciding). The participants specified with the help of the card set their preferred and perceived role in decision-making about ART. Additionally the difference between preferred and perceived decisional role was calculated, indicating whether decisional role preferences and perceptions were congruent or discrepant (e.g., perceiving more or less control than preferred). The CPS was used to test the following hypotheses:

- **Hypothesis 1:** PWHA prefer shared decision-making rather than leaving the decision up to the doctor. Only a small minority prefers making the decision alone.
- **Hypothesis 2:** The preferences of PLWH are not reflected in the clinical encounter.

3.1.1. Which decisional roles did PWHA prefer? (*Hypothesis 1*)

Hypothesis 1 was supported according to the card set of the CPS. Number one was shared responsibility in decision making about ART, which was preferred by the majority (47 of 79, 59%) of the participants. This was followed by making the decision themselves, considering the doctors opinion (15 of 79, 19%), the doctor making the decision considering patients opinion (8 of 79, 10%) and making the decision themselves (7 of 79, 9%). Only 2 (3%) of the 79 patients indicated as ideal that their doctor made the decision about ART (see figure 68).

3.1.2. Were decisional role preferences met in the clinical encounter? (*Hypothesis 2*)

a) Which decisional roles did PWHA perceive?

As assessed with the card set of the CPS, shared responsibility in decision making was apparent in 25 (32%) of the 79 patients, 18 (23%) who perceived deciding themselves considering the doctors opinion and 16 (20%) who perceived deciding themselves. The doctor deciding considering patients opinion was perceived by 12 (15%) of 79 patients and the doctor deciding was apparent in 8 (10%) of 79 patients (see figure 68).

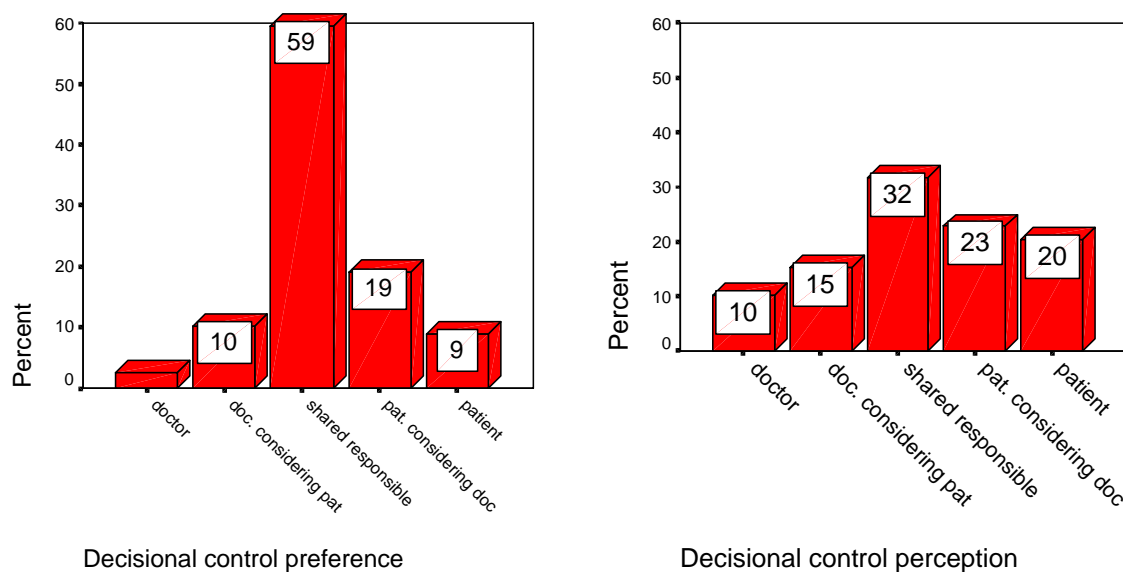
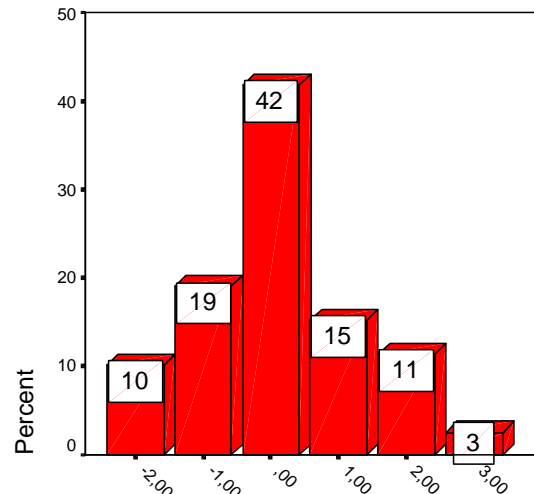


Figure 68: Frequency distribution of decisional control preferences and perceptions on the CPS (n=79).

b) Relationship between preferred and perceived decisional control

According to the CPS the decisional control preferences were significantly correlated with decisional perceptions ($r = .38^{**}$). The level of preferred and perceived decisional control was congruent in 33 (42%) of the 79 participants. Still these results support partially *hypothesis 2*, because the majority of the participants (46 of 79, 58%) did not perceive the decisional control they preferred.

Perceiving one level less control than preferred accounted for 15 (19%) of 79 participants, followed by perceiving one level more control than preferred, which accounted for 12 (15%) of 79 participants. Perceiving even two levels more control than preferred was reported by 9 (11%) of 79 participants, whereas 8 (10%) of 79 participants perceived two levels less control than preferred and 2 (3%) of 79 participants perceived three levels more control than preferred (see figure 69).



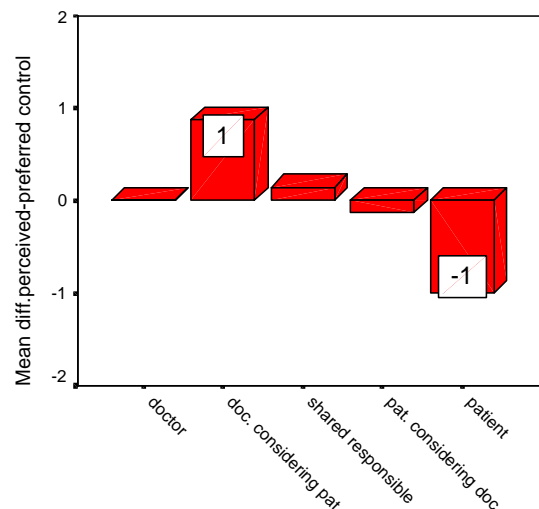
Difference perceived-preferred control

Figure 69: Frequency distribution of the difference between the perceived and preferred control on the 5-point CPS (n=79).

c) Which decisional control preferences were not met in the clinical encounter?

Depending on the decisional control preference as depicted by the CPS participants differed significantly on the mismatch between the preferred and perceived decisional control ($F_{4,74} = 2.65^*$) (see figure 70).

- The discrepancy between preferred and perceived control was highest in the 7 participants who preferred maximal decisional control. Although they preferred to make the decision alone (without considering the doctors opinion), they perceived on average deciding *themselves considering the doctors opinion*, which was one level (mean -1.00, SD 1.00) less control than preferred.



Decisional control preference

Figure 70: Relationship between decisional control preferences and the difference between perceived and preferred control on the 5-point CPS (n=79)

- Surprisingly the 8 participants who preferred the doctor deciding considering patients opinion closely followed this mismatch between preferred and perceived decisional control. They perceived on average *shared responsibility in decision-making*, which was almost one level (mean .87, SD 1.64) more decisional control than preferred.
- In contrast the decisional control preferences were best met in the two patients who preferred the doctor deciding about ART, who both perceived that their doctor made the decision. Only small discrepancies between preferred and perceived decisional control were seen in the 15 patients preferring to make the decision about ART themselves considering the doctors opinion, who perceived slightly less control than preferred (mean -1.33, SD .83) and the 47 participants preferring shared responsibility in decision-making about ART, who perceived slightly more control than preferred (mean .15, SD 1.18).

d) Which decisional control perceptions did match best with the decisional control preferences?

According to the CPS the decisional control perception was significantly strongly associated with the congruency between preferred and perceived decisional control depending on the level of decisional control they perceived ($F_{4,74} = 28.56^{***}$) (figure 71).

- As shared responsibility in decision-making about ART was the ideal of the majority of the participants, the decisional control preferences were best met in the 25 participants perceiving shared responsibility in decision-making about ART, who perceived on average only one third of a level less control than preferred (mean -.32, SD .75).
- In contrast the 16 participants who perceived deciding themselves perceived much more control than preferred (mean 1.56, SD .96), and accordingly the 8 participants who perceived their doctors deciding perceived much less control than preferred (mean -1.25, SD .88).
- Also the 12 participants who perceived the doctor deciding considering patients opinion perceived on average almost one level less control than preferred (mean -.92, SD .51).

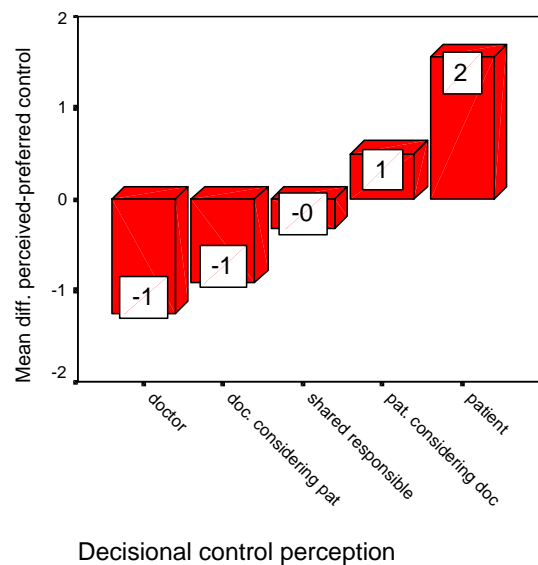


Figure 71: Relationship between decisional control perceptions and the difference between perceived and preferred control on the 5-point CPS (n=79)

- Smaller discrepancies were seen in the 18 participants who perceived deciding themselves considering the doctors opinion. They perceived on average half a level more control than preferred (mean .50, SD .71).

3.1.3. Relationship between the decision about ART and decisional control

a) Relationship between the decision about ART and decisional control preferences

The decision whether to take ART or not was not significantly correlated with the decisional control preference in the CPS ($r = .18, p = .10$). There were no significant differences in the decisional control preferences between the decisions to maintain, change, restart, and stop or not to start ART ($F_{4,74} = 1.53, p = .20$) (see figure 72).

- On average *shared responsibility in decision-making* was the favorite decisional role in the decision to restart ($n = 8, \text{mean } 2.75, \text{SD } .46$), to maintain ($n = 22, \text{mean } 3.09, \text{SD } .75$), to change ($n = 28, \text{mean } 3.25, \text{SD } .80$) and to stop ART ($n = 16, \text{mean } 3.38, \text{SD } 1.09$). Only the 5 participants deciding not to start ART had a desire for slightly more decisional responsibility, preferring on average rather to make the decision alone considering the doctors opinion (mean 3.80, SD .84).

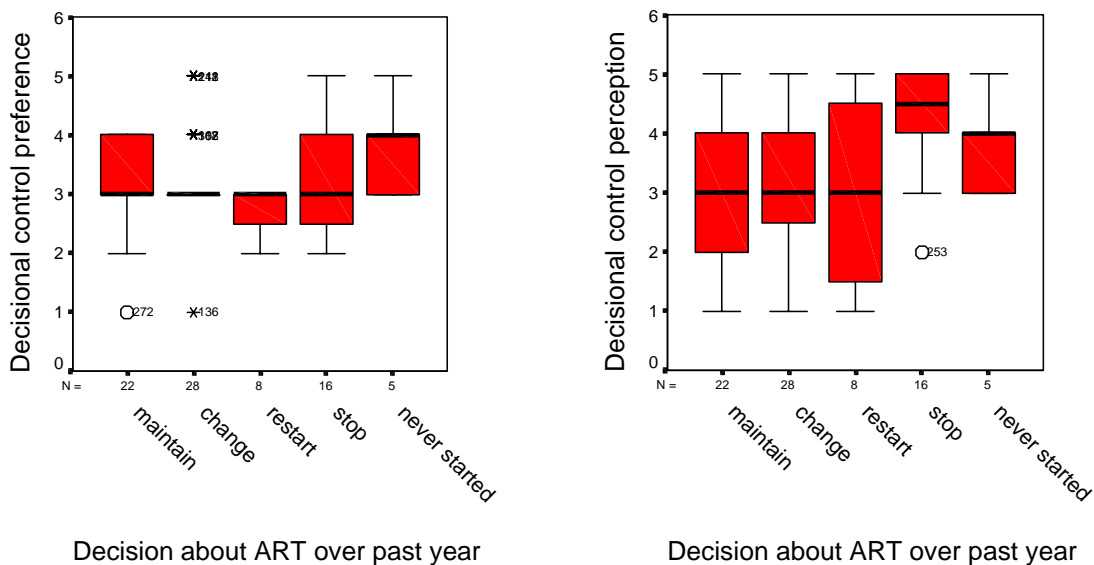


Figure 72: Box plots of decisional control preferences and perceptions on CPS (scale from 1=doctor to 5 = patient) in the decisions made about ART over the past year ($n=79$).

b) Relationship between the decision about ART and decisional control perceptions

On the other hand there were significant differences in the decisional control perceptions between the decisions to maintain, change, restart, and stop or not to start ART ($F_{4,74} = 4.38^{**}$) (see figure 73).

- The perceived decisional control was on average *shared responsibility* in the decision to maintain ($n = 22, \text{mean } 2.82, \text{SD } 1.26$), to restart ART ($n = 8, \text{mean } 3.00, \text{SD } 1.60$), and

to change ART (n = 28, mean 3.07, SD 1.05), compared to patients who perceived on average *deciding themselves considering the doctors opinion* in the decision not to start (n = 5, mean 3.80, SD .93) and to stop ART (n = 16, mean 4.25, SD .93).

Consecutively the decision to take ART or not was significantly inversely correlated with the perception of decisional control (r = -.42**). Participants deciding to take ART perceived less decisional control (mean 2.97, SD 1.20) than participants deciding to not take ART (mean 4.14, SD .91) (see figure 73).

- Of the 58 participants taking ART the majority (21 of 58, 36%) perceived shared responsibility in decision-making about ART, followed by 11 (19% of 58) either perceiving the doctor deciding considering patients opinion or the patient deciding considering the doctors opinion. Eight (14%) of 58 patients perceived the doctor deciding and 7 (12%) of 58 patients perceived deciding themselves to take ART.
- The 21 patients deciding not to take ART perceived mostly deciding alone (9 of 21, 43%) followed by deciding alone considering the doctors opinion (7 of 21, 33%). Only 4 (19%) of the 21 patients perceived sharing responsibility in the decision not to take ART, one (5% of 21) the doctor deciding considering patients opinion and none the doctor making the decision not to take ART.

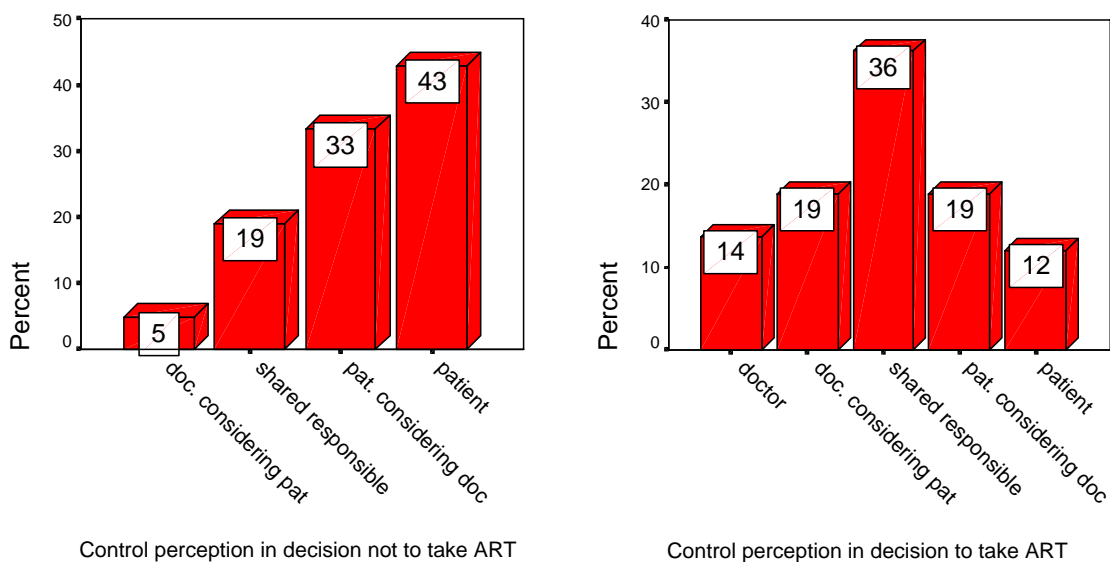


Figure 73: Frequency distributions of the decisional control perception in the decision not to take ART (n=21) and in the decision to take ART (n=58).

c) In which decision about ART were the decisional control preferences not met in the clinical encounter?

Successively there were significant differences in the mismatch between preferred and perceived decisional control indicated by the CPS between the decision to take and not to take ART ($F_{1,77} = 7.84^{**}$). In particular the decision to stop ART was strongest associated with perceiving more control than preferred, compared to all other decisions made about ART (to maintain, to change, to restart or not to start), where the decisional control preferences were better met in the clinical encounter ($F_{1,77} = 10.23^{**}$) (see figure 74).

- The 21 patients deciding not to take ART perceived a mean of .67 (SD 1.31) more control than preferred. This was mainly, because the 16 participants deciding to stop ART perceived a mean of .88 (SD 1.45) more control than preferred. They preferred on average *shared responsibility in decision-making* (mean 3.38, SD 1.09), but perceived on average *deciding themselves considering the doctors opinion* (mean 4.25, SD .93). Surprisingly all 5 participants who decided never to start ART perceived a congruency between preferred and perceived decisional control, preferring and perceiving to make the decision themselves considering the doctors opinion.

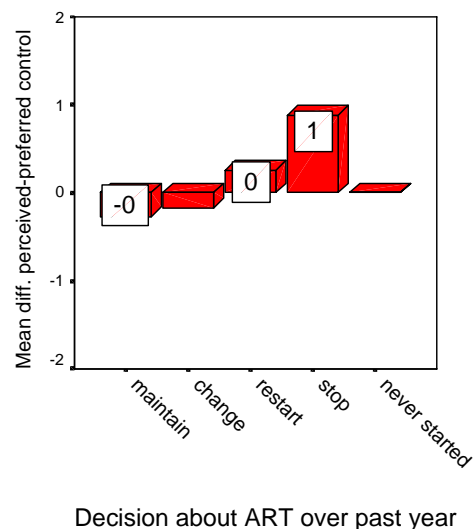


Figure 74: Relationship between the decisions made about ART over the past year and the mean difference between perceived and preferred control on the 5-point CPS (n=79)

- The 58 participants taking ART perceived only slightly less control than preferred (mean -.15, SD 1.09). Out of this the decisional control preferences were best met in the 28 participants changing ART who perceived a mean discrepancy of -.18 (SD 1.02) and the 22 participants maintaining ART who perceived a mean of -.27 (SD 1.03) less control than preferred, whereas the 8 participants restarting ART perceived a mean of .25 (SD 1.49) levels more control than preferred.

3.1.4. Relationship between sources of information and decisional control preferences and perceptions

a) Relationship between the importance of the doctor as a source of information and decisional control perceptions

Particularly participants who perceived deciding themselves about ART considered the doctor as a significantly less important source of information ($r = -.52^{***}$, $F_{1,77} = 29.41^{***}$, see figure 75) and made significantly less use of the doctor as a source of information ($r = -.32$, $F_{1,77} = 8.97^{**}$). *Patients who perceived deciding themselves about ART considered the information from the doctor as less important than patients who did not perceive deciding themselves.*

The 16 participants who perceived deciding themselves about ART perceived on average the doctor as a source of information as *little* in importance (mean 2.25, SD 1.77) of, compared to all other participants who perceived the information from the doctor on average as *much* in importance (doctor deciding considering patients opinion $n=12$, mean 4.92, SD .29, shared responsibility in decision making $n=25$, mean 4.68, SD .63, doctor deciding alone $n=8$, mean 4.50, SD .93, and patient deciding considering the doctors opinion $n=18$, mean 3.78, SD 1.73).

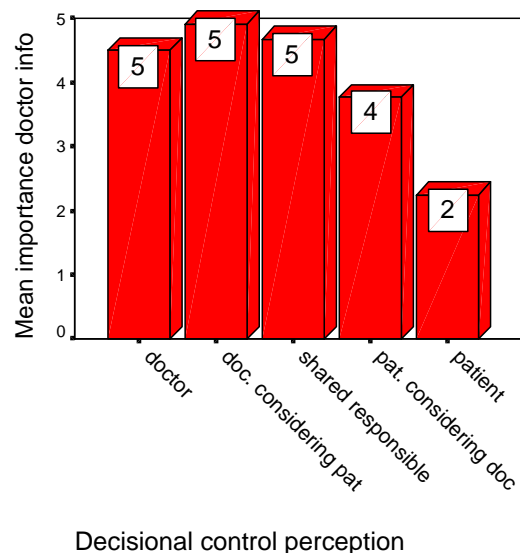


Figure 75: Relationship between the decisional control perceptions on the CPS and the importance of the doctor as a source of information in the decision about ART (scale from 0=*not at all* to 5 = *very much*) ($n=79$).

b) Did patients who preferred having more decisional control seek more information outside the doctor's office?

There was a significant positive correlation between the preference for decisional control on the CPS and the use of expert literature ($r = .29^{**}$), conferences, seminars and symposia ($r = .29^{**}$), positive magazines ($r = .23^*$), and Internet ($r = .25^*$). *Participants with a higher desire*

for decisional control made more use of publications as a source of information than participants who preferred to leave the decision to their doctor.

No significant relationship was found between decisional control preferences and the use of other people (living or not living with HIV) as a source of information. Further there was no significant relationship between the use and the importance of other people or other sources of information and a mismatch between decisional control preferences and perceptions.

3.1.5. Relationship between socio-demographic, medical and behavioral parameters and decisional control preferences and perceptions

Decisional control perceptions, preferences, as well as the discrepancy between control perceptions and preferences on the CPS were significantly related with having a partner or not as well as the viral load log at the interview.

- The 48 participants who did not have a partner preferred a little more decisional control than the 31 participants who had a partner ($t = -2.15^*$, $df77$, mean 3.38, SD .96 vs. mean 2.97, SD .55).
- As participants perceived having higher decisional control on the CPS for the decision not to take ART, viral load log at the interview was significantly weakly correlated with the decisional control perception on the CPS ($r = .24^*$). *The more decisional control patients perceived, the higher the viral load log.*

Decisional control perceptions, preferences, as well as the discrepancy between control perceptions and preferences on the CPS were not significantly associated with other medical parameters (i.e., years since HIV diagnosis, CD4 nadir, CD4 cells, changes in CD4 cells and viral load, and CDC category B and C symptoms) other socio-demographic parameters (i.e., gender, ethnicity, sexual orientation, age, income, education, employment status, health insurance) and other behavioral parameters (smoking, alcohol and recreational drug use, and use of complementary/alternative therapies).

3.1.6. Summary of the assessment of decisional control preferences and perceptions using the CPS

The Control Preference scale (CPS) elicited decisional preferences as well as decisional perceptions on a 5-point Likert scale (ranging from 1 = doctor to 5 = patient) (**aim 6**) in order to test the following hypotheses:

- **Hypothesis 1:** PWHA prefer shared decision-making rather than leaving the decision up to the doctor. Only a small minority prefers making the decision alone.
- **Hypothesis 2:** The preferences of PLWH are not reflected in the clinical encounter.

As assessed with the card set of the CPS, shared responsibility in decision making was apparent in 28 (32%) of 79 participants, followed by 18 (23%) of 79 participants who perceived deciding alone considering the doctors opinion and 13 (16 %) of 79 who perceived deciding themselves. The doctor deciding considering patients opinion was perceived by 12 (15%) of 79 patients and the doctor deciding in 8 (10%) of 79 patients.

Hypothesis 1 was supported: shared responsibility in decision making about ART was preferred by 47 (59%) of the 79 participants, followed by making the decision alone considering the doctors opinion 15 (19%) of 79) and 8 (10% of 79) the doctor making the decision considering patients opinion. Only a minority (7 of 79, 9%) preferred deciding alone and leaving the decision completely to the doctor was very low (2 of 79, 3%). There were no significant differences on decisional control preferences between the different decisions about ART (although the 5 participants with the decision not to start ART rather preferred and perceived to make the decision about ART alone considering the doctor's opinion). A higher preference for decisional control was significantly correlated with gathering more information outside the doctor's office, such as the use of expert literature ($r = .29^{**}$), conferences, seminars and symposia ($r = .29^{**}$), positive magazines ($r = .23^*$), and Internet ($r = .25^*$). Participants in a partnership preferred on average significantly less decisional control than participants who did not have a partner ($t = -2.15^*$, $df77$, mean 3.38 vs. mean 2.97).

Hypothesis 2 was only partially supported. Decisional control preferences and perceptions were significantly moderately correlated ($r = .38^{**}$): 42% (33 of 79) did perceive the decisional control they preferred and 58% (46 of 79) did not:

- Perceiving less control than preferred was indicated by the 9% (7 of 79) participants who preferred deciding completely alone, but perceived to consider their doctors opinion in their own decision.
- Generally, if patients perceived shared responsibility in decision-making, there was the best match with the decisional control preferences of PWHA. But surprisingly perceiving more control than preferred accounted for the 10% (8 of 79) participants who perceived on average *shared responsibility in decision-making*, but preferred that their *doctor made the decision considering patients opinion*, which was one level more control than preferred.
- Importantly, perceiving more control than preferred was significantly associated with the decision to stop ART ($F_{1,77} = 10.23^{**}$). The 16 participants with the decision to stop ART preferred on average *shared responsibility in decision-making*, but perceived on average *deciding themselves about ART* (alone/considering the doctor's opinion). Also the 11 participants who rated the importance of the information from their doctor as *little* or even

very little, perceived significantly more decisional control than preferred ($F_{3,75} = 3.08^*$).

They preferred on average deciding *themselves considering the doctor's opinion*, but perceived deciding *themselves* without considering the doctor's opinion.

Patient's perception of decisional control was a clinically relevant aspect, as a perception of more decisional control than preferred was positively correlated with the decision not to take ART ($r = .42^{**}$) and consecutively a higher the viral load log at the interview ($r = .24^*$).

3.2. Assessment of decisional conflict using the Generic Decisional Conflict Scale (GDCS) (aim 7)(hypothesis 3)

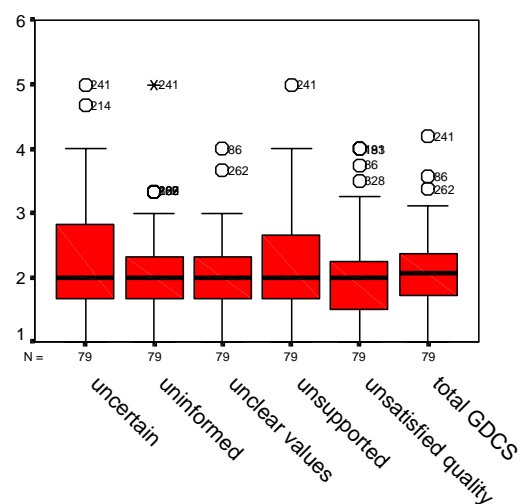
The factors contributing to conflict in the decision about ART were assessed using the Generic Decisional Conflict Scale (GDCS) (O'Connor 1995, 1999) (aim 7). The GDCS is composed of five subscales measuring: state of uncertainty, feeling uninformed, feeling unclear about values, feeling unsupported in decision-making, and the perception of the quality of the decision being made. The statements are answered on a 5 point Likert-scale ranging from 1 = *very little* to 5 = *very high* decisional conflict. A mean total score > 2 is considered as expressing decisional conflict. The GDCS was used to test the following hypothesis:

- **Hypothesis 3:** PWHA who perceive less control than preferred have more decisional conflict in the decision about ART.

3.2.1. How much decisional conflict did PWHA perceive in the decision about ART?

On average there was *little* decisional conflict in the decision about ART. The *state of uncertainty* was rated with a mean of 2.20 (SD .92), closely followed by *feeling unsupported in decision making* (mean 2.18, SD .81), *feeling uninformed* (mean 2.06, SD .69), *feeling unclear about values* (mean 1.99, SD .66) and the *perception of the quality of the decision* (mean 1.96, SD .71), resulting in a mean of 2.06 (SD .61) for in the total GDCS. Of the 79 participants 37 (47%) reported a mean total GDCS ≤ 2 , whereas 42 (53%) expressed decisional conflict (mean total GDCS > 2).

The box plots show (see figure 76) that, although there was on average little decisional conflict, some participants rate *high* and *very high* on the GDCS and its subscales. These so-called outliers may lead to overestimated correlations using Pearson's coefficients. To consider these extremes, correlation coefficients were calculated using Spearman's Rho, which measures the association between rank orders. In the Spearman correlation only the order of the data is important, not the level, therefore extreme variations in expression values have less control over the correlation.



Generic decisional conflict

Figure 76: Generic decisional conflict: Box plots of the 5 subscales and the total of the GDCS (scale from 1= *very little* to 5 = *very high*) (n=79).

a) In which decision about ART did PWHA perceive most decisional conflict according to the GDCS?

Surprisingly there were no significant differences in the state of uncertainty, feeling uninformed, feeling unclear about values, feeling unsupported in decision-making, and the perception of the quality of the decision being made between the decision to maintain, change, restart, stop or not to start ART ($F_{4,74} = .30, p = .87$) (see figure 77). Even the decision not to take ART against treatment guidelines was not significantly correlated with decisional conflict ($r_s = .19, p = .09$), as there was on average *little* decisional conflict in every decision about ART.

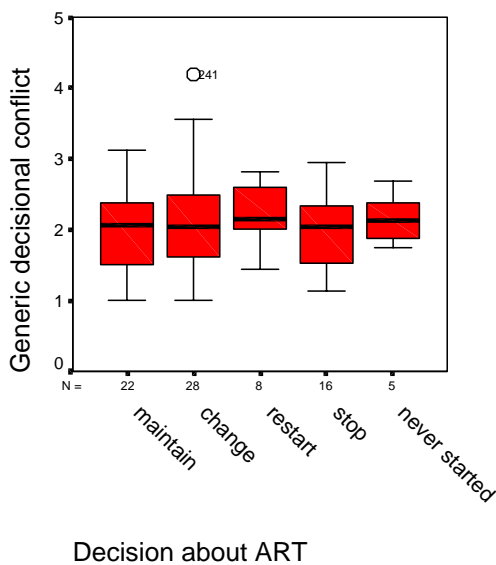


Figure 77: Box plots of decisional conflict on the total of the GDCS (scale from 1= *very little* to 5 = *very much*) in the decisions made about ART over the past year (n=79).

In the following case extremely high decisional conflict was rated on the GDCS (mean 4.19) compared to the other participants:

- A 43-year-old African-American heterosexual woman, involved in a monogamous relationship, currently unemployed, diagnosed with HIV 4 years ago and still asymptomatic **just** had her CD4 nadir with 65 cells/ μ l at the interview. Her viral load was 115,161 viral load copies/ml; despite having changed her ART more than 12 weeks ago. She had no knowledge of resistance and reported that a resistance test was never performed. She complains: *“I’m tired and weak, and can’t get out of bed. I have no appetite.”* But she did not talk to her doctor about her health problems: *“Probably because I was tired. I just told him that I knew I was getting sick because I could feel it in my body. And I just do what he says. But I didn’t really talk about it. I take it as prescribed, because doctor says I have to take them.”* According to the CPS she preferred shared responsibility in decision-making but perceived that the doctor made the

decision about ART without considering her opinion. In the ACTG adherence questionnaire she also reported an extremely high sum of reasons for missing doses (sum = 26) compared to all 58 participants taking ART (mean sum 4.52, SD .67).

b) Was decisional conflict related to socio-demographic, medical or behavioral characteristics?

One subscale of the GDCS (feeling unclear about values) was associated with medical and behavioral characteristics.

- From the medical perspective changes in CD4 cells over the past year was significantly relevant in relation to feeling unclear about values. The more CD4-cells increased over the past year, the fewer participants felt unclear about values according to the GDCS ($r_s = -.29^*$).
- Also there was a significant inverse correlation between the use of complementary/alternative treatment and feeling unclear about values ($r_s = -.27^*$).

Participants using complementary/alternative treatments felt clearer about values in their decision about ART than participants not using complementary/alternative treatments. None of the subscales measuring decisional conflict (i.e., feeling uncertain, uninformed, unclear about values, unsupported, or unsatisfied with the quality of the decision-making process) was significantly associated with other medical parameters (i.e., years since HIV diagnosis, CD4 stage, CD4 nadir, CD4 and viral load at the interview, viral load changes over the past year, CDC category B or C symptoms) or other socio-demographic/ behavioral parameters (gender, sexual orientation, age, education, income, employment status, health insurance, partnership status, smoking, alcohol and recreational drug use).

3.2.2. Relationship between decisional control preferences and perceptions on the CPS and generic decisional conflict in the GDCS

a) Relationship between decisional conflict and preferred decisional control

The levels of decisional conflict as indicated by the GDCS were not significantly different among the types of decisional control preferred on the CPS ($F_{4,74} = 1.96, p = .11$) (see figure 78).

- There was least decisional conflict in the 2 participants who preferred to leave the decision completely to their doctor (mean 1.09, SD .13), followed by the 7 participants who preferred to make the decision completely alone (mean 1.57, SD .69). Whereas there was more decisional conflict in the participants preferring shared responsibility ($n = 47$, mean 2.15, SD .69), and the participants who preferred deciding alone considering the doctor's opinion ($n = 15$, mean 2.11, SD .46) and those who preferred that the doctor made the decision considering patient's opinion ($n = 8$, mean 2.00, SD .35).

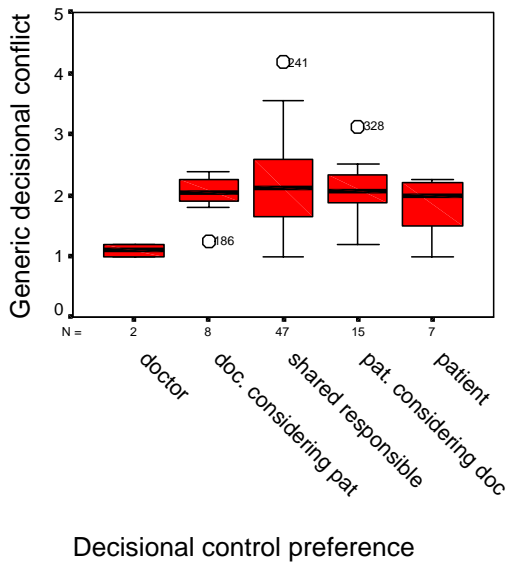


Figure 78: Box plots of decisional conflict on the total of the GDCS (scale from 1= *very little* to 5 = *very much*) in the decisional control preferences on the CPS (n=79).

The participants preferring to leave the decision about ART to the doctor rated least decisional conflict, whereas participants preferring shared responsibility in decision-making rated a little more decisional conflict, although the difference was not significant.

b) Relationship between decisional conflict and the perceived decisional control

The levels of decisional conflict as indicated by the GDCS were not significantly different among the types of decisional control preferred on the CPS ($F_{4,74} = .91, p = .46$). Although, the 25 participants who perceived shared decisional responsibility in decision making rated that they were significantly less unclear about values in the decision about ART than the 54 participants who did not perceive shared responsibility ($t = -2.10^*, df 77, \text{mean } 1.76, SD .66$ vs. $\text{mean } 2.08, SD .63$).

b) Did PWHA who perceived less control than preferred have more decisional conflict in the decision about ART (*Hypothesis 3*)

Perceiving less control than preferred according to the CPS was significantly positively correlated with decisional conflict ($r = .22^*, F_{1,77} = 3.84^*$), particularly with feeling uncertain ($r_s = .29^{**}$) and being unclear about values ($r_s = .26^*$), but there was no significant correlation with the perception of the quality of the decision or feeling unsupported and uninformed in the decision.

It is important to note, that particularly in the participants who decided to take ART, perceiving less decisional control than preferred was positively correlated with decisional conflict ($r = .27^*, F_{1,56} = 4.53^*$). If the patient perceived less control than preferred in the decision to take ART, this was particularly positively correlated with feeling uncertain ($r_s = .35^{**}$), unclear about values ($r_s = .31^*$) and unsupported in the decision to take ART ($r_s =$

.26*) but it was not significantly correlated with the perception of the quality of the decision and not with feeling uninformed in this decision.

Further in the 47 participants who preferred shared responsibility in decision-making about ART perceiving less decisional control than preferred was significantly positively correlated with decisional conflict ($r = .48^{**}$, $F_{1,45} = 13,73^{**}$) (see figure79).

- Decisional conflict was highest in the 4 participants who preferred shared responsibility and perceived that their doctor made the decision without ($n = 4$ mean 2.97, SD .85) or with consideration of patient’s opinion ($n=9$, mean 2.50, SD .51).
- Whereas there was on average *little* decisional conflict if the ideal of shared responsibility was met in the clinical encounter ($n = 18$, mean 1.92, SD .67). Interestingly participants who perceived more decisional control than preferred, making the decision alone with ($n=8$, mean 1.88, SD .55) or without considering the doctor’s opinion ($n=8$, mean 2.10, SD .59), did also rate on average *little* decisional conflict.

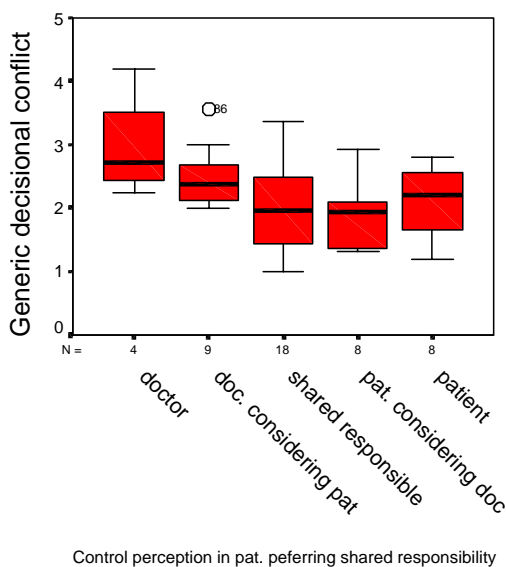


Figure 79: Box plots of decisional conflict on the total of the GDCS (scale from 1= *very little* to 5 = *very much*) in the decisional control perceptions of participants preferring shared responsibility on the CPS ($n=47$).

If the doctor made the decision about ART in participants who preferred shared responsibility in decision-making, this was significantly associated feeling unclear about values ($r_s = .49^{**}$), uncertain about the decision ($r_s = .44^{***}$), unsupported ($r_s = .40^{**}$) and uninformed ($r_s = .38^*$), as well as with perceiving a low quality of the decision ($r_s = .30^*$).

Thus the **Hypothesis 3** that perceiving less control than preferred is associated with decisional conflict in the decision about ART is supported. This accounts particularly for participants who prefer shared responsibility in decision-making and participants deciding to take ART.

c) Decisional conflict in PWA who did not idealize shared responsibility in decision-making

As 47 (59%) of the 79 participants preferred shared responsibility in decision-making, the size of the study was too small to have statistical power to investigate decisional conflict in participants who preferred deciding alone or who prefer to leave the decision to the doctor. Remarkably some individuals who did not prefer shared responsibility in decision-making showed *very little* decisional conflict, whether their control preferences were met in the clinical encounter or not (see figure 80).

- *Very little* decisional conflict was rated by the two participants, who preferred and perceived to leave the decision to the doctor, but also by one participant who preferred deciding alone considering the doctors opinion, but perceived that the doctor made the decision considering patients opinion and by another participant who preferred deciding alone, but perceived to consider doctors opinion in his own decision.

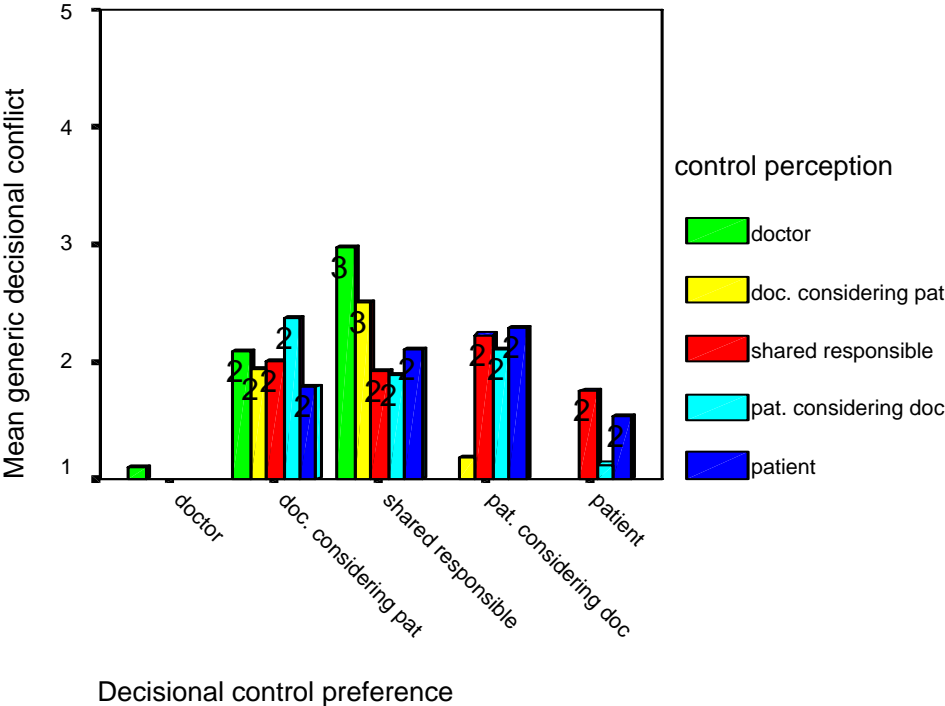


Figure 80: Relationship between decisional control preference and perception on the CPS and mean decisional conflict on the total of the GDCS (scale from 1= *very little* to 5 = *very high*) (n=79).

d) Was perceiving more control than preferred associated with decisional conflict?

In the 79 participants there was no significant association between perceiving more control than preferred and decisional conflict. Also, neither in the 21 participants not taking ART not

in the 47 participants preferring shared responsibility in decision-making perceiving more control than preferred was significantly associated with decisional conflict.

3.2.3. Summary of the assessment of decisional conflict using the GDCS

The GDCS was used to examine 5 subscales contributing to decisional conflict: feeling uncertain, uninformed, unclear about values, unsupported and unsatisfied with quality in the process of decision-making about ART (**aim 7**). The 5 point Likert-scale ranging from 1 = *very little* to 5 = *very high* decisional conflict was also used to test

- **Hypothesis 3:** Perceiving less control than preferred is associated with decisional conflict in the decision about ART.

On average there was *little* decisional conflict in the decision about ART mean of 2.06 (SD .61): *state of uncertainty* (mean 2.20, SD .92), *feeling unsupported in decision making* (mean 2.18, SD .81), *feeling uninformed* (mean 2.06, SD .69), *feeling unclear about values* (mean 1.99, SD .66) and the *perception of the quality of the decision* (mean 1.96, SD .71).

There was no significant difference in decisional conflict between the decisions about ART, whether it was to maintain, to change, to restart, or to stop or never to start ART. From the medical perspective changes in CD4 cells over the past year were a significantly relevant factor. The more CD4-cells increased over the past year, the fewer participants rated feeling unclear about values ($r_s = -.29^{**}$). Also, the more participants used complementary or alternative treatments, the less they rated feeling unclear about values ($r_s = -.27^{**}$).

Hypothesis 3 that perceiving less control than preferred is associated with decisional conflict in the decision about ART was supported. Particular this accounts for participants who prefer shared responsibility in decision-making and participants deciding to take ART (see figure 81).

- Perceiving less control than preferred was significantly associated with decisional conflict ($r = .22^*$, $F_{1,77} = 3.84^*$). Patients perceiving less control than preferred in the decision about ART rated feeling more uncertain ($r_s = .29^{**}$) and unclear about values ($r_s = .26^*$).
- Perceiving less control than preferred in the decision to take ART was associated with decisional conflict ($r = .27^*$, $F_{1,56} = 4.53^*$), especially with feeling uncertain ($r_s = .34^{**}$) and unsupported in decision-making ($r_s = .26^*$).
- If the doctor decided about ART for patients who prefer shared decisional responsibility, this was associated with decisional conflict ($r = .48^{***}$, $F_{1,45} = 13.73^{**}$), with feeling unclear about values ($r_s = .49^{**}$), uncertain ($r_s = .44^{***}$), unsupported ($r_s = .40^{**}$) and uninformed ($r_s = .38^*$) in decision-making and with perceiving a low quality of the decision ($r_s = .30^*$).

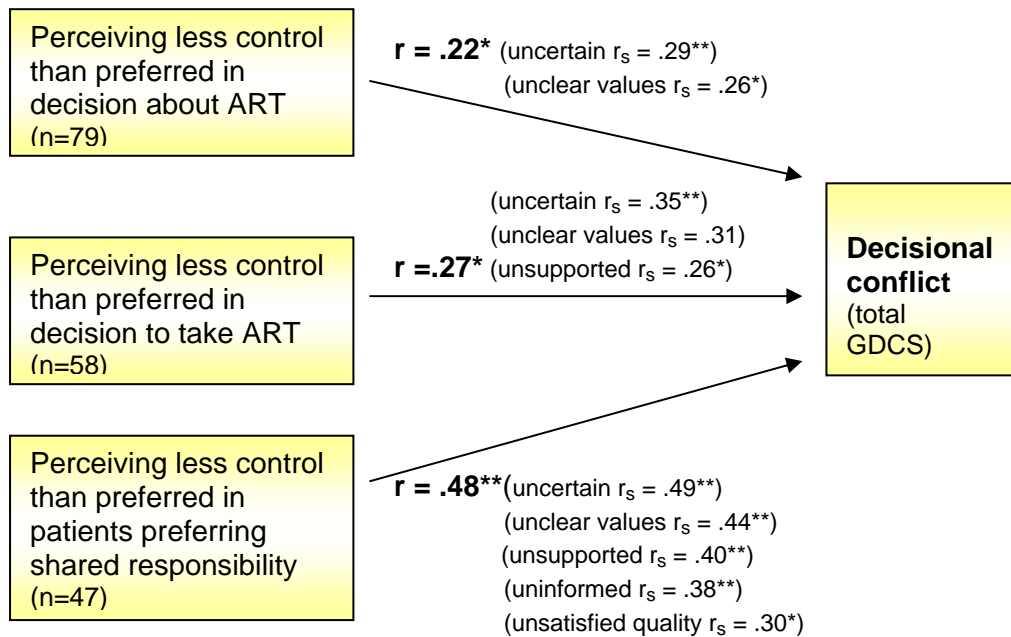


Figure 81: Significant Pearson's (and Spearman's) correlations between perceiving less control than preferred on the CPS in the decision about ART (n=79), patients making a decision to take ART (n=58), patients preferring shared responsibility in decision making on the CPS and decisional conflict on the total GDCS (and for the subscales in parenthesis).

If participants perceived shared responsibility in decision-making, they rated feeling less unclear about values than participants who did not perceive shared responsibility ($t = -2.10^*$, $df = 77$, mean 1.76, SD .66 vs. mean 2.08, SD .63). Least decisional conflict was rated in the 2 participants who preferred and perceived to leave the decision to their doctor. Perceiving more decisional control than preferred was not significantly associated with decisional conflict.

3.3. Assessment of self-reported adherence using the ACTG-adherence questionnaire and the interview (aim 8) (hypotheses 4 &5)

The ACTG adherence questionnaire (ACTG 2001) is a standard instrument to assess not only the prescribed medications (see results chapter 1.2.3., pp. 57-60), but also to assess pill burden, special instructions, percentage of missed doses over the last 3 days, last time skipping medications, reasons for missing doses and frequent symptoms of HIV or ART (**aim 8**). It was given at the time-point of the interview and one year prior as part of the LTS study¹. Additionally participants were asked in the interview, if they had reasons for non-adherence, which were not listed in the ACTG adherence questionnaire and if they did talk to their doctor about adherence. In order to test the following hypotheses these findings could be related to the results of the CPS and the GDCS:

- **Hypothesis 4:** PWHA perceiving less control than preferred and more decisional conflict in the decision to take ART are less adherent to ART.
- **Hypothesis 5:** If PWHA perceive less decisional control than preferred, they talk less to their doctors about their reasons for non-adherence.

3.3.1. The pill burden and special instructions in participants taking ART

Overall the pill-burden was rather low. The 58 patients taking ART at the interview time-point took a mean of 7.94 (SD 5.03) pills each day. Most of the patients taking ART were on a twice-daily regimen (48 of 58, 83%), followed by once daily (6 of 58, 10%). Only two (3%) of 58 patients had to take ART three times daily and one each four and five times daily. Over the past year 22 participants have been taking antiretroviral medications that had to be taken on an empty stomach (either ddl or Indinavir). Nine of the 22 (41%) did not report their food restrictions correctly when asked during the ACTG questionnaire.

3.3.2. The frequency of non-adherence in participants taking ART

a) How frequent was non-adherence reported in the ACTG questionnaire

The 58 participants taking ART reported good adherence in the ACTG questionnaire (mean 99.97%, SD 11.10%) over the past 3 days. The number is so low because only 4 (7% of 58) reported that they skipped doses within the last three days. The mean percentage of missed doses in these 4 participants was 37.35% (SD 24.72%). However, 9 participants had stopped ART without telling their doctors, which were not considered as being non-adherent

¹ In 3 monthly follow-up intervals the research team completed the ACTG adherence-questionnaire with the participants over the phone as part of the LTS-study

in this analysis (including this 9 participants who did not take their prescribed medication at all the proportion of prescribed medication taken over the past 8 days was 88.58%).

Not skipping medications over the past month was reported by 37 (64 %) and skipping ART within the past month was reported by 21 (36%) of the 58 participants taking ART (see figure 82).

- Thirteen (22%) of 58 participants reported that they skipped ART 1-3 months ago, 12 (21% of 58) more than 3 months ago and even 12 (21% of 58) reported that they never skipped ART.
- Ten (17% of 58) skipped 2-4 weeks ago, 4 (7% of 58) 1-2 weeks ago, and 7(12% of 58) within the past week (of which 6 (10% of 58) skipped their medication the last weekend).

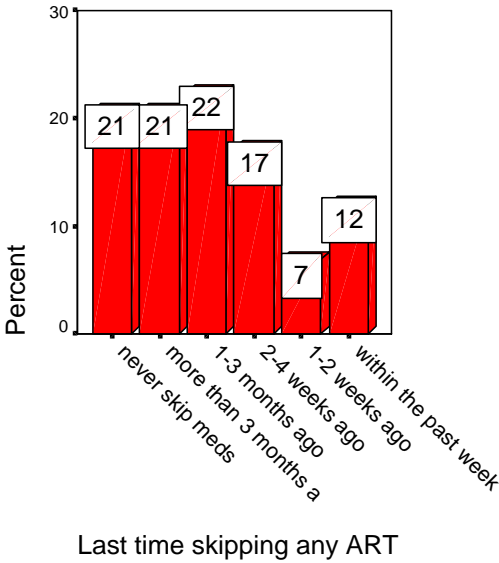


Figure 82: Frequency distribution of last time skipping ART reported in the ACTG adherence questionnaire by participants taking ART (n=58).

b) Who is 100 Percent adherent?

It seems questionable, if participants report in the ACTG-adherence questionnaire, that they never skip medications.

- Six (50%) of the 12 participants who reported at the interview that they never skipped their medication and never had reasons for non-adherence had a detectable viral load. Of this 6 participants, two had a viral load above 1,000 copies/ml, two had a viral load above 10,000 copies/ml, and two had a viral load above 100,000 copies/ml.
- At the interview 4 (7%) of 58 participants reported initially that they never shipped medications but when asked the list of potential reasons for non-adherence they revised their self-report.

Remarkably the ACTG adherence questionnaire gives the instruction that participants should not fill out the checklist for the reasons for missing doses, if they claim that they never skip doses.

Potential adherence to ART is over-reported in 19 (33%) of 58 participants who had a detectable viral load despite reporting to have been 100% adherent over the past month. However the detectable viral load might also be due to drug resistance. Of the 19 participants with detectable viral load despite good adherence 13 (68%) were not tested for

drug resistance and 6 (32%) were known to have drug resistance (but all 6 have been at least 24 months on a regimen which was chosen according to the results of the resistance test). In the remaining 39 (67%) of the 58 participants taking ART there was a significant correlation between the last time skipping any dose of ART and viral load log at the interview ($r = .48^{**}$).

3.3.3. What were the reasons for missing doses?

a) Which reasons for missing doses did participants report in the ACTG adherence questionnaire?

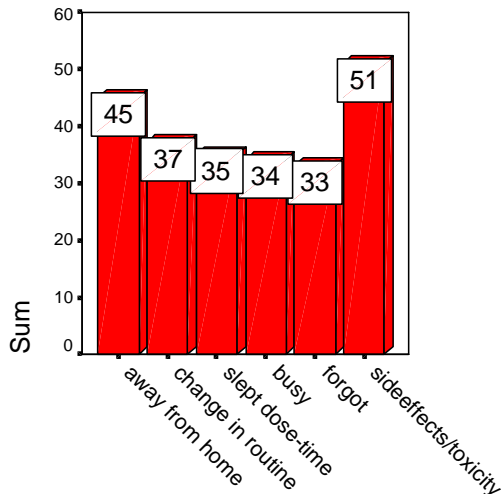
In the ACTG questionnaire 14 frequent reasons for missing doses were rated on a scale from 0= never, 1= rarely, 2 = sometimes to 3= often. The sum of reasons was calculated by the number of reasons weighted by the frequency. The 58 participants taking ART reported a mean sum of 4.52 (SD 5.08) reasons for missing doses, ranging from zero to 26. The total sum of reasons reported was 319. Five reasons accounted for 58% of the total sum of reasons:

- *were away from home* (sum = 45, 14% of total sum),
- *had a change in daily routine* (sum = 37, 12% of total sum),
- *slept through dose time* (sum = 35, 11% of total sum),
- *were busy with other things* (sum = 34, 11% of total sum each), and
- *simply forgot* (sum = 33, 10% of total sum each).

Although these reasons achieved a high sum, they were mostly reasons to miss doses sometimes or rarely and never reported in more than two participants as being a reason to miss doses often. Reasons for often missing doses in 4 participants each were:

- *Felt sick/ill from side effects* (sum = 21), *felt like the drug was toxic or harmful* and *wanted to avoid side effects* (sum = 15 each). These three reasons taken together as “*side-effects/toxicity*” of the treatment equal a sum of 51, which is 16% of the sum of total reasons.

Figure 83 reviews the total sum of the six most common reasons for non-adherence rated in the ACTG questionnaires by the 58 participants taking ART.



Sum of reasons for missing doses

Figure 83: Sum of the 6 most common reasons for missing doses (scale from 0=never to 3=often) reported in the ACTG adherence questionnaire by the participants taking ART (n=58).

Less frequent reasons were: *had a problem taking pills at specified times (with meals, on empty stomach, etc.)* (sum = 27, 9% of total sum), *ran out of pills* (sum = 20, 6% of total sum), *did not want others to notice you taking medications, had too many pills to take* (each sum = 11, 3% of total sum), *felt depressed or overwhelmed* (sum = 10, 3% of total sum) and *felt good* (sum = 5, 2% of total sum).

c) Which reasons for missing doses were not listed in the ACTG-questionnaire?

The participants were also asked in the interview if they had other reasons for missing doses, which were not listed in the ACTG questionnaire. The following further reasons for often missing doses were reported:

- *irritable bowel syndrome,*
- *detoxification from substance use,*
- *nausea during pregnancy, and*
- *just did not feel like taking it*

Although running out of pills is a reason listed in the ACTG questionnaire, one 47-year old African-American heterosexual woman living on disability describes that this running out of pills as not only a patient related issue but also related to the medical system: “*Medicaid has a problem, they give you just so much pills. If it’s on a weekend, and you are out of your pills, you can’t call it in, you run out of medication. I just think they are too cheap to not even be able to overlap it a week, to make sure that you do not run out of medications, but they don’t, they do it their way.*”

3.3.4. Symptoms related to HIV or ART

a) Which symptoms did participants report in the ACTG adherence questionnaire?

The ACTG adherence questionnaire includes a checklist of 12 HIV or ART related symptoms over the past two weeks which is rated on a scale from 0= never, 1= rarely, 2= sometimes to 3= often. The sum of the symptoms was calculated by the number of symptoms weighted by the frequency. The total sum of the symptom checklist was 750. Five symptoms accounted for 59% of the total sum of symptoms (see figure 84):

- *Difficulty in falling or staying asleep, or unusual daytime sleepiness* (sum = 95, 13% of total sum),
- *trouble remembering so that you had to keep lists* (sum = 94, 12.5 % of total sum),
- *fatigue, or loss of energy, that keeps you from doing the things you need or want to do* (sum = 88, 12% of total sum),
- *pain, numbness or tingling in hands or feet* (sum = 87, 11.5 % of total sum), and
- *felt sad, down or depressed* (sum = 74, 10% of total sum).

Less frequent symptoms accounting for less than 10% of the total sum were: *headache of any type or severity; skin problems, such as rash, sores or dryness* (sum= 63, 8% of total sum each), *cough of any type or severity* (sum = 49, 7% of total sum), *three or more runny bowel movements or episodes of diarrhea per day* (sum = 47, 6% of total sum), *upset stomach or the feeling that you will vomit* (sum = 42, 5.5% of total sum), *loss of balance in walking or getting up from chair or bed* (sum = 36, 5% of total sum) and *fever or high temperature* (sum = 12, 1.5% of total sum).

Five symptoms were present every day in more than 10% of the participants (see figure 84):

- *pain, numbness or tingling in hands or feet* (19 of 79, 24%),
- *trouble remembering so that you had to keep lists* (18 of 79, 23%),
- *difficulty in falling or staying asleep, or unusual daytime sleepiness* (15 of 79, 19%),
- *skin problems, such as rash, sores or dryness* (12 of 79, 15%), and
- *fatigue, or loss of energy, that keeps you from doing the things you need or want to do* (9 of 79, 11%).

Symptoms with daily presence in up 10% of the 79 participants were cough (8 of 79, 10%) (however, 6 (75%) of the 8 participants reporting daily cough were smokers), headache (7 of 79, 9%), diarrhea or depressive feelings/sadness (6 of 79, 8% each), nausea or problems with balance during movements (4 of 79, 5% each).

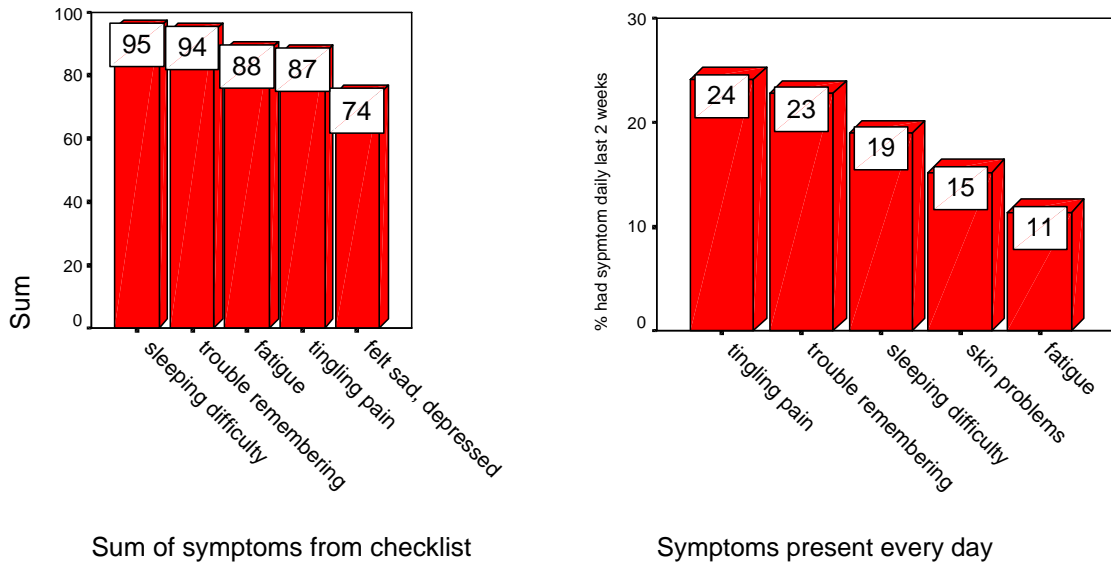


Figure 84: Sum of the 6 most common symptoms of HIV/ART (scale from 0=never to 3=often) and frequency distribution of the 5 symptoms present every day in more than 10% of the participants according to the ACTG adherence questionnaire (n=79).

b) Was the decision about ART associated with the reported symptoms?

Interestingly taking ART or not is not significantly correlated with the sum of symptoms from the checklist of the ACTG adherence questionnaire. Further, there are no significant differences in the frequency of symptoms reported on the checklist between the decision to maintain, to change, to restart or not to start ART. But the questionnaire does not differentiate whether symptoms are related to HIV or its treatment.

c) Relationship between symptoms of HIV or ART and adherence to ART

For the 58 participants taking ART the sum of symptoms of HIV/ART was significantly positively associated with the sum of reasons for non-adherence to ART ($r = .33^{**}$, $F_{1,56} = 6.62^{**}$).¹ *Participants on ART who report to have often and more symptoms of HIV (or ART) also report to have more reasons not to take their medication as prescribed. Symptoms of HIV or ART explain 11% of variance in the sum of reasons for non-adherence.*

3.3.5. How continuous did participants take ART over the past year?

All participants did fill out the ACTG adherence questionnaire at the interview and one-year prior and additionally the participants were followed up in 3 monthly intervals completing the ACTG-adherence questionnaire over the phone. Taking together the information at the

¹ Calculating Pearson's coefficients with windsorized outliers in each variable.

interview and the follow-up ACTG adherence questionnaires over the last year the number of treatment interruptions was calculated (see figure 85):

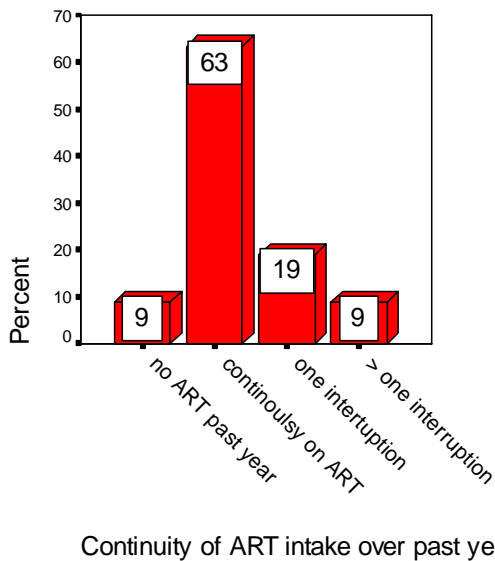


Figure 85: Continuity of ART intake according to the interviews and 3 monthly follow-ups with the ACTG-adherence questionnaire over the past year (n=79).

- Of the 79 participants 50 (63%) took ART continuously over the past year whereas 22 (28%) reported interruptions of their treatment over the past year, of which 15 (19%) reported only one treatment interruption and 7 (9%) several treatment interruptions. Seven (9%) of the 79 participants did not take ART at all over the past year, of which 5 participants were ART-naïve and 2 participants had discontinued treatment for more than one year.

3.3.6. Relationship between decisional control and adherence to ART

a) Were PWHA who perceived less decisional control than preferred in the decision to take ART less adherent to ART? (*Hypothesis 4*)

The first part of *hypothesis 4*, testing whether PWHA perceiving less decisional control than preferred in the decision to take ART are less adherent to ART, was rejected. In the 58 participants taking ART perceiving less control than preferred on the CPS was not significantly correlated with the proportion of missed doses ($r = .20$, $p = .12$), the last time skipping doses ($r = .11$, $p = .40$), or the total sum of reasons for missing doses ($r_s = .19$, $p = .16$). Even if the 19 participants who potentially over-reported adherence (see above) were excluded, perceiving less decisional control than preferred was not associated with poorer adherence according to the ACTG adherence questionnaire.

b) Did PWHA talk less to their doctor about their reasons for non-adherence if they perceived less decisional control than preferred? (*Hypothesis 5*)

The majority of the participants (46 of 58, 79%) reported in the interview that they did talk to their doctor about their reasons for non-adherence. There was no significant correlation between perceiving less control than preferred in the decision to take ART and sharing reasons for non-adherence with the doctor ($r = -.03$, $p = .84$). PLWH who perceive less decisional control than preferred in the decision to take ART are neither reporting less adherence to ART, nor do they talk to their doctor less about their reasons for missing doses than PLWH who do not perceive less decisional control than preferred. In conclusion *Hypothesis 5* was rejected.

3.3.7. Relationship between decisional conflict and adherence to ART (*Hypothesis 4*)

Also the second part of *hypothesis 4* could not be supported: Perceiving more difficulties in the decision to take ART on the GDS was not associated with self-reported adherence on the ACTG adherence questionnaire. In the 58 participants taking ART the total of generic decisional conflict on the GDCS was not significantly correlated with the percentage of missed doses ($r = -.15$, $p = .25$), the last time skipping any doses ($r = .07$, $p = .61$) and the sum of reasons for missing doses ($r_s = .12$, $p = .38$). Even if the 19 participants who potentially over reported adherence (see above) were excluded, decisional conflict was not significantly associated with the percentage of missed doses, the last time skipping any doses or the sum of reasons for missing doses.

Nevertheless decisional conflict on the total GDCS was significantly positively correlated with three reasons for non-adherence:

- *Had problem taking pills at specified times* ($r_s = .41^{**}$),
- *Did not want others to notice you taking medications* ($r_s = .33^*$),
- *Had too many pills to take* ($r_s = .31^*$).

The more decisional conflict on the GDCS, the more participants taking ART reported having problems taking their medication on time, did not want others to notice them taking their medication and felt that they had too many pills to take.

3.3.8. Relationship between symptoms of HIV or ART and decisional conflict

The sum of symptoms of HIV or ART from the checklist of the ACTG adherence questionnaire was significantly associated with decisional conflict on the GDCS ($r_s = .33^{**}$), mainly with the subscales feeling unsupported ($r_s = .35^*$), perceiving a low quality of the decision ($r_s = .30^{**}$) and feeling uncertain ($r_s = .25$).

Overall Decisional conflict as indicated by the total of the GDCS was significantly positively correlated with seven symptoms of either HIV or ART from the checklist:

- *Fatigue/ loss of energy* ($r_s = .36^{**}$)
- *Trouble remembering* ($r_s = .34^{**}$)
- *Felt sad, down or depressed* ($r_s = .31^{**}$)
- *Sleeping difficulties* ($r_s = .30^{**}$)
- *Diarrhea* ($r_s = .30^{**}$)
- *Nausea* ($r_s = .29^*$)
- *Loss of balance* ($r_s = .22^*$)

Regression analysis showed that 13% of the variance in decisional conflict could be explained by symptoms of HIV or ART ($r = .36^{**}$, $F_{1,77} = 11.53^{**}$). *Participants who perceived more symptoms of HIV or ART, in particular fatigue, memory problems, depression, sleep disturbances, diarrhea, nausea and loss of balance, rated a higher decisional conflict.*

3.3.9. Summary of the examination of self-reported adherence using the ACTG-adherence questionnaire and the interview (aim 8)

The ACTG adherence questionnaire were used to assess pill burden, special instructions, percentage of missed doses over the last 3 days, last time skipping medications, reasons for missing doses and frequent symptoms of HIV or ART over the past year (aim 8). Additionally the interview assessed whether participants communicated with their doctors about adherence or not. In relation to the CPS and the GDCS this should test the following hypotheses:

- **Hypothesis 4:** PWHA perceiving less control than preferred and more decisional conflict in the decision to take ART are less adherent to ART.
- **Hypothesis 5:** If PWHA perceive less decisional control than preferred, they talk less to their doctors about their reasons for non-adherence.

Most patients (48 of 58, 83%) were on a twice-daily regimen, taking on average of 7.84 pills per day. Having to take ART less often per day accounted for 9 (27%) of the 33 patients who changed their treatment over the past year. Surprisingly 9 (41%) of 22 participants, who had to take their medication on an empty stomach, did not recall their food instructions correctly.

Adherence to ART was good (mean 99.97%, SD 11.10) over the past 3 days. Not skipping medications over the past month was reported by 37 (64 %) of the 58 participants. However adherence to ART seems to be over-reported in the ACTG- adherence questionnaire, especially in participants who report that they never skip medications. Six (50%) of the 12 participants, who claimed at the interview that they never skipped ART, did report missing doses one-year prior. More stable were the reported reasons for missing doses, and one third of the participants reported having often reasons for missing doses.

Six reasons accounted for three quarter of the sum of reasons to skip doses: Side effects/toxicity (16%), being away from home (14%, having a change in daily routine (12%), sleeping through dose time (11%), being busy with other things (11%), and simply to forget (10%). In the interview single participants reported additional reasons for often skipping doses, such as irritable bowel syndrome, detoxification from substance use, nausea during pregnancy, and just not to feel like taking it.

The ACTG adherence questionnaire does not differentiate whether the symptoms on the checklist are related to HIV or to ART. Many patients reported having daily signs of peripheral neuropathy (19 of 79, 24%), problems with memory (18 of 79, 23%), sleeping

problems (15 of 79, 19%), skin problems (12 of 79, 15%) and fatigue (9 of 79, 11%). In sum 59% of the reported symptoms consisted of sleeping and memory problems, fatigue, signs of peripheral neuropathy and depression, which could all be related to both, ART or HIV. Importantly, participants on ART who reported having often and more symptoms of HIV (or ART) reported to have more often reasons to be non-adherent ($r = .33^{**}$, $F_{1,56} = 6.62^{**}$). Symptoms of HIV or ART explained 11% of variance in the sum of reasons for non-adherence. It further has to be noted, that PWHA reporting more symptoms of HIV or ART in the ACTG adherence questionnaire, also rate more decisional conflict on the GDCS ($r = .33^{**}$), mainly feeling unsupported ($r = .35^*$), perceiving a low quality of the decision ($r = .30^{**}$) and feeling uncertain ($r = .25$). Participants perceiving more symptoms of HIV or ART, in particular fatigue ($r = .36^{**}$), memory problems ($r = .34^{**}$), depression ($r = .31^{**}$), sleep disturbances ($r = .30^{**}$), diarrhea ($r = .30^{**}$), nausea ($r = .29^*$) and loss of balance ($r = .22^*$), also report a higher decisional conflict on the GDCS. Regression analysis shows that 13% of the variance in decisional conflict can be explained by symptoms of HIV or ART ($r = .36^{**}$, $F_{1,77} = 11.53^{**}$).

Hypothesis 4 could not be supported. Neither perceiving less control than preferred on the CPS nor rating more decisional conflict on the GDCS were associated with reporting less adherence to ART on the ACTG adherence questionnaire, even after excluding 19 participants who had a detectable viral load despite reporting that they did not skip any dose over the past month. Nevertheless the more participants rated decisional conflict on GDCS, the more they reported three reasons for non-adherence: *Had problem taking pills at specified times* ($r = .41^{**}$), *did not want others to notice you taking medications* ($r = .33^*$), and *had too many pills to take* ($r = .31^*$).

Also **hypothesis 5** was rejected. According to the interviews 46 (79%) of the 58 participants taking ART did communicate with their doctor about adherence. There was no significant correlation between perceiving less control than preferred in the decision to take ART and sharing the reasons for non-adherence with the doctor.

3.4. The assessment of quality of life with the HIV/AIDS targeted Quality of Life questionnaire (HAT-QoL) and the interviews (aim 9) (*hypothesis 6*)

Seven (27 items) of the 9 subscales of the HIV/AIDS targeted Quality of Life questionnaire (HAT-QoL) (Holmes & Shea 1999) were selected for this study (see methods, chapter 4.1.4., pp. 34-36). They measure overall function, life satisfaction, health worries, financial worries, HIV mastery, disclosure worries and sexual function. Each subscale, including the mean total of 7 subscales, were rated on a 5-point Likert-scale ranging from 1 = *very low* to 5 = *very high* quality of life (e.g., very few health worries = 5 as it indicates a *very high* quality of life, whereas very low overall function = 1 as it indicates a *very low* quality of life). Each subscale and the total were transformed on a 0-to-100 scale, where 0 is the worst score possible and 100 is the best score possible. Following hypothesis should be tested using the HAT-QoL in conjunction with the CPS and the GDCS, as well as the interviews eliciting the effect of the decision about ART on quality of life:

- **Hypothesis 6:** If decisional control preferences are met in the clinical encounter and if there is little decisional conflict, this is associated with a better quality of life in PLWA.

The 2 remaining subscales of the HAT-QoL, measuring providers trust and medication concerns, had insufficient psychometric properties and could be replaced by other instruments with better psychometric properties, such as the subscale *trust* of the Doctor-Patient Relationship Questionnaire (DPR) (Ironson et al. under review) and the subscale on concerns about potential adverse effects of ART of the Beliefs about Medication Questionnaire (BMQ) (Horne & Weinman 1998). As these quantitative instruments were part of the parent study, which is the Long-Term-Survivor (LTS) study, they will be discussed separately in chapter 4 of the result section (pp. 221-239).

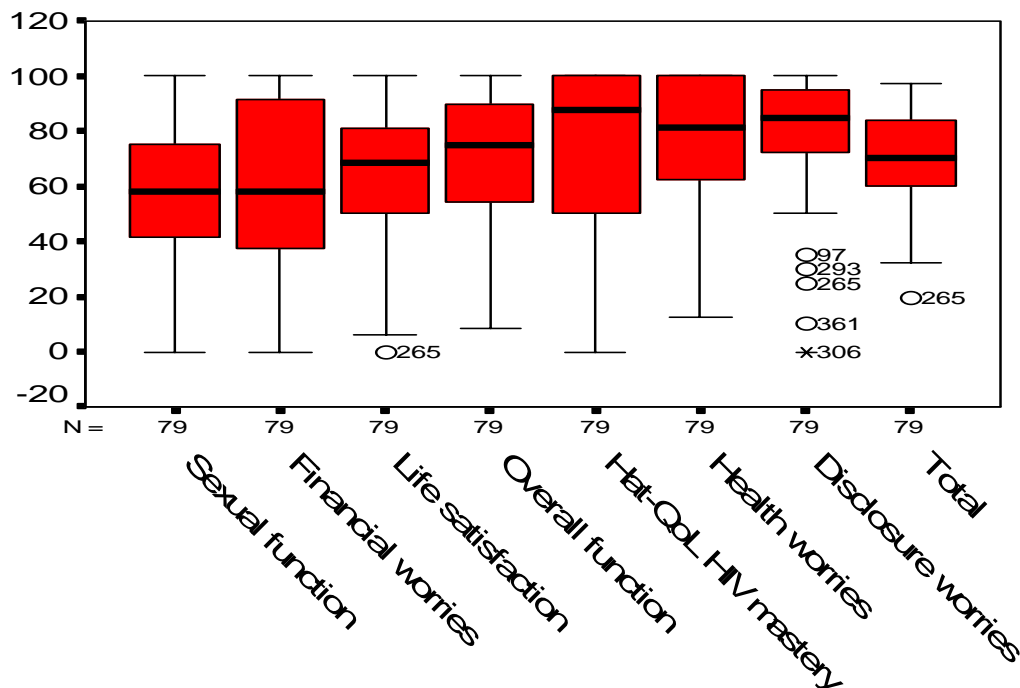
3.4.1. The measurement of quality of life in PWHA (*aim 9*)

a) How good was quality of life in the participants according to the HAT-QoL?

According the total of 7 subscales of the HAT-QoL the participants perceived on average a good quality of life (mean 69.92, SD 16.72). The box plots of the subscales and the total (see figure 86) illustrate that some participants reported extreme disclosure worries compared to the other participants. It has to be noted that disclosure worries were not related to time since HIV-diagnosis ($r_s = .09$, $p = .44$). Also, one participant rated an extremely low life satisfaction and extremely low total HAT-QoL.

- The subscale with the lowest mean item score was *sexual function* (mean 57.17, SD 26.55), followed by *financial worries* (mean 60.23, SD 32.60) and *life satisfaction* (mean

64.24, SD 25.43). Higher scores were on the scales *overall function* (mean 70.10, SD 22.64), *HIV mastery* (mean 72.94, SD 31.29), *health worries* (mean 77.29, SD 24.13) and the highest was *disclosure worries* (mean 80.63, SD 21.25).



HAT-QoL

Figure 86: Box plots of the HIV/AIDS targeted quality of life (HAT-QoL) (n=79). Dimensions of all 7 subscales and total transformed on a linear 0-to-100 scale, where 0 is the worst possible and 100 is the best quality of life score possible.

The following case presents the participant who rated an extremely low quality of life on the total HAT-QoL (mean 19.40) compared to all participants (mean 69.92, SD 16.72):

- A 38-year-old heterosexual Hispanic man, separated and living alone, working part-time as a technician was diagnosed with HIV 11 years ago with a CD4 nadir of 200 cells/ μ l. He reported in the interview that he never had symptoms of HIV or AIDS, although his doctor confirmed that he had cryptosporidiosis one year ago. About a year ago his doctor changed his treatment according to a genotype resistance test to a regimen that he had to take three times a day, with a pill burden of 13 antiretroviral tablets daily. At the interview he still had 509 CD4 cells/ μ l and 506 viral load copies/ml although he stopped his treatment 2 months ago without telling his doctor: *“If it was my own will, I would not be in this regime. I would be on the one before this one, it was less pills, and I felt better, it wasn’t as sensitive on my stomach as this one is. My doctor made the decision. I don’t like this treatment at all. I gained weight again, 40 pounds in three weeks. Well if I gain weight, you can imagine my quality of life is not that good. I have told him (doctor) how I feel, because I thought it was a side effect, but I don’t know if he understands. My lab*

work hasn't changed in years, it always been the same. Even now that I am not taking medicine it is still the same. Well apparently the medications were not doing anything at all. My own immune system is the one that is fighting not the medicine." On the CPS he indicated that he preferred his doctor deciding considering patient's opinion but perceived that he made the decision to stop ART alone considering the doctor's opinion.

b) Is quality of life as measured by the HAT-QoL related to the decision about ART?

According to the 7 subscales of the HAT-QoL taking ART or not was not significantly correlated with quality of life ($r = .10, p = .38$)¹. There were no significant differences in any of the 7 subscales of the HAT-QoL between the decision to maintain, to change, to restart, to stop or not to start ART ($F_{4,74} = .69, p = .44$). As the HAT-QoL was not given one year prior to the interview, the changes in quality of life according to the HAT-QoL could not be calculated. If participants reported in the interview that the decision about ART had a positive impact on their psychosocial function, this was significantly positively correlated with reporting less financial worries ($r = .33^{**}$) and better HIV-mastery ($r = .22^*$) in the HAT-QoL. *If the decision had a positive impact on psychosocial function participants reported less financial worries and a better HIV mastery.* The impact of the decision about ART on physical function was not related to any subscale of the HAT-QoL.

c) The relationship between socio-demographic, medical and behavioral parameters and quality of life according to the HAT-QoL

The 7 subscales of the HAT-QoL¹ and were analyzed for special characteristics with respect to socio-demographic, medical and behavioral parameters.

HIV-mastery was significantly positively correlated with education ($r = .32^{**}$), employment ($r = .29^{**}$) and income ($r = .28^*$). *The higher socioeconomic status the better participants' rated HIV mastery.* HIV mastery was significantly negatively correlated with heterosexual orientation ($r = -.33^{**}$, controlled for years since diagnosis $r = -.30^{**}, df 76$) and African American ethnicity ($r = -.27^*$, controlled for years since diagnosis $r = -.24^*, df 76$). Heterosexual African American women rated significantly less HIV mastery than homo/-bisexual men of Caucasian, Hispanic or other ethnic origin ($t = -2.93^{**}, df 49, mean 3.45, SD 1.42$ vs. mean 4.39, SD .88).

Symptoms of HIV or ART (sum of category B symptoms including diarrhea and peripheral neuropathy) were the most relevant parameter, which were significantly inversely correlated

¹ Pearson's correlations were calculated with windorized outliers for the subscales life satisfaction, disclosure worries and the total of the 7 HAT-QoL subscales.

with the total of the 7 HAT-QoL subscales ($r = -.34^{**}$). *The less symptoms of HIV or ART were perceived, the better the quality of life.* The sum of category B symptoms including diarrhea and peripheral neuropathy over the past 6 months was significantly negatively correlated with overall function ($r = -.41^{**}$), financial worries ($r = -.33^{**}$), life satisfaction ($r = -.28^*$), sexual function ($r = -.28^*$) and health worries ($r = -.26^*$), but not with HIV mastery and disclosure worries. Excluding diarrhea and neuropathy the sum of category B symptoms was only inversely correlated with sexual function ($r = -.25^*$). Further, viral load log was significantly inversely correlated with health worries ($r = .32^{**}$). *The higher the viral load log the more participants reported health worries.*

Smoking was significantly weakly inversely correlated with HIV mastery ($r = -.23^*$) and the more frequently participants reported use of alcohol, the less they reported life satisfaction ($r = -.27^*$).

None of the 7 subscales of the HAT-QoL was significantly correlated with gender, age, health insurance, partnership status, use of complementary/alternative treatments, recreational drug use, as well as for years since HIV diagnosis, CD4 nadir, CD4 cells, changes in CD4 cells and viral load over the past year, and CDC category C symptoms in the past.

3.4.2. The relationship between decisional control preferences on the CPS, decisional conflict on the GDCS and quality of life in the HAT-QoL (*hypothesis 6*)

a) Do participants perceive a better quality of life if their decisional control preferences are met in the clinical encounter?

The first part of *hypothesis 6* could not be supported. Out of 32 correlations only 2 were significant, which is just what would be expected by chance alone: The HAT-QoL subscale *overall function* was significantly negatively correlated with perceiving more control than preferred ($r = -.24^*$) and with patients perceptions of decisional control ($r = -.26^*$). Perceiving more control than preferred explains 6% of variance in overall function ($F_{1,77} = 4.65^*$). No other linear relationships were found between the subscales of the HAT-QoL and the CPS.

b) Do participants perceive a better quality of life if they have less decisional conflict?

On the other hand the second part of *hypothesis 6* was supported. Table 19 summarizes the Spearman correlations between quality of life on the 7 subscales and the total of the HAT-QoL and decisional conflict on the 5 subscales and the total of the GDCS. The total of the 7 subscales of the HAT-QoL was significantly negatively correlated with the total

decisional conflict on the GDCS ($r_s = -.46^{***}$). Regression analysis² revealed that 23% of variance in quality of life was explained by decisional conflict ($r = .48^{***}$, $F_{1,77} = 22.82^{***}$). *The participants perceived a better quality of life, if they perceived less decisional conflict*

Table 19: Spearman correlations: Quality of life on the 7 subscales and the total of the HAT-QoL and decisional conflict on the 5 subscales and the total of the GDCS (n=79).

Quality of life on the HAT-QOL	GDCS Subscale 1 Uncertainty	GDCS Subscale 2 Feeling uninformed	GDCS Subscale 3 Feeling unclear about values	GDCS Subscale 4 Feeling unsupported in decision	GDCS Subscale 5 Perception of quality of decision	GDCS Total Scale
HAT-QOL 1 Overall function	-.289**	-.249*	-.310**	-.337**	-.352**	-.350**
HAT-QOL 2 Life satisfaction	-.362**	-.302**	-.311**	-.372**	-.358**	-.412**
HAT-QOL 3 Health worries	-.399**	-.299**	-.290**	-.329**	-.318**	-.374**
HAT-QOL 4 Financial worries	-.201	-.259*	-.135	-.311**	-.176	-.305**
HAT-QOL 6 HIV mastery	-.135	-.119	-.212	-.173	-.397**	-.230*
HAT-QOL 7 Disclosure worries	-.050	-.167	-.210	-.192	-.269*	-.176
HAT-QOL 9 Sexual function	-.351**	-.281*	-.149	-.304**	-.225*	-.333**
HAT-QOL total of 7 subscales	-.391**	-.368**	-.347**	-.440**	-.449**	-.459**

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Strong overall correlation ($r_s > .375$)

- A better quality of life (total of the 7 HAT-QoL subscales) is significantly inversely associated with all 5 subscales of the GDCS: perceiving a low quality of the decision ($r_s = -.45^{***}$), feeling uncertain ($r_s = -.39^{***}$), feeling unsupported ($r_s = -.44^{***}$), feeling uninformed ($r_s = -.37^{**}$) and feeling unclear about values ($r_s = -.35^{**}$).
- Decisional conflict (total on the GDCS) is significantly inversely associated 5 subscales of the HAT-QoL: life satisfaction ($r_s = -.41^{***}$), health worries ($r_s = -.37^{**}$), overall function ($r_s = -.35^{**}$), sexual function ($r_s = -.33^{**}$) and HIV-mastery ($r_s = -.23^*$). *The higher decisional conflict, the more health worries and the lower life satisfaction, overall function, sexual function, and HIV mastery.* The total on the GDCS is not significantly associated with disclosure worries, although one subscale of the GDCS, the perception of the quality of the decision, is significantly inversely correlated with disclosure worries ($r_s = -.27^*$).

² Extreme values for the total of the HAT-QoL and GDCS were winsorized for regression analysis

3.4.3. The relationship between adherence to ART and symptoms of ART according to the self-reported ACTG adherence questionnaire and quality of life on the HAT-QoL

The sum of reasons for non-adherence was significantly inversely correlated with the total of the HAT-QoL ($r = -.33^*$), and the subscales life satisfaction ($r = -.37^{**}$), health worries ($r = .30^*$), and overall function ($r = -.27^*$) (using scales windsorized for outliers calculating Pearson's correlations). *The less often participants reported reasons for non-adherence, the better life satisfaction and overall function and the less health worries.*

In addition, the sum of symptoms on the checklist of the ACTG adherence questionnaire was significantly inversely correlated with the total of the 7 subscales of the HAT-QoL ($r_s = -.63^{***}$)¹. The frequency of symptoms related to HIV or ART was significantly negatively correlated with overall function ($r_s = -.70^{***}$), financial worries ($r_s = -.54^{***}$), health worries ($r_s = -.54^{***}$), life satisfaction ($r_s = -.50^{***}$), and sexual function ($r_s = -.42^{***}$)¹. *The less often participants had symptoms related to HIV or ART, the better overall function, life satisfaction and sexual function and the less health and financial worries.* Two subscales of the HAT-QoL, HIV mastery and disclosure worries, were not significantly correlated with symptoms of HIV or ART from the checklist of the ACTG adherence questionnaire. The strong correlations between symptoms and overall function, health worries and life satisfaction are partially explained as some items on the HAT-QoL are directly related to symptoms of HIV or ART (e.g., *I've been too tired to be socially active, pain has limited my ability to be physically active, I've been pleased with how healthy I am, I haven't been able to live the way I'd like because I'm so worried about my health*).

Quality of life as indicated by the total of the 7 HAT-QoL subscales was significantly inversely correlated with the symptoms fatigue ($r_s = -.62^{***}$), depression ($r_s = -.58^{***}$), sleep disturbances ($r_s = -.53^{***}$), diarrhea ($r_s = -.52^{***}$), memory problems ($r_s = -.46^{***}$), nausea ($r_s = -.46^{***}$), signs of peripheral neuropathy ($r_s = .38^{**}$), fever ($r_s = -.30^{**}$), loss of balance ($r_s = -.29^{**}$), skin rash ($r_s = .27^*$), and headache ($r_s = .26^*$)². It remains unclear whether these symptoms from the checklist of the ACTG adherence questionnaire are related to HIV or its treatment.

¹ Pearson's correlations were calculated using windsorized values for outliers.

² Spearman coefficients were calculated to adjust for outliers.

3.4.4. Summary of the assessment of quality of life with the HIV/AIDS targeted Quality of Life questionnaire (HAT-QoL)

The HIV/AIDS targeted Quality of Life questionnaire (HAT-QoL) was rated on a 5-point Likert-scale ranging from 1 = *very low* to 5 = *very high* quality of life. Seven of 9 subscales used in this study measure: overall function, life satisfaction, health worries, financial worries, HIV mastery, disclosure worries and sexual function. The following hypothesis was tested in conjunction with the CPS and the GDCS, as well as the interviews eliciting the effect of the decision about ART on quality of life:

- **Hypothesis 6:** If decisional control preferences are met in the clinical encounter and if there is little decisional conflict, this is associated with a better quality of life in PLWA.

According to the total of 7 subscales of the HAT-QoL the participants perceived on average a good quality of life (mean 69.92, SD 16.72): The quality of life as measured by the HAT-QoL was not significantly related to the decision about ART. However, participants who reported in the interview that the decision about ART had a positive impact on their psychosocial function, rated significantly less financial worries ($r = .33^{**}$) and better HIV-mastery ($r = .22^*$) on the HAT-QoL. Overall, the higher the socioeconomic status the better participants' rated HIV mastery. The fewer participants reported symptoms of HIV or ART, the better the quality of life. The sum of symptoms on the ACTG checklist was inversely correlated with the HAT-QoL ($r_s = .63^{***}$ for). Further, the higher the viral load log the more participants reported health worries ($r_s = .32^{**}$).

Hypothesis 6 was supported for decisional conflict but not for decisional control. Decisional conflict explained 23% of variance in quality of life as indicated by the total of the 7 HAT-QoL subscales. The participants who perceived less decisional conflict perceived a better quality of life ($r = .48^{***}$, $F_{1,77} = 22.82^{***}$). The less participants perceived a poor quality of the decision ($r_s = -.45^{***}$), felt uncertain ($r_s = -.39^{***}$), unsupported ($r_s = -.44^{***}$), uninformed ($r_s = -.37^{**}$) and unclear about values ($r_s = -.35^{**}$), the better the quality of life (total of the 7 HAT-QoL subscales). The higher decisional conflict on the GDCS, the more health worries ($r_s = -.37^{**}$) and the lower life satisfaction ($r_s = -.41^{***}$), overall function ($r_s = -.35^{**}$), sexual function ($r_s = -.33^{**}$), and HIV mastery ($r_s = -.23^*$) in the HAT-QoL. However, meeting or not meeting decisional control preferences was not significantly associated with quality of life.

3.5. Summary of the results of the quantitative study (aims 6-9, hypotheses 1-6)

The main aims of the quantitative study were to assess

- decisional control preferences and perceptions using the CPS (*aim 6*),
- decisional conflict using the GDCS (*aim 7*),
- self-reported adherence to ART using the ACTG adherence questionnaire (*aim 8*),
- and quality of life using the HAT-QoL (*aim 9*).

The following hypotheses were tested:

- **Hypothesis 1:** PWHA prefer shared decision-making rather than leaving the decision up to the doctor. Only a small minority prefers making the decision alone.
- **Hypothesis 2:** The preferences of PWHA are not reflected in the clinical encounter.
- **Hypothesis 3:** PWHA who perceive less control than preferred have more decisional conflict in the decision about ART.
- **Hypothesis 4:** PWHA perceiving less control than preferred and more decisional conflict in the decision to take ART are less adherent to ART.
- **Hypothesis 5:** If PWHA perceive less decisional control than preferred, they talk less to their doctors about their reasons for non-adherence.
- **Hypothesis 6:** If decisional control preferences are met in the clinical encounter, this is associated with less decisional conflict and a better quality of life in PLWH.

Aim 6: As assessed with the card set of the CPS, of the 79 participants shared responsibility in decision making was perceived in 25 (32%), followed by 18 (23%) participants who perceived deciding alone considering the doctors opinion and 16 (20%) who perceived deciding themselves. The doctor deciding considering patients opinion was perceived by 12 (15%) of 79 patients and the doctor deciding in 8 (10%) of 79 patients.

Hypothesis 1 was completely supported: Shared responsibility in decision-making about ART was the ideal of 47 (59%) of the 79 participants. This was followed by 15 (19%) of 79 participants who prefer deciding alone considering the doctor's opinion and 8 (10%) who preferred the doctor making the decision considering patients opinion. Only 2 (3%) of 79 participants wanted to leave the decision completely up to their doctor, but 7 (9%) of 79 participants preferred making the decision alone.

Hypothesis 2 was partially supported: Although overall decisional control preferences were significantly correlated with decisional control perceptions on the CPS ($r = .38^{***}$), shared responsibility in decision-making was perceived in only 28 (32%) but preferred in 47 (59%) of the 79 participants and overall 46 (58%) of 79 participants did not perceive having the

decisional control they preferred. Importantly, perceiving more control than preferred was significantly associated with the decision to stop ART ($F_{1,77} = 10.23^{**}$) as well as rating the information from the doctor as less important ($F_{3,75} = 3.08^*$).

Aim 7: On average there was *little* decisional conflict in the decision about ART. The mean of 2.05 (SD .64) for the total on the GDCS (scale from 1= *very little* to 5 = *very high* decisional conflict) was composed of: *state of uncertainty* (mean 2.19, SD .94), *feeling unsupported in decision making* (mean 2.18, SD .81), *feeling uninformed* (mean 2.06, SD .69), *feeling unclear about values* (mean 1.98, SD .66) and the *perception of the quality of the decision* (mean 1.94, SD .70).

Hypothesis 3 was supported: Perceiving less control than preferred is associated with decisional conflict in the decision about ART ($r = .22^*$, $F_{1,77} = 3.84^*$). Particularly this accounted for participants preferring shared responsibility in decision-making ($r = .47^{**}$, $F_{1,45} = 13.73^{**}$) and participants deciding to take ART ($r = .31^*$, $F_{1,56} = 4.53^*$).

Aim 8: Most patients (48 of 58, 83%) were on a twice-daily regimen, taking on average 7.84 pills per day. Self-reported adherence over the last three days was high (mean 99.97%, SD 11.10), but participants over-reported adherence, particularly if they claimed that they never skipped doses. The six reasons accounted for three quarter of the sum of reasons to skip doses: Side effects/toxicity (16%), being away from home (14%), having a change in daily routine (12%), sleeping through dose time (11%), being busy with other things (11%), and simply to forget (10%). In the interview single participants reported additional reasons for often skipping doses, such as irritable bowel syndrome, detoxification from substance use, nausea during pregnancy, and just not to feel like taking it. In the symptom checklist of the ACTG adherence questionnaire many patients reported having daily signs of peripheral neuropathy (19 of 79, 24%), problems with memory (18 of 79, 23%), sleeping (15 of 79, 19%), or skin (12 of 79, 15%) and fatigue (9 of 79, 11%). Importantly, participants on ART who report to have often and more symptoms of HIV (or ART) also report to have more often reasons to miss doses ($r = .33^{**}$, $F_{1,56} = 6.62^{**}$) and to perceive decisional conflict ($r = .36^{**}$, $F_{1,77} = 11.53^{**}$).

Hypothesis 4 was rejected: Neither perceiving less control than preferred on the CPS nor rating more decisional conflict on the GDCS was associated with reporting less adherence to ART on the ACTG adherence questionnaire. Nevertheless, the more participants taking ART rated decisional conflict on the GDCS, the more they reported having problems taking their medication at specified times ($r_s = .41^{**}$), and to miss doses because they did not want

others to notice them taking their medication ($r_s = .33^*$), and felt that they have too many pills to take ($r_s = .31^*$).

Also **hypothesis 5** was rejected. According to the interviews 46 (79%) of the 58 participants taking ART did communicate with their doctor about adherence. There was no significant correlation between perceiving less control than preferred in the decision to take ART and sharing the reasons for non-adherence with the doctor.

Aim 9: The participants reported a mean score of 69.92 (SD 16.72) on the HAT-QoL on a 0-to-100 dimension score, where 0 is the worst possible and 100 is the best quality of life score possible. The subscale with the lowest quality of life was *sexual function* (mean 57.17, SD 26.55), followed by *financial worries* (mean 60.23, SD 32.60) and *life satisfaction* (mean 64.24, SD 25.43). Higher scores were on the scales *overall function* (mean 70.10, SD 22.64), *HIV mastery* (mean 72.94, SD 31.29), *health worries* (mean 77.29, SD 24.13) and the highest was *disclosure worries* (mean 80.63, SD 21.25).

The less frequent participants reported symptoms associated to HIV or its treatment, such as fatigue ($r_s = -.62^{***}$), depression ($r_s = -.58^{***}$), sleep disturbances ($r_s = -.53^{***}$), diarrhea ($r_s = -.52^{***}$), memory problems ($r_s = -.46^{***}$), nausea ($r_s = -.46^{***}$), signs of peripheral neuropathy ($r_s = .38^{**}$), fever ($r_s = -.30^{**}$), loss of balance ($r_s = -.29^{**}$), skin rash ($r_s = .27^*$), and headache ($r_s = .26^*$), the better quality of life according to the HAT-QoL. The less often participants taking ART reported reasons for non-adherence, the better quality of life on the total HAT-QoL ($r = -.33^*$), and the subscales life satisfaction ($r = -.37^{**}$), health worries ($r = .30^*$), and overall function ($r = -.27^*$).

Hypothesis 6 was supported for decisional conflict, but not for decisional conflict. The participants who perceived less decisional conflict perceived a better quality of life ($r = .48^{***}$, $F_{1,77} = 22.82^{***}$). The fewer participants perceive a low quality of the decision ($r_s = -.45^{***}$), feel uncertain ($r_s = -.39^{***}$), unsupported ($r_s = -.44^{***}$), uninformed ($r_s = -.37^{**}$) and unclear about values ($r_s = -.35^{**}$) the better the quality of life (total of the 7 HAT-QoL subscales). The higher decisional conflict on the GDCS, the more health worries ($r_s = -.37^{**}$) and the lower life satisfaction ($r_s = -.41^{***}$), overall function ($r_s = -.35^{**}$), sexual function ($r_s = -.33^{**}$), and HIV mastery ($r_s = -.23^*$) according to the HAT-QoL. However, there was no significant association between meeting patient's decisional control preferences in the clinical encounter or not and patient's perceived quality of life.

4. Overview of relevant quantitative results of the Long-Term Survivor study (LTS) (aim 9) (hypothesis 6)

The following 4 questionnaires of the Long-Term Survivor study (LTS) were considered as relevant in conjunction with this sub-study on medical decision-making:

- Doctor-Patient-Relationship questionnaire (DPR),
- Beliefs about Medication Questionnaire (BMQ),
- Beck Depression Inventory (BDI), and
- Perceived Stress Scale (PSS)

Complementary to the HAT-QoL, which has insufficient psychometric properties for providers trust and medication concerns, the Doctor-Patient Relationship questionnaire (DPR) (Ironson et al. under review) was used to assess doctors trust and the Beliefs about Medication Questionnaire (BMQ) (Horne & Weinman 1999) was used to assess medication concerns (**aim 9**). For these two aspects of quality of life (doctor's trust in the DPR and medication concerns in the BMQ) **hypothesis 6** needs to be tested:

- **Hypothesis 6:** If decisional control preferences are met in the clinical encounter and if there is little decisional conflict, this is associated with a better quality of life in PLWA.

4.1. The assessment of the doctor-patient relationship using the Doctor-Patient Relationship questionnaire (DPR) (aim 9) (hypothesis 6)

4.1.1. Styles of doctor patient relationship and qualities

The DPR questionnaire measures 3 styles (defiant, collaborative and compliant) and the 4 qualities (patient asks, trust, doctor informs, and doctors availability) which are all rated on a scale from 1= *very little* to 5 = *very high*. Figure 87 summarizes the box plots of the 3 styles and 4 qualities in the DPR.

- The participants (n = 79¹) rated on average *high* on the collaborative (mean 4.19, SD .78) and compliant (mean 3.97, SD .73), and *little* on the defiant (mean 1.79, SD .76) style of DPR.
- On the 4 qualities the participants (n=77²) rated *very high* on 3 styles: patient asks (mean 4.57, SD .80), trust (mean 4.56, SD .80), and doctor informs (mean 4.54, SD .82), and *high* on one style, doctor's availability (n=78³, mean 4.00, SD .90 ;).

¹ Interpolated values for two participants

² Two participants did not fill out the questionnaires

³ One participant did not fill out the questionnaire

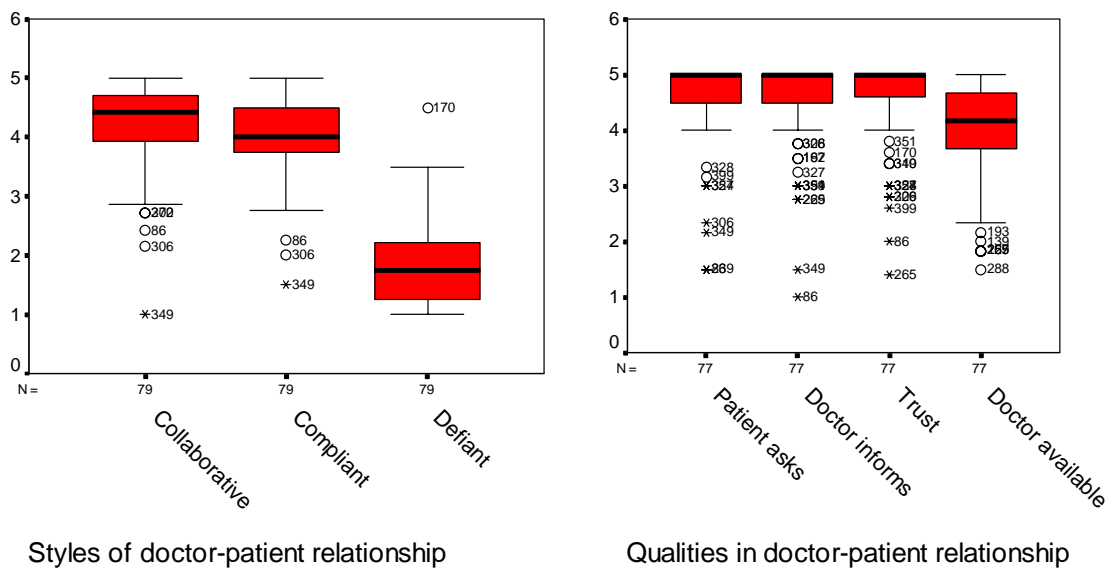


Figure 87: Box plots of styles (n=79) and qualities (patient asks, trust, doctor informs n=77, doctor's availability n=78) of doctor-patient relationship in the DPR (scale from 1 = *very little* to 5 = *very much*).

4.1.2. The association between the doctor-patient relationship in the DPR and the decision about ART

a) Association between the style of DPR and the decision about ART

Between the decision to maintain, change, restart, and stop or never to start ART there were significant differences on the compliant ($F_{4,74} = 3.96^{**}$) but not on the collaborative ($F_{4,74} = 1.78$, $p = .14$) and defiant style of DPR ($F_{4,74} = .42$, $p = .79$) (see figure 88). The decision to take ART or not was significantly positively correlated with a compliant ($r = .41^{***}$) and collaborative ($r = .25^*$) style of DPR, but was not significantly associated with the defiant style of DPR ($r = .12$, $p = .30$).¹

¹ Scales for DPR styles were used with windsorized outliers to calculate ANOVAs and Pearson's Correlations.

The 58 participants taking ART stated a more compliant (mean 4.15, SD .60) and collaborative (mean 4.32, SD .65) style of DPR than the 21 participants not taking ART, who stated a less compliant (mean 3.47, SD .83) and a less collaborative style (mean 3.83, SD 1.01). Participants taking ART rated mean 1.75 (SD .75) on the scale for the defiant style and participants not taking ART mean 1.93 (SD .77).

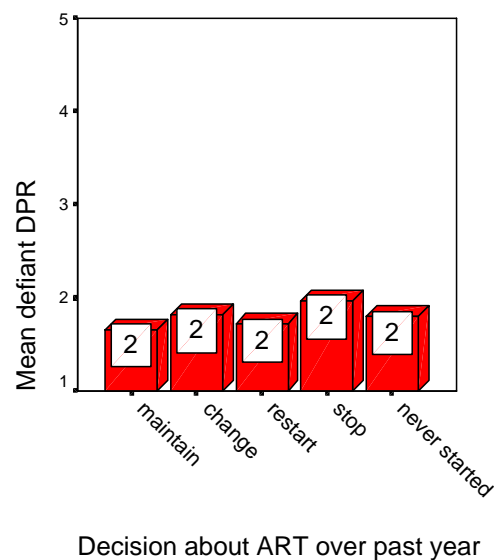
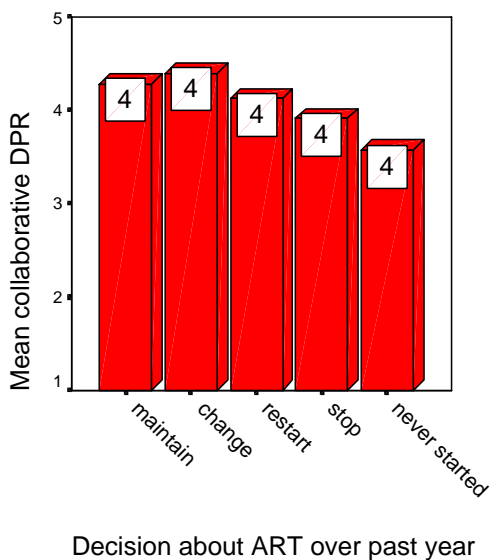
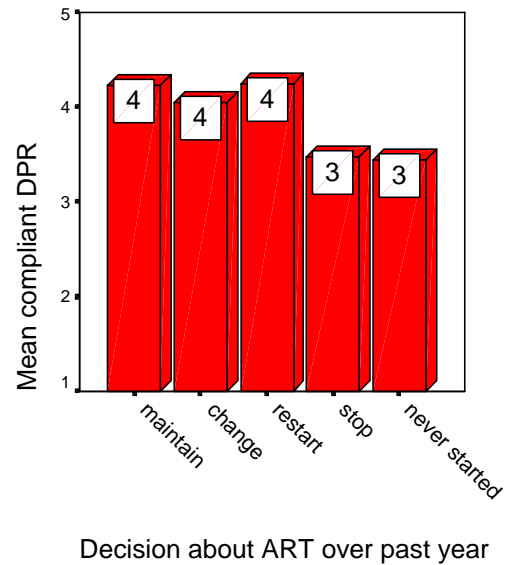


Figure 88: Relationship between the decisions made about ART over the past year and the mean styles of doctor-patient relationship in the DPR (n=79).¹

b) Association between the qualities in the DPR and the decision about ART

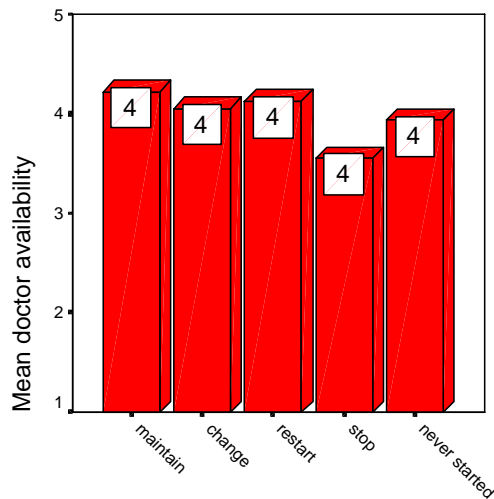
Although the 4 qualities reported in the DPR did not differ significantly between the decision to maintain, change, restart, stop or never to start ART (see figure 89), the decision to take ART or not was significantly associated with 2 of the 4 qualities, doctors availability ($r = .26^*$, $n=78^1$) and trust ($r = .23^*$, $n=77^2$).³

¹ Interpolated values for two participants

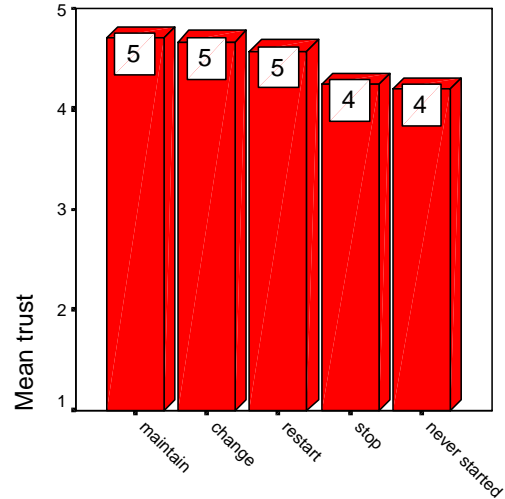
¹ One participant did not fill out the questionnaire

² Two participants did not fill out the questionnaires

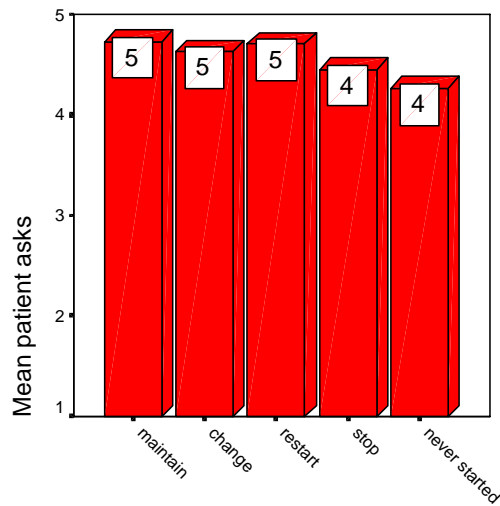
³ Scales for qualities in DPR were used with windsorized outliers to calculate ANOVAs and Pearson's Correlations.



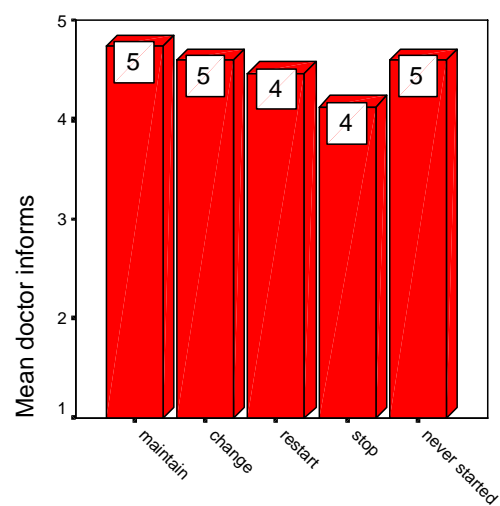
Decision about ART over past year



Decision about ART over past year



Decision about ART over past year



Decision about ART over past year

Figure 89: Relationship between the decision made about ART over the past year and the mean qualities (doctor's availability $n=78^1$, patient asks, trust, doctor informs $n=77^2$) of doctor-patient relationship in the DPR.

- Participants deciding to take ART vs. not taking rated significantly higher on the qualities *doctor's availability* (participants taking ART $n=57$, mean 4.13, SD .87 vs. participants not taking ART $n=21$, mean 3.64, SD .88) and *trust* (participants taking ART $n=57$, mean 4.67, SD .67 vs. participants not taking ART, $n=20$, mean 4.25, SD 1.04)
- The decision to take ART or not was not significantly associated with *patients asking* (participants taking ART $n=57$, mean 4.68, SD .63 vs. participants not taking ART, $n=20$, mean 4.29, SD 1.00), and *doctors informing* in the DPR (participants taking ART $n=57$, mean 4.63 SD .74 vs. participants not taking ART, $n=20$ mean 4.29, SD 1.00).

4.1.3. The association between doctor-patient relationship using the DPR and decisional control on the CPS

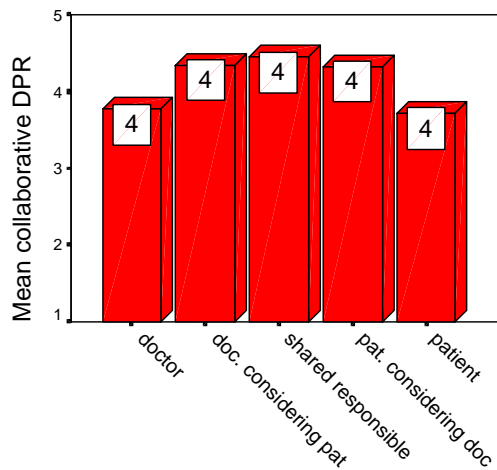
a) The association between the styles in DPR and decisional control on the CPS

There was a significant association between a compliant style in the DPR and the decisional control perception ($\beta = -.35^{**}$, $F_{1,77} = 10.61^{**}$) and the decisional control preference ($\beta = -.40^{***}$, $F_{1,77} = 14.50^{***}$). *Participants in a compliant style of DPR prefer and perceive that the doctor is more involved in the decision about ART.* A compliant style of DPR explains 20% of variance in decisional control preference and 13% of variance in decisional control perception.

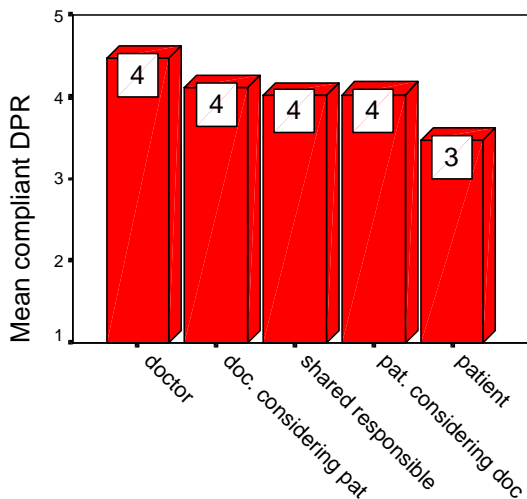
A defiant style in the DPR was significantly associated with the patient perceiving making the decision about ART on the CPS ($\beta = .24^*$, $F_{1,77} = 4.63^*$) but it was not significantly associated with the patient preferring to make the decision about ART. A defiant style of DPR explains 6% of variance in decisional control perception.

A collaborative style of DPR was not significantly correlated with the decisional control preferences and perceptions on the CPS. Nevertheless a collaborative style of DPR was significantly associated with perceiving shared responsibility in decision-making ($\beta = .22^*$, $F_{1,77} = 4.04^*$).

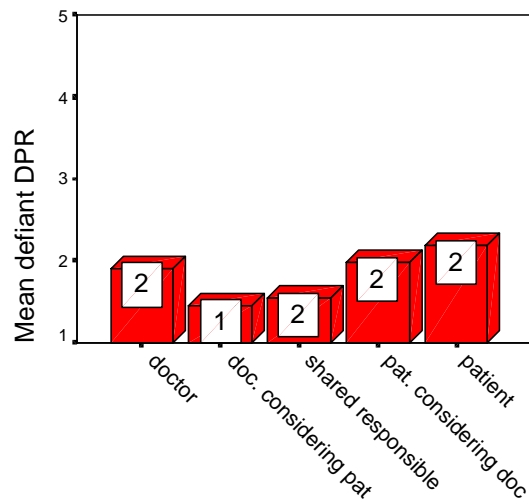
Figure 90 illustrates the relationship between the style of DPR and the decisional control perception. The 25 participants perceiving shared responsibility in decision-making reported the most collaborative DPR (mean 4.45, SD .43), closely followed by the 12 patients perceiving their doctors deciding considering patients opinion (mean 4.35, SD .93) and the 18 patients perceiving to decide themselves considering their doctors opinion (mean 4.33, SD .64). The DPR was less collaborative in the 16 patients perceiving to decide themselves (mean 3.65, SD .98) and the 8 patients perceiving their doctors deciding (mean 3.76, SD .83). There are no associations between collaborative DPR and decisional control preferences or perceiving more or less control than preferred.



Decisional control perception



Decisional control perception



Decisional control perception

Figure 90: Relationships between decisional control perception on the CPS and the styles of doctor-patient relationship in the DPR (n=79).

b) The relationship between qualities in the DPR and decisional control on the CPS

As trust in the doctor-patient relationship is considered as one aspect of quality of life in PWHA (Holmes & Shea 1998), it should be tested if a mismatch between decisional control preferences and perceptions is associated with trust in the DPR (**Hypothesis 6**). This hypothesis could not be supported, as trust in the DPR was neither significantly associated with perceiving more control than preferred ($r = -.18, p = .12$) nor with perceiving less control than preferred ($r = .06, p = .61$) on the CPS. Although, there was one significant negative correlation: The less patients perceived deciding themselves the more they rated mutual trust in DPR ($r = -.24^*$). *The more patients trust the doctor, the more they perceive the doctor*

to be involved in the decisions. Similar, the less patients perceived deciding themselves; the more they asked their doctor about information ($r = -.28^*$) and the more the doctor informs ($r = -.26^*$). Regression analysis with stepwise exclusion shows that that the qualities *patient asks* explains 8% of variance in decisional control perception ($r = -.28^*$, $F_{1,75} = 6.36^*$). *The more patients ask their doctor the more patients perceive the doctor to be involved in the decision.*

4.1.4. The association between doctor-patient relationship using the DPR and decisional conflict on the GDCS

According to **hypothesis 6** trust should be inversely associated with decisional conflict. This was not supported, as the qualities trust in the DPR was not significantly correlated with any subscale of the GDCS.

Overall decisional conflict on the GDCS was significantly associated with the qualities doctor informs ($r = .29^{**}$, $F_{1,75} = 6.94^{**}$)¹. The qualities *doctor informs* explains 9% of variance in decisional conflict. *The more the doctor informs, the less patients perceive decisional conflict.* The qualities *doctor informs* was significantly negatively correlated with the perception of the quality of the decision ($r_s = -.30^{**}$), feeling uninformed ($r_s = -.29^{**}$), unsupported ($r_s = -.28^*$) and uncertain ($r_s = -.23^*$). *The more the doctor informs, the better participants perceive the quality of the decision, and the more they feel informed, supported and certain about the decision.*

The qualities of patients asking was inversely correlated with the perception of the quality of the decision ($r_s = -.24^*$) and feeling unsupported in the decision ($r_s = -.24^*$). *The more patients ask, the better they perceive the quality of the decision and feel supported in the decision about ART.*

Finally, doctor's availability in the DPR was significantly inversely correlated with feeling unclear about values on the GDCS ($r_s = -.29^{**}$). *The more the doctor is available, the clearer patients feel about their values in the decision about ART.*

Overall no significant correlations have been found between decisional conflict (total GDCS) and the three styles of doctor-patient relationship (compliant, collaborative and defiant). A collaborative style of DPR was significantly inversely correlated with feeling unclear about values ($r_s = .24^*$). *The more patients rated a compliant style of DPR, the clearer they felt about values in the decision about ART.*

¹ For regression analysis windsorized extreme values were used for the DPR scale doctor informs and the total GDCS

4.1.5. The association between doctor-patient relationship using the DPR and quality of life according to the HAT-QoL

As trust in the doctor-patient relationship is already considered as an important aspect of quality of life according to the HAT-QoL, it was examined, if the other dimensions of the DPR are associated with the HAT-QoL. It was found that quality of life, as indicated by the total of the 7 HAT-QoL subscales, was significantly positively associated with a compliant style of DPR ($r = .29^{**}$) and the qualities doctor's availability ($r = .43^{**}$), doctor informs ($r = .33^{**}$) and patient asks ($r = .26^*$).¹ *The more patients were compliant and asked and the more the doctors were available and informed, the better the quality of life.* No significant associations were found between a collaborative or defiant style of DPR and quality of life in the HAT-QoL.

Although a compliant style and the qualities patient asks, doctor informs, and doctor availability were all significantly correlated with quality of life on the HAT-QoL, when regression analysis with stepwise exclusion was performed, only doctor availability remained in the model due to multi-collinearity among the variables. Doctor availability explains 18% of variance in DPR ($r = .43^{***}$, $F_{1,75} = 17.23^{***}$), whereas the other variables (compliant style of DPR, doctor informs, and patient asks) do not contribute more to the model.

4.1.6. Summary of the assessment of the doctor-patient relationship using the Doctor-Patient Relationship questionnaire (DPR) (aim 9) (hypothesis 6)

The DPR, a Likert scale ranging from 1= *very little* to 5 = *very high*, was rated on average *high* for the collaborative (mean 4.19, SD .78) and compliant style (mean 3.97, SD .73), *little* for the defiant style (mean 1.79, SD .76), *very high* for the 3 qualities patient asks (mean 4.57, SD .80), trust (mean 4.56, SD .80), doctor informs (mean 4.54, SD .82), and *high* for the qualities doctor's availability (mean 4.00, SD .90).

Participants taking ART rated significantly higher a compliant ($r = .41^{***}$) and a collaborative ($r = .25^{**}$) style of DPR, and the qualities doctors availability ($r = .26^*$) and trust ($r = .23^*$) than participants not taking ART. Participants in a compliant style of DPR prefer ($r = -.40^{***}$, $F_{1,77} = 14.50^{***}$) and perceive ($r = -.35^{**}$, $F_{1,77} = 10.61^{**}$) that the doctor is more involved in the decision about ART. A defiant style in the DPR was significantly associated with the patient perceiving making the decision about ART on the CPS ($r = .24^*$, $F_{1,77} = 4.63^*$), whereas a collaborative style of DPR was significantly associated with perceiving shared responsibility in decision-making ($r = .22^*$, $F_{1,77} = 4.04^*$).

¹ Pearson's correlations were calculated using scales windsorized for outliers in HAT-QoL and DPR

As trust in the doctor-patient relationship is considered as one aspect of quality of life in PWHA (Holmes & Shea 1998), it should be tested if a better match between decisional control preferences and perceptions and less decisional conflict are related with more trust in the DPR (**Hypothesis 6**). This hypothesis was not supported as the DPR was neither significantly correlated with a discrepancy between preferred and perceived decisional control nor with decisional conflict.

Nevertheless, the more patients rated trust in the DPR, the more they perceived the doctor to be involved in the decision ($r = -.24^*$). Similar, the fewer patients perceived deciding themselves; the more they asked their doctor about information ($r = -.28^*$, and the more the doctor informed ($r = -.26^*$). The qualities *patient asks* explained 8% of variance in decisional control perception ($r = -.28^*$, $F_{1,75} = 6.36^*$).

Overall decisional conflict on the GDCS was significantly inversely associated with the qualities doctor informs ($r = .29^{**}$, $F_{1,75} = 6.94^{**}$). The qualities *doctor informs* explained 9% of variance in decisional conflict. The more the doctor informed, the less patients perceived decisional conflict ($r_s = .29^{**}$), and the better they perceived the quality of the decision ($r_s = -.30^{**}$), and the more they rated to feel informed ($r_s = -.29^{**}$) supported ($r_s = -.28^*$) and certain about the decision ($r_s = -.23^*$). Further, the more patients asked, the better they perceived the quality of the decision ($r_s = -.24^*$) and felt supported in the decision about ART ($r_s = -.24^*$). Also, the more the doctor was available ($r_s = -.29^{**}$) and the more the patient was compliant in DPR ($r_s = .24^*$), the clearer patients felt about their values in the decision about ART.

Subscales of the DPR were also significantly correlated with the total of the HAT-QoL. The more the doctor was available ($r = .43^{**}$) and informed ($r = .33^{**}$) and the more the patient were compliant ($r = .29^{**}$) and asked ($r = .26^*$), the better the quality of life. Regression analysis with stepwise exclusion identified that doctor availability explains 18% of variance in DPR ($r = .43^{***}$, $F_{1,75} = 17.23^{***}$), whereas the other variables (compliant style of DPR, doctor informs, and patient asks) did not contribute more to the model.

4.2. The assessment of beliefs about medication using the Beliefs about Medication Questionnaire (BMQ) (aim 9) (hypothesis 6)

The two subscales of the Beliefs about Medications Questionnaire (BMQ) (Horne & Weinman 1999) assess beliefs about necessity of ART and medication concerns, which are both rated on a scale from 1 = *very little* to 5 = *very high*. The 79 participants perceived on average a *high* necessity for ART (mean 3.56, SD .89) and *moderate* concerns about potential adverse effects of ART (mean 2.92, SD .53) (see figure 91).

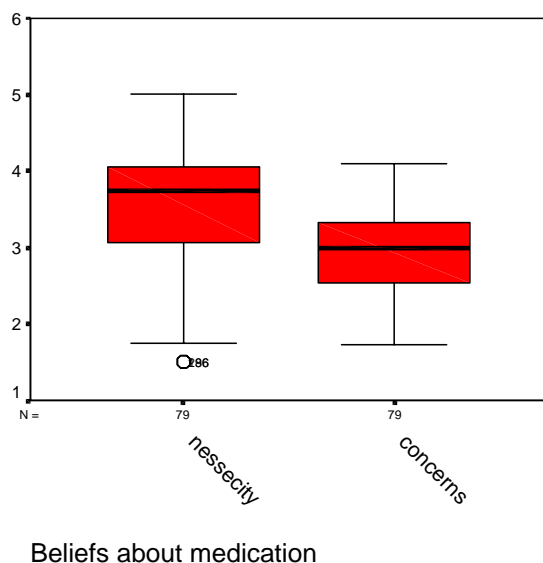
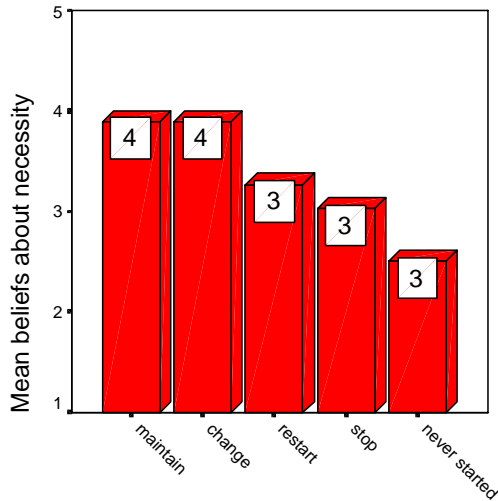


Figure 91: Box plots of beliefs about necessity and concerns about potential adverse effects of ART in the BMQ (scale from 1 = *very little* to 5 = *very high*) (n=79).

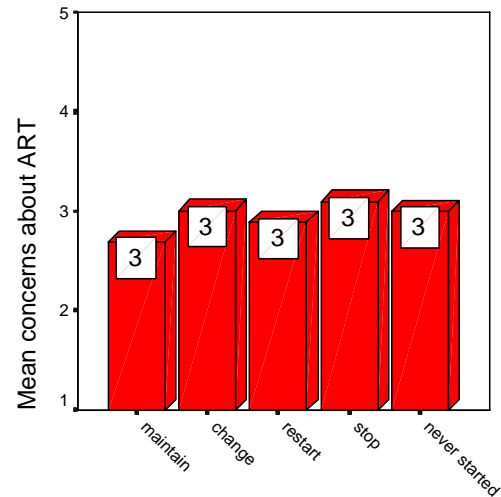
4.2.1. The relationship between the beliefs about ART and the decision about ART.

Depending on the decision about ART (to maintain, change, restart, stop or not to start) significant differences were found in beliefs about the necessity ($F_{4,74} = 6.69^{***}$) but not in concerns about ART (see figure 92). The decision to take ART was significantly correlated with the beliefs about the *necessity of ART* ($r = .45^{***}$), but not significantly with *the concerns about ART* ($r = -.17, p = .14$).

- The 58 participants taking ART believed on average in a *high* necessity for ART (mean 3.80, SD .75), whereas the 21 participants not taking ART believed in a *moderate* necessity taking ART (mean 2.90, SD .93). Concerns about potential adverse effects of ART were on average *moderate* in participants taking ART (mean 2.87, SD .56) and *moderate* in participants not taking ART (mean 3.07, SD .43).



Decision about ART over past year



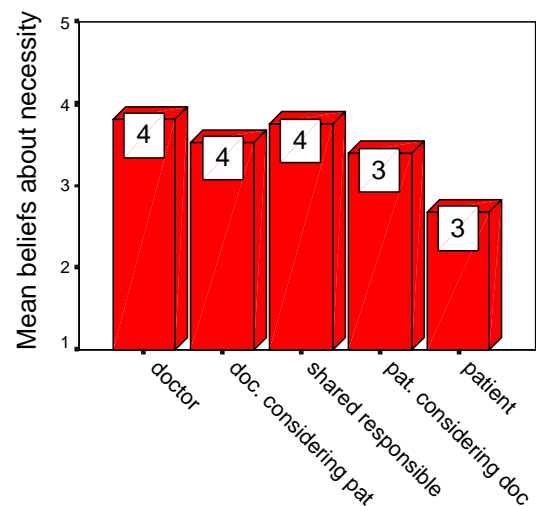
Decision about ART over past year

Figure 92: Relationship between the decisions made about ART over the past year and the mean beliefs about necessity of ART and medication concerns (scale from 1 = *very little* to 5 = *very high*) in the BMQ (n=79).

4.2.2. The relationship between beliefs about medication and decisional control *(hypothesis 6)*

There was a significant negative association between the perceived personal necessity for ART and the decisional control preference ($r = -.27^*$) (see figure 93).

- Perceived personal necessity for ART was *low* in the 7 participants perceiving to decide themselves (mean 2.68, SD 1.06), *moderate* in the 15 participants perceiving to decide themselves considering doctors opinion (mean 3.39, SD 1.02) and *high* in the participants perceiving shared responsibility in decision-making (n=47, mean 3.75, SD .75), the participants perceiving the doctor deciding considering patients opinion (mean 3.53, SD .98) and the participants perceiving the doctor deciding (mean 3.81, SD.09).



Decisional control preference

Figure 93: Relationship between decisional control preference on the CPS and beliefs about necessity of ART (scale from 1 = *very little* to 5 = *very high*) in the BMQ (n=79).

There were no further significant correlations between perceived necessity of ART and concerns about potential adverse effects of ART and decisional role preferences, perceptions and deviances between preferred and perceived decisional roles.

Medication concerns are considered as a component of quality of life in PWHA (Holmes & Shea). **Hypothesis 6** examines whether a mismatch between preferred and perceived decisional control is associated with more concerns about medication. This could not be supported, as concerns about potential adverse effects of ART were not significantly associated with a discrepancy between preferred and perceived decisional control.

4.2.3. The relationship between beliefs about medication and decisional control (hypothesis 6)

In contrast the second part of **hypothesis 6** was supported. This hypothesis examines whether decisional conflict is related to more concerns about medication. Overall concerns about potential adverse effects of ART were significantly associated with decisional conflict on the GDCS ($r = .42^{***}$, $F_{1,77} = 16.03$). Decisional conflict explains 19% of variance in concerns about medication.¹ Significant positive correlations were found between concerns about medication in the BMQ and the total decisional conflict on the GDCS ($r_s = .40^{***}$), especially with feeling uncertain ($r_s = .39^{***}$), unsupported ($r_s = .33^{**}$), and uninformed ($r_s = .32^{**}$), and with a perception of a low quality of the decision ($r_s = .28^*$). *The less participants perceive decisional conflict, particularly the less they feel uncertain, unsupported, uninformed, and unsatisfied with the quality in their decision about ART, the less they reported concerns about ART.*

There were no significant correlations between the perceived personal necessity of ART and generic decisional conflict (including subscales).

4.2.4. The relationship between beliefs about medication and adherence

Among the 58 PWHA taking ART the sum of reasons for non-adherence in the ACTG adherence questionnaire was significantly positively correlated with concerns about ART ($r = .33^*$) and inversely correlated with the perceived necessity of ART ($r = .31^*$). *Participants reporting more often reasons for non-adherence rated higher concerns and lower perceived necessity of ART in the BMQ.*

¹ For regression analysis one extreme on the total GDCS was windsorized.

4.2.5. Summary of the assessment of beliefs about medication using the Beliefs about Medication Questionnaire (BMQ)

The Beliefs about Medications Questionnaire (BMQ) assesses medication concerns and beliefs about necessity, both rated on a scale from 1 = *very little* to 5 = *very high*. The participants perceived on average a *high* necessity for ART (mean 3.56, SD .89) and *moderate* concerns about potential adverse effects of ART (mean 2.92, SD .53). The decision to take ART was significantly associated with beliefs about the necessity of ART ($r = .45^{***}$). The more participants preferred to decide alone according to the CPS, the less they perceived personal necessity for ART in the BMQ ($r = -.27^*$). Participants reporting more often reasons for non-adherence rated higher concerns ($r = .33^*$) and lower perceived necessity of ART ($r = .31^*$) in the BMQ.

Concerns about medication are considered as one aspect of quality of life in PWHA. Therefore **hypothesis 6** examines whether patients have fewer concerns about medication if they have less decisional conflict and if their decisional control preferences are met in the clinical encounter. This hypothesis was not supported for decisional control, but it was supported for decisional conflict. The match between decisional control preferences and perceptions was not significantly associated with medication concerns, but there was a significant association between decisional conflict and medication concerns ($r = .42^{***}$, $F_{1,77} = 16.03$). The less participants reported decisional conflict on the GDSC ($r = .40^{***}$) (particular the less they felt uncertain ($r_s = .39^{***}$), unsupported ($r_s = .33^{**}$), uninformed ($r_s = .32^{**}$), and unsatisfied with the quality ($r_s = .28^*$) in their decision about ART), the less they reported concerns about ART.

4.3. The assessment of depression using the Beck Depression Inventory (BDI) and perceived stress using the Perceived Stress Scale (PSS)

4.3.1. How much depression and stress did the participants perceive?

a) The assessment of depression with the BDI

The Beck Depression Inventory (BDI) assesses depression on two subscales, the affective and the somatic. The total scores of both subscales indicate 6 levels of depression ranging from *normal ups and downs* to *extreme depression* (Beck et al. 1961). In the 79 participants the mean score for depression on the BDI was 8.56 (SD 8.99), of which the affective subscale accounted for mean 4.18 (SD 4.35) and the somatic subscale for 4.17 (SD 5.60).

- On average score were *normal ups and downs* in 54 (68%) of the 79 participants, whereas 9 (11%) participants had *mild depression* and 7 (9%) participants had *borderline clinical depression*. Manifest depression was scored in the BDI in 9 (11%) of 79 participants: 7 (9%) had *moderate depression* and one (1%) each *severe and extreme depression* (see figure 94).

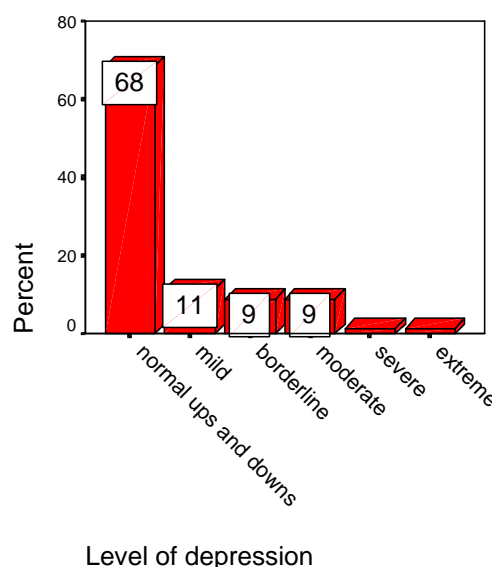


Figure 94: Frequency distribution of levels of depression on the BDI (n=79).

It also has to be noted, that 14 (18%) of the 79 participants rated zero on the BDI and overall 32 (40%) of the participants had a total score below 5 on the BDI. According to Groth-Marnat (1990) a score below 5 is lower than usual and indicates a potential denial of depression (“faking good”).

b) The assessment of perceived stress with the PSS

The perceived stress scale (PSS) compares the perceived stress with a norm table, which adjusts for age, gender and ethnicity (Cohen & Williamson 1988, pp 31-69). On this norm table among the ethnic groups African-American population had the highest score (mean 14.7, SD 7.2), and the lowest mean score was in the male population (mean 12.1, SD 5.9). Further an annual income below \$ 5,000 (in 1988) was associated with a mean score of 23.1

(SD 8.5) on the PSS. The highest mean score in the PSS norm table was rated in people who were disabled/too ill to work (mean 19.9, SD 8.4).

- The mean score for perceived stress on the PSS in this study was 16.35 (SD 7.36), which is higher than the norm for HIV negative African-American individuals (mean 14.7, SD 7.2). Overall 50 (63%) of 79 participants perceived more stress than the mean of an African-American population and 29 (37%) perceived less stress than the mean of an African-American population (see figure 95).

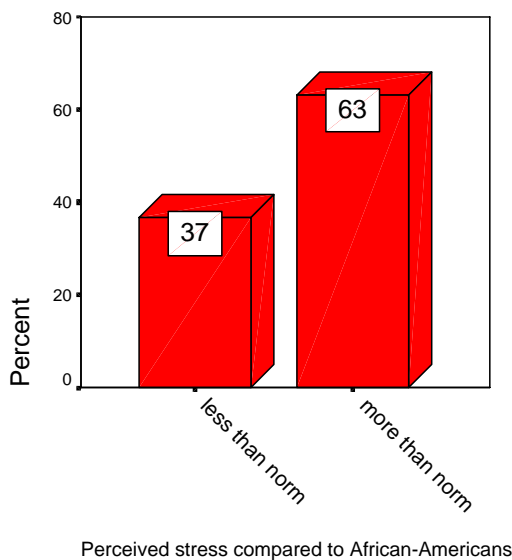


Figure 95: Frequency distribution of perceived stress on the PSS compared to the norm for a HIV negative African American population (n=79).

4.3.2. Are depression and perceived stress associated with decisional control preferences and perceptions on the CPS in the participants?

Neither the BDI (including subscales) nor the PSS were significantly associated with decisional control preferences and perceptions or perceiving more or less control than preferred. According to this study decisional control is not associated with depression and perceived stress.

4.3.3. Are depression and perceived stress associated with decisional conflict in the GDCS in the participants?

Table 20 summarizes the Spearman correlations between depression on the BDI, perceived stress Depression and perceived stress on the PSS and decisional conflict on the subscales and the total of the GDCS. Perceived stress was significantly positively correlated with the total decisional conflict in the GDCS ($r_s = .49^{***}$), with significant correlations in all subscales.

There was a significant positive correlation between the level of depression and the total decisional conflict on the GDCS ($r_s = .43^{***}$), although depression was not significantly correlated with feeling uninformed.

Table 20: Spearman correlations: Depression on total score of the BDI, perceived stress on the PSS and decisional conflict on the subscales and the total of the GDCS (n=79).

BDI & PSS	GDCS Subscale 1 uncertainty	GDCS Subscale 2 Feeling uninformed	GDCS Subscale 3 Feeling unclear about values	GDCS Subscale 4 Feeling unsupported in decision	GDCS Subscale 5 Perception of quality of decision	GDSC Total
Level of depression (BDI)	.286*	.189	.374**	.403**	.385**	.425**
Perceived Stress (PSS)	.400**	.380**	.444**	.383**	.396**	.488**

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Strong overall correlation ($r_s > .375$)

Regression analysis showed that perceived stress was significantly associated with generic decisional conflict ($r = .51^{***}$, $F_{1,77} = 27.17^{***}$), explaining 26% of variance in decisional conflict.¹ *The more participants perceived stress, the more they perceived decisional conflict.* Also depression is significantly associated with generic decisional conflict ($r = .38^{**}$, $F_{1,77} = 9.26^{**}$), explaining 14% of variance in decisional conflict.

4.3.4. The relationship between depression and perceived stress and quality of life in the HAT-QoL

As table 21 illustrates there was a negative overall correlation between the quality of life indicated by the total of the 7 subscales of the HAT QoL and perceived stress measured on the PSS ($r = -.68^{***}$) and the depression examined with the BDI ($r = -.67^{***}$). Regression analysis¹ with stepwise exclusion reveals that depression ($\beta = .44^{***}$) and perceived stress ($\beta = .43^{***}$) are both significantly associated with quality of life in the HAT-QoL ($F_{2,76} = 54.51^{***}$) and explaining 59% of variance. *The fewer participants are depressed or perceive stress, the better the quality of life.*

¹ For regression analysis windsorized values were used for outliers in the BDI, total GDCS and total HAT-QoL.

Table 21: Pearson's correlations: Depression on total score of the BDI, perceived stress on the PSS and quality of life on 7 subscales and their total in the HAT-QoL (n=79).¹

Quality of life on the HAT-QOL	Level of depression (BDI)	Perceived Stress (PSS)
HAT-QOL 1 Overall function	-.612**	-.583**
HAT-QOL 2 Life satisfaction	-.552**	-.633**
HAT-QOL 3 Health worries	-.538**	-.552**
HAT-QOL 4 Financial worries	-.482**	-.558**
HAT-QOL 6 HIV mastery	-.213	-.229*
HAT-QOL 7 Disclosure worries	-.287*	-.155
HAT-QOL 9 Sexual function	-.338**	-.383**
HAT-QOL total of 7 subscales	-.673**	-.680**

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Strong overall correlation ($r > .375$)

4.3.5 Summary of the assessment of depression using the Beck Depression Inventory (BDI) and perceived stress using the Perceived Stress Scale (PSS)

The score on the BDI was rated as normal in 54 (68%) of the 79 participants, whereas 9 (11.5%) had mild depression, 7 (9%) borderline clinical depression and 9 (11.5%) manifest clinical depression. The mean score for perceived stress on the PSS was 16.35 (SD 7.36), which is higher than the norm for HIV negative African-American individuals (mean 14.7, SD 7.2). According to this study decisional control preferences and perceptions measured using the CPS was not associated with depression and perceived stress. However, perceived stress ($r = .51^{***}$, $F_{1,77} = 27.17^{***}$) and depression ($r = .38^{**}$, $F_{1,77} = 9.26^{***}$) were significantly associated with more decisional conflict on the GDCS. Regression analysis with stepwise exclusion showed that both, depression ($\beta = .44^{***}$) and perceived stress ($\beta = .43^{***}$), explained 59% of variance in quality of life on the HAT-QoL ($r = .77$, $F_{2,76} = 54.51^{***}$).

¹ For Pearson's correlations the outliers in the BDI and life satisfaction, disclosure worries and the total of the 7 subscales of the HAT-QoL were windsorized.

4.4. Summary of the relevant results of the Long-Term Survivor study (LTS)

Four questionnaires of the Long-Term Survivor study (LTS) were considered as relevant in conjunction with this sub-study on medical decision-making:

- Doctor-Patient-Relationship questionnaire (DPR),
- Beliefs about Medication Questionnaire (BMQ),
- Beck Depression Inventory (BDI), and
- Perceived Stress Scale (PSS)

a) The assessment of doctor-patient relationship using the DPR

The scale of the DPR ranges from 1 = *very little* to 5 = *very high*. On average the participants rated *high* on collaborative (mean 4.17) and compliant (mean 3.97) and *little* on the, defiant (mean 1.79) style of DPR. They rated on average *very high* on 3 of 4 qualities of DPR, patient asks (mean 4.61), trust (mean 4.56), doctor informs (mean 4.54) and *high* on one doctor availability (mean 4.00). The decision to take ART was significantly positively correlated a compliant ($r = .42^{***}$) and collaborative ($r = .30^{**}$) style of DPR, and the qualities trust ($r = .24^*$) and doctors availability ($r = .24^*$).

b) The assessment of beliefs about medication using the BMQ

Also the scale of the BMQ ranges from 1 = *very little* to 5 = *very high*. The participants perceived on average a *high* necessity for ART (mean 3.56) and *moderate* concerns about potential adverse effects of ART (mean 2.92). The decision to take ART was significantly associated with beliefs about the necessity of ART ($r = .45^{***}$).

c) The assessment of depression using the BDI

The score on the BDI was in the normal range for 54 (68%) of the 79 participants, whereas 25 (32%) had depression, ranging from mild to manifest clinical depression. It has to be noted, that 32 (40%) had a score on the BDI which was lower than usual and might potentially be “faking good”.

d) The assessment of perceived stress using the PSS

The mean score for perceived stress on the PSS was 16.35 (SD 7.36), which is higher than the norm for HIV negative African-American individuals (mean 14.7, SD 7.2).

Complementary to the HAT-QoL, which has insufficient psychometric properties for providers trust and medication concerns, the Doctor-Patient Relationship questionnaire (DPR) was used to assess doctors trust and the Beliefs about Medication Questionnaire (BMQ) was used to assess medication concerns (**aim 9**). This should test further

- **Hypothesis 6:** If decisional control preferences are met in the clinical encounter and if there is little decisional conflict, this is associated with a better quality of life in PWHA, .

Using 7 of the 9 subscales of the HAT-QoL **hypothesis 6** could be supported for decisional conflict, but there was only partial support for decisional control preferences. The match of decisional control preferences and perceptions was only related to one subscale of the HAT-QoL (overall function). Now it should be tested, if the remaining 2 domains of the HAT-QoL (providers trust and medication concerns) are related to decisional control and decisional conflict. Complementary to **hypothesis 6** the following assumption is made for trust measured with the DPR and medication concerns assessed by the BMQ: If decisional control preferences are met in the clinical encounter and if there is little decisional conflict, this is associated with more trust in the doctor-patient relationship and less concerns about medication in PWHA.

Hypothesis 6 could not be supported for trust. Trust in the DPR was neither significantly correlated with a discrepancy between preferred and perceived decisional control nor with decisional conflict. Regarding medication concerns in the BMQ **hypothesis 6** was not supported for decisional control, but was supported for decisional conflict. The match between decisional control preferences and perceptions was not significantly associated with medication concerns, but there was a significant association between decisional conflict and medication concerns ($r = .42^{***}$, $F_{1,77} = 16.03^{***}$). The less participants reported decisional conflict on the GDCS ($r_s = .40^{***}$) (particular the less they felt uncertain ($r_s = .39^{***}$), unsupported ($r_s = .33^{**}$), uninformed ($r_s = .32^{**}$), and unsatisfied with the quality ($r_s = .28^*$) in their decision about ART), the less they reported concerns about ART.

5. Relationship between the results of the qualitative and the quantitative part of this study (aim 10)

The last aim of this study is to examine the relationship between the qualitative and quantitative results of the study, i.e. the models of decision-making about treatment in the qualitative part of the study and the results of the quantitative part of the study on decisional control, decisional conflict, adherence and quality of life, including relevant quantitative results of the parent study (Long-Term Survivor study) such as doctor-patient relationship, beliefs about medication, depression, and perceived stress. The final objective is to develop a model to improve the quality of decision-making about ART and the quality of life in PWHA out of the results of the qualitative and quantitative part of the study.

5.1. The relations between models of decision-making about ART in the qualitative part of the study and the quantitative results of the study (aim 10)

The first part of the final objective (**aim 10**) was to give an overview of the relationships between the models of decision-making about ART in the qualitative part of this study and the quantitative results on decisional control on the CPS, decisional conflict on the GDCS, self-reported adherence in the ACTG adherence questionnaire and quality of life in the HAT-QoL, as well as the quality of life related scales *trust* in the DPR and *medication concerns* in the BMQ.

Given that Charles et al. (1999) assumes increasing levels of patient's participation and information in the decision-making about ART from the pure paternalistic to the pure informed choice model, the correlation with the models of decision-making about ART and the decisional control preferences and perceptions will be calculated. The associations between the models of decision-making about ART and the CPS, GDCS, ACTG adherence questionnaire, HAT-QoL, DPR and BMQ will be examined using ANOVA. Additionally the special characteristics comparing the models of decision making about ART

- paternalistic (pure/intermediate) vs. shared decision-making/informed choice
- shared decision-making vs. paternalistic/ informed choice
- and informed choice (pure/intermediate) vs. shared decision-making/paternalistic

will be examined using the Mann-Whitney U-test (see method section, chapter 4.2.3., pp. 43-44).

5.1.1. The associations between the models of decision-making about ART in the interviews and decisional control on the CPS

a) Are models of decision-making about ART related to decisional control perceptions in the CPS?

If the qualitative study on models of decision-making about ART matches well with the results of the CPS, the following correspondence would be expected (see table 22):

Table 22: Expected correspondence between the models of decision making about ART rated from the interviews and patients decisional control preferences on the CPS (n=79).

Qualitative study (interviews): Model of decision making about ART	Quantitative study (CPS): Decisional control preference
Pure paternalistic model	Doctor decides alone
Intermediate paternalistic model	Doctor decides considering patients opinion
Shared decision-making model	Shared responsibility in decision-making
Intermediate informed choice model	Patient decides considering doctor's opinion
Pure informed choice model	Patient decides alone

These results support the reliability of the interview ratings on models of decision-making about treatment. There was a significant strong association between the models of decision-making about ART rated from in the interviews and patients self-reported decisional control perceptions on the CPS ($r = .64^{***}$) (see figure 96). Except for the pure paternalistic model the results of the qualitative study did match with the quantitative results.

- In contrast to expectation in the pure paternalistic model rated by the interviewers participants perceived on average *the doctor deciding considering patient's opinion* (n = 9, mean 2.33, SD .79) instead of *the doctor deciding* alone on the CPS. As expected in the intermediate paternalistic model decisional control perception was on average *the doctor considering patients opinion* (n = 14, mean 2.14, SD .79), in the shared decision-making model *shared responsibility in decision-making* (n = 28, mean 3.25, SD .80), in the intermediate informed choice model the *patients considering doctors opinion* (n = 18, mean 3.89, SD .58) and in the pure informed choice model patients perceived that they *made the decision themselves* (n= 10, mean 4.7, SD .67).

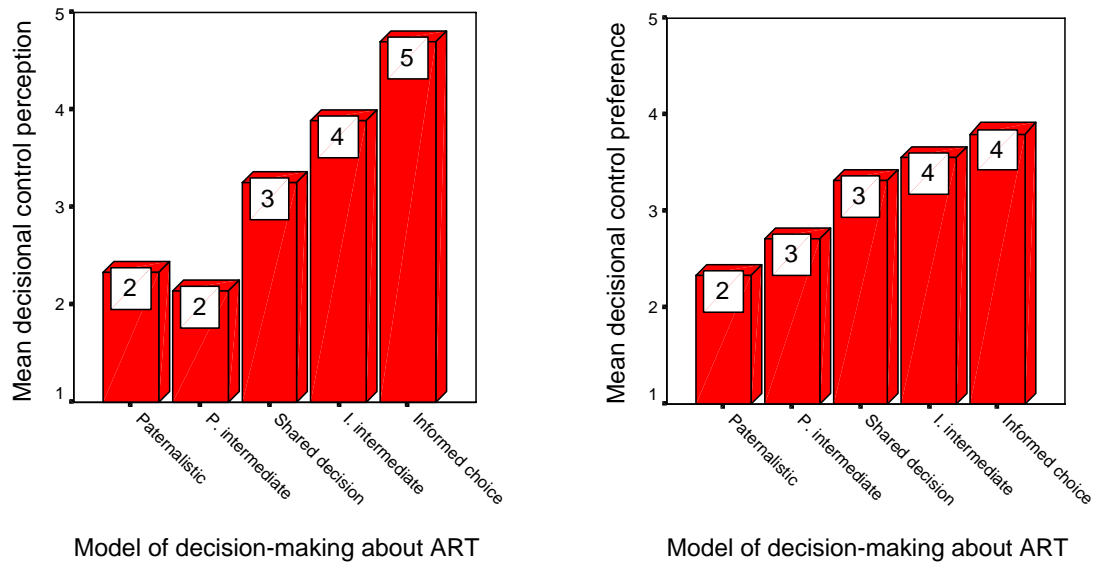


Figure 96: Relationship between the models of decision-making about ART in the interviews and decisional control perceptions and preferences on the CPS (scale from 1= *doctor decides alone* to 5 = *patient decides alone*) (n=79).

b) Are decisional control preferences in the CPS met in the clinical encounter according to the interviews?

The models of decision-making about ART are significantly associated with the decisional control preferences on the CPS ($r = .58^{***}$) (see figure 97). **Hypothesis 2** examines whether decisional control preferences are met in the clinical encounter or not. The qualitative study supports as well that this hypothesis applies partially. For most (45 of 79, 57%) participants there was a mismatch between the model of medical decision-making rated from the interviews and the decisional control preference, but for 34 (43%) decisional control preferences were met in the clinical encounter. According to the model of medical decision-making rated from the interviews 27 (34%) of 79 participants perceived less decisional control than preferred and 18 (23%) perceived more decisional control than preferred on the CPS.

Between the models of decision-making about ART significant differences were found on the match between decisional control preferences and perceptions calculation the deviation between the perceived models of decision-making rated from the interview and patients decisional control preferences on the CPS ($F_{4,74} = 20.14^{***}$) (see figure 97). In the shared-decision-making model decisional control preferences are met in the clinical encounter. In the informed choice models (pure/intermediate) participants perceive significantly more control than preferred compared to the paternalistic/shared decision-making models ($z = -5.91^{***}$). Conversely, in the paternalistic models participants (pure/intermediate) perceive

significantly less control than preferred compared to the shared decision-making/informed choice models ($z = -5.23^{***}$).

- Participants perceive less control than preferred on the CPS in the pure paternalistic model ($n=9$, mean -1.33 , SD $.71$) and in the intermediate paternalistic model ($n=14$, mean $-.71$, SD $.73$). The match between decisional control preferences on the CPS and the perceived model of decision-making about ART rated from the interview was best in the shared decision-making model ($n=28$, mean $-.32$, SD $.61$), followed by the intermediate informed choice model ($n=18$, mean $.44$, SD $.71$). Participants perceive more control than preferred on the CPS in the pure informed choice model ($n=10$, mean 1.20 , SD 1.02).

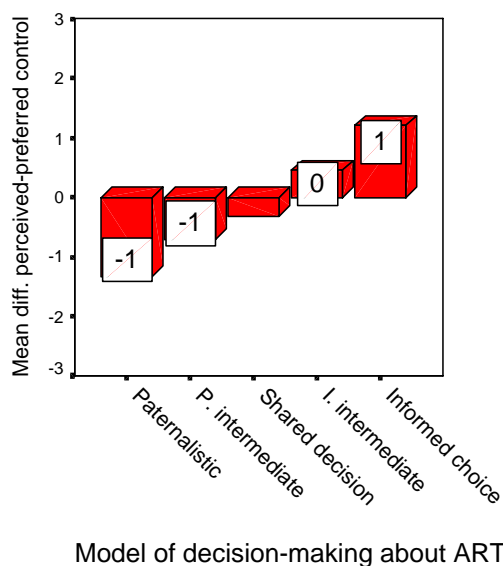


Figure 97: Relationship between the models of decision-making about ART in the interviews and difference between the perceived model of decision-making about ART and the decisional control preference on the CPS (scale from 1= *doctor decides alone* to 5 = *patient decides alone*) ($n=79$).

5.1.2. The associations between models of decision-making about ART in the interviews and decisional conflict on the GDCS

No significant differences were found on decisional conflict on the GDCS between the models of decision-making about ART in the interviews ($F_{4,74} = .31$, $p = .87$), (see figure 98).¹ Also, there were no significant differences in decisional conflict found comparing the models of decision-making about ART using the Mann-Whitney U-test.

¹ For ANOVA calculation the total of the GDCS was windsorized for one outlier.

- The total decisional conflict on the GDCS was low in all medical models; mean 1.89 (SD .64) in the pure informed choice model, mean 1.93 (SD.58) in the intermediate informed choice model, mean 2.00 (SD .71) in the intermediate paternalistic model, mean 2.12 (SD .59) in the shared decision-making model and mean 2.33 (SD .83) in the pure paternalistic model.

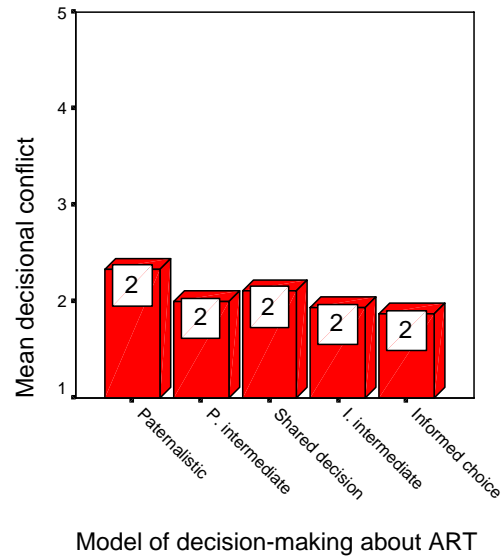


Figure 98: Relationship between the models of decision-making about ART in the interviews and decisional conflict on the GDCS (scale from 1 = *very little* to 5 = *very high*) (n=79).

5.1.3. The associations between models of decision-making about ART in the interviews and self-reported adherence using the ACTG adherence questionnaire

a) The relationship between the models of decision-making about ART and self-reported non-adherence

Between the models of decision-making about ART no significant differences were found on the frequency of non-adherence ($F_{3, 57} = 1.10, p = .37$) and on the sum of reasons for non-adherence ($F_{3, 57} = 1.64, p = .17$) for the 58 participants taking ART. In addition, no significant differences were found between the models of decision-making about ART on the five common reasons for non-adherence: *side effects/toxicity, were away from home, had a change in daily routine, slept through dose time, were busy with other things and simply forgot*. Further, there were no significant differences on the frequency and the reasons for non-adherence comparing the models of decision-making about ART using the Mann-Whitney U-test.

b) The relationship between the models of decision-making about ART and the continuity of ART intake in the ACTG-adherence questionnaire over the past year

On the continuity of ART over the past year reported in the ACTG-adherence questionnaires, (followed up every 3 months) there were significant differences between the medical models

($F_{4,74} = 6.91^{***}$) in the 79 participants (see figure 99). Taking ART continuously over the past year was significantly more common in the shared decision-making model than in the paternalistic/informed choice models ($z = -.256^*$). Conversely taking ART continuously over the past year was significantly less common in the informed choice models (pure/intermediate) than in the paternalistic/shared-decision-making models ($z = -2.23^*$) (see figure 99).

- In the shared decision-making model 23 (82%) of 28 participants have been continuously taking ART over the past year, closely followed by 11 (79%) of 14 participants in the intermediate paternalistic model and 12 (67%) of 18 participants in the intermediate informed choice model. Whereas in the pure paternalistic model only 3 (33%) of 9 participants and in the pure informed choice model 1 (10%) participants have been continuously taking ART over the past year.

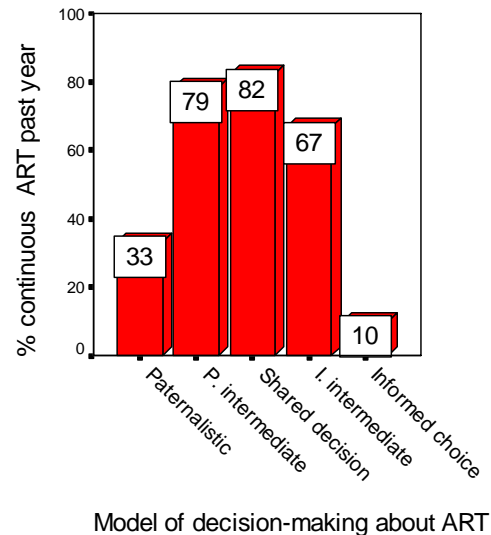
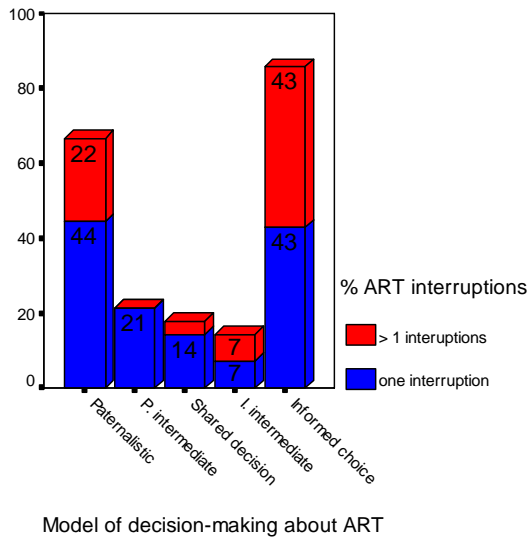


Figure 99: Relationship between the models of decision-making about ART in the interviews and the continuity of taking ART over the past year according to the 3 monthly follow-ups with the ACTG adherence questionnaire (n=79).

In the 72 participants who took ART over the past year there were significant differences on the frequency in short term treatment interruptions between the models of medical decision-making ($F_{4,67} = 7.37^{***}$) (see figure 100). No significant differences were found for the frequency of treatment interruptions in the 72 participants who took ART over the past year comparing the models of decision-making about treatment with the using the Mann-Whitney U-test.

- Treatment interruptions were most common in the pure informed choice model (6 of 7, 86%) and the pure paternalistic model (6 of 9, 67%). Three (43%) of 7 participants in the pure informed choice model and 2 (22%) of 9 participants in the pure paternalistic model and had at least two temporary treatment interruptions over the past year. The lowest percentage of treatment interruptions was in the intermediate informed choice model in which 2 (14%) of 14 participants interrupted treatment, one of which interrupted ART

more than once over the past year. This was closely followed by the shared decision-making model in which 5 (18%) of 28 participants interrupted treatment, one of which interrupted ART more than once over the past year. Treatment interruptions were also less common in the intermediate paternalistic model (3 (21%) of 14 participants reported one treatment interruption).



the interviews and the frequency of treatment interruptions over the past year according to the interviews and 3 monthly follow-ups with the ACTG adherence questionnaire (n=72 participants taking ART over the past year).

Figure 100: Relationship between the models of decision-making about ART in

There were also significant differences between the medical models on not taking ART at all over the past year ($F_{4,74} = 4.45^{**}$) (see figure 101). Not taking ART at all over the past year was significantly more common in the informed choice models (pure/intermediate) than in the paternalistic/shared-decision-making models ($z = -3.72^{***}$) and conversely less common in the shared decision-making model than in the informed choice/paternalistic models ($z = -2.04^*$).

- Not taking ART at all over the past year (which includes the 5 ART-naïve participants and 2 ART experienced participants who did not take ART at all over the past year) were exclusively found in the participants in the intermediate informed choice model (4 of 18, 22%) and the informed choice model (3 of 10, 30%).

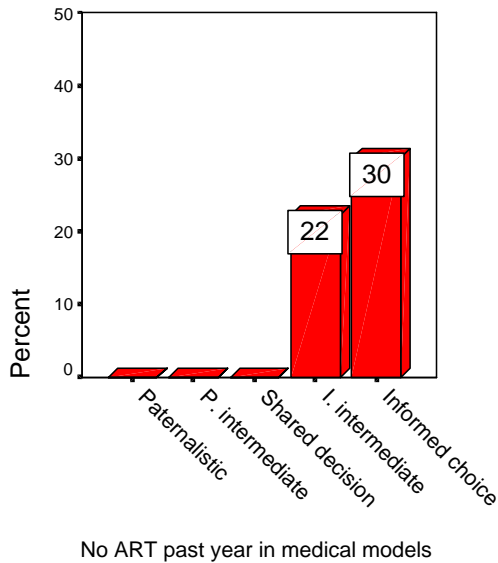


Figure 101: Relationship between the models of decision-making about treatment in the interviews and not taking ART over the past year according to the 3 monthly follow-ups with the ACTG adherence questionnaire (n=79).

c) The relationship between the models of decision-making about ART and symptoms of HIV or ART in the ACTG adherence questionnaire

For the symptoms of HIV over the past 2 weeks from checklist of the ACTG adherence questionnaire there were significant differences between the models of decision-making about ART in pain, numbness or tingling in hands or feet ($F_{4,74} = 2.62^*$) (see figure 102), a symptom which could be both either related with HIV itself or a side effect of ART. Signs of peripheral neuropathy were significantly more frequent in the shared decision-making model than in the paternalistic/informed choice models ($z = -.286^{**}$). Conversely signs of peripheral neuropathy were significantly less frequent in the informed choice models (pure/intermediate) than in the paternalistic/shared-decision-making models ($z = -2.23^*$).

- Symptoms of peripheral neuropathy were on average *sometimes* in the shared decision-making model (n=18, mean 1.68, SD 1.39), compared to *rarely* in the pure paternalistic model (n=9, mean 1.00, SD 1.32), and less than *rarely* in the intermediate paternalistic model (n=14, mean .93, SD 1.21), the pure informed choice model (n=10, mean .70, SD 1.16) and the intermediate informed choice model (n=10, mean .61, SD .92).

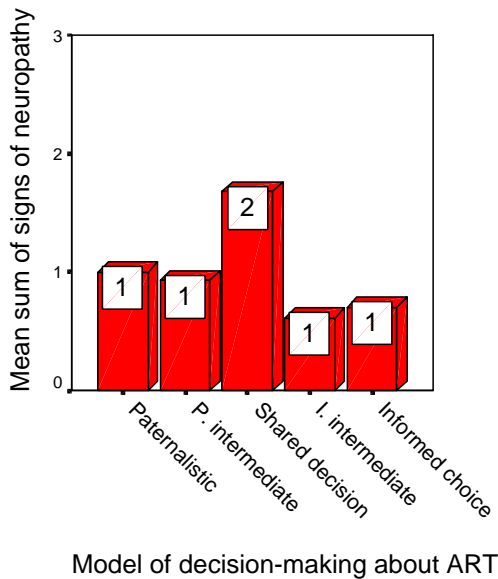


Figure 102: Relationship between the models of decision-making about ART in the interviews and the mean sum of the symptoms of peripheral neuropathy over the past two weeks in the ACTG adherence questionnaire (scale from 0 = never, 1 = rarely, 2 = sometimes, to 3 = every day) (n=79).

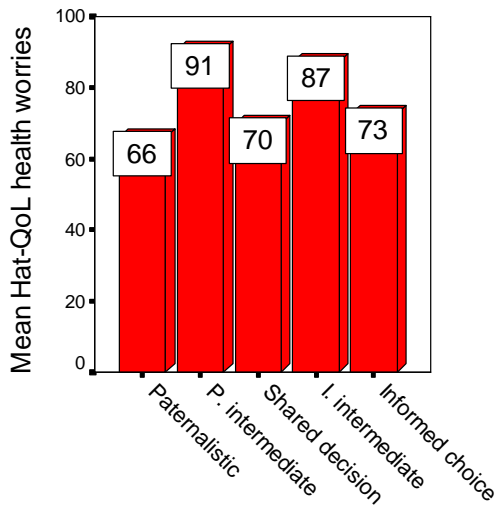
5.1.4. The associations between models of decision-making about ART in the interviews and quality of life using the HAT-QoL

Significant differences between the models of decision-making about ART were found on 3 of the 7 subscales of the HAT-QoL with sufficient psychometric properties: health worries ($F_{4,74} = 3.52^*$), and overall function ($F_{4,74} = 2.47^*$)¹ (see figure 103). Participants in the shared decision-making model had significantly less health worries than participants in the paternalistic/informed choice models ($z = -2.79^{**}$). There were no significant differences on the total of the 7 subscales of the HAT-QoL ($F_{4,74} = 2.37$, $p = .061$) and on the subscales for life satisfaction, financial worries, sexual function, disclosure worries and HIV mastery.

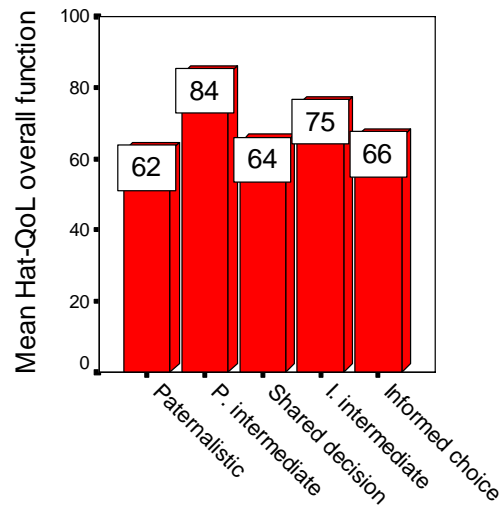
- Least health worries were rated on average in the pure paternalistic model (mean 90.63, SD 12.44), followed by the intermediate informed choice model (mean 87.15, SD 17.61), the pure informed choice model (mean 72.50, SD 27.04), the shared decision-making model (mean 69.64, SD 22.48), and most health worries in the intermediate paternalistic model (mean 55.97, SD 36.46).
- Best overall function was rated on average in the intermediate paternalistic model (mean 86.63, SD 15.46) and the intermediate informed choice model (mean 75.00, SD 15.66), followed by the pure informed choice model (mean 65.83, SD 19.12), the shared decision-making model (mean 64.23, SD 24.31) and the pure paternalistic model (mean 62.04, SD 33.10).

¹ For ANOVA calculation scales life satisfaction, disclosure worries and the totals of the HAT-QoL and GDCS were winsorized for outliers.

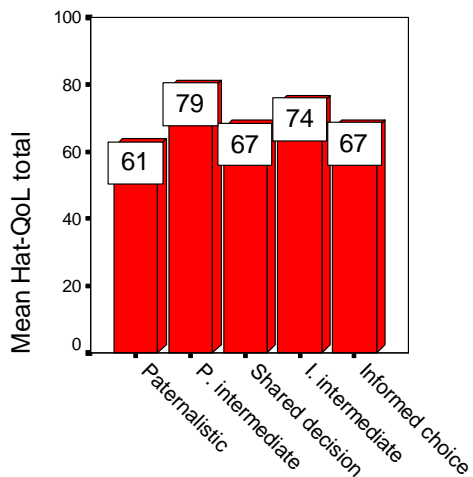
- On the total score of the 7 HAT-QoL subscales there was no significant difference between the models of decision-making about treatment: Mean 78.70 (SD 9.63) in the intermediate paternalistic model, mean 74.17 (SD 11.13) in the intermediate informed choice model, mean 66.85 (SD 17.99) in the pure informed choice model, mean 66.70 (SD 16.02) in the shared decision-making model, and mean 61.21 (SD 27.80) in the pure paternalistic model.



Model of decision-making about ART



Model of decision-making about ART



Model of decision-making about ART

Figure 103: Relationship between the models of decision-making about ART in the interviews and the 3 subscales health worries, life satisfaction, overall function, and the total of 7 HAT-QoL subscales (linear scale 0-to-100 scale, where 0 is the worst score possible and 100 is the best score possible)

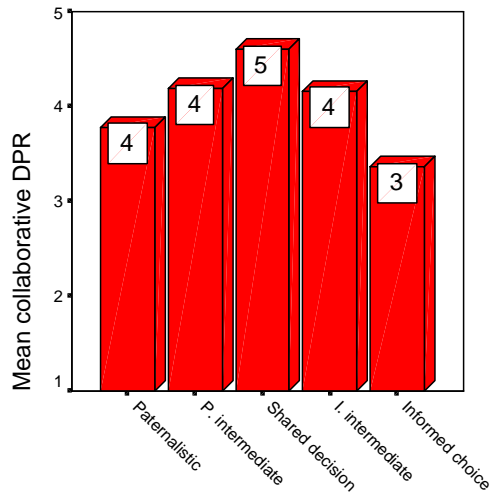
5.1.5. The associations between models of decision-making about ART in the interviews and doctor-patient relationship in the DPR

a) The relation between models of decision-making about ART in the interviews and the style in the DPR

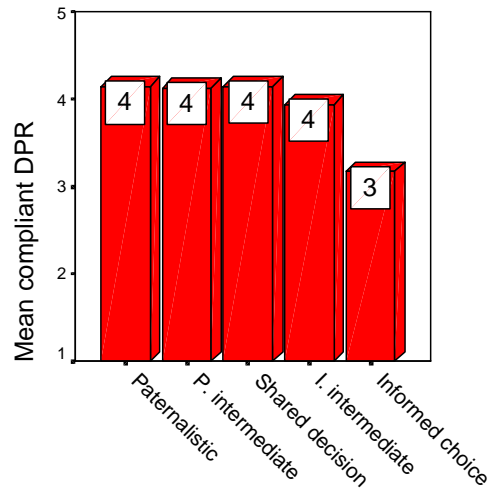
Significant differences between the models of decision-making about ART were found for the compliant style in the DPR ($F_{4,74} = 3.96^{**}$), but not for the collaborative and defiant styles of DPR¹ (see figure 104). Nevertheless in the shared decision-making model participants reported a significantly more collaborative style in the DPR ($z = -3.50^{***}$) and also less defiant style in the DPR ($z = -2.31^*$) than participants in the paternalistic/informed choice model. Conversely in the informed choice models (pure/intermediate) participants reported significantly less collaborative ($z = -2.90^{**}$), and less compliant ($z = -2.62^{**}$) but more defiant ($z = -2.65^{**}$) style in the DPR than the participants in the paternalistic/shared decision-making models.

- An on average *very high* collaborative DPR was rated in the shared decision-making model (mean 4.60, SD .35), followed by a on average *high* collaborative style in the intermediate paternalistic model (mean 4.18, SD .83), the intermediate informed choice model (mean 4.16, SD .58) and the pure paternalistic model (mean 3.88, SD .85). A *moderate* collaborative DPR was rated on average in the pure informed choice model (mean 3.36, SD .79).
- A *high* compliant DPR was reported on average in the share decision-making model (mean 4.14, SD .52), the pure paternalistic model (mean 4.14, SD .64), the intermediate paternalistic model (mean 4.13, SD .83), and the intermediate informed choice model (mean 3.94, SD .90), whereas a *moderate* compliant style was reported on average in the pure informed choice model (mean 3.17, SD .73).
- A *very little* to *little* defiant style of DPR was found on average in all medical models, mean 1.54 (SD .62) in the shared decision-making model, mean 1.55 (SD .63) in the intermediate paternalistic model, mean 1.99 (SD .67) in the pure paternalistic model, mean 2.08 (SD .92) in the pure informed choice model, and mean 2.11 (SD .84) in the intermediate informed choice model.

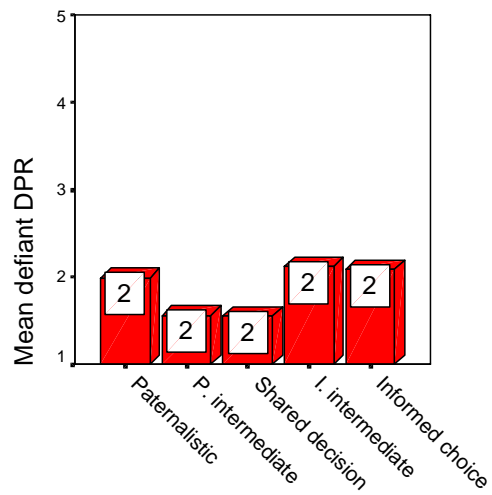
¹ For ANOVA calculation the styles of DPR were windsorized for outliers.



Model of decision-making about ART



Model of decision-making about ART



Model of decision-making about ART

Figure 104: Relationship between the models of decision-making about ART in the interviews and the styles of DPR (scale from 1 = *very little* to 5 = *very high*) (n=79)¹.

¹ Interpolated values for two participants

b) The relation between models of decision-making about ART in the interviews and the qualities in the DPR

Between the models of decision-making about ART, no significant differences were found in the four qualities in the DPR: patient asks, doctor informs, trust and doctor's availability using ANOVA¹ (see figure 105). Nevertheless, the Mann-Whitney U-test revealed that in the shared decision-making model participants reported significantly higher patient asks ($z = -2.93^{**}$) and trust ($z = -2.03^*$) qualities in the DPR than participants in the paternalistic/informed choice model. Conversely in the informed choice models (pure/intermediate) participants reported significantly less patient asks (-3.13^{**}) and trust (-2.48^*) qualities than the participants in the paternalistic/shared decision-making models.

- A *very high* score in the quality *patient asks* was rated on average in the shared decision-making model (mean 4.86, SD .36). A *high to very high* score was rated on average in the intermediate informed choice model (mean 4.56, SD .52), the intermediate paternalistic model (mean 4.52, SD 1.03), and in the pure paternalistic model (mean 4.39, SD 1.13). A *high* score was rated on average in the pure informed choice model (mean 3.94, SD 1.13).
- A *very high* score in the quality *doctor informs* was rated on average in the shared decision-making model (mean 4.79, SD .60) and in the intermediate informed choice model (mean 4.60, SD 1.23). A *high to very high* score was rated on average in the intermediate paternalistic model (mean 4.48, SD 1.16) and in the pure paternalistic model (mean 4.47, SD .76). A still *high* score was rated on average in the pure informed choice model (mean 3.75, SD 1.26).
- Again, trust was rated on average *very high* in the shared decision-making model (mean 4.82, SD .43), followed by the intermediate paternalistic model (mean 4.61, SD .92) and the intermediate informed choice model (mean 4.52, SD .64). A *high* score was rated on average in the pure paternalistic model (mean 4.38, SD 1.15) and in the pure informed choice model (mean 3.91, SD 1.05).
- Only doctor's availability was not rated best in the shared decision-making model. On average *high* score were reported in the intermediate paternalistic model (mean 4.35, SD .64), followed by the shared decision-making model (mean 4.18, SD .73) and the intermediate informed choice model (mean 3.97, SD 1.00). A *moderate to high* score was rated in the pure paternalistic (mean 3.53, SD 1.23) and the pure informed choice model (mean 3.45, SD .97).

¹ For ANOVA calculation the qualities in the DPR were windsorized for outliers

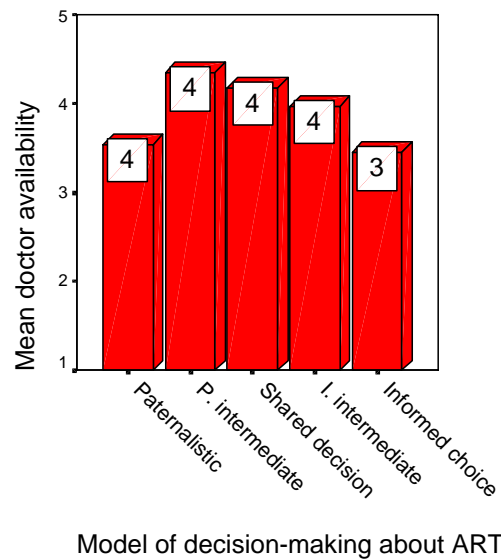
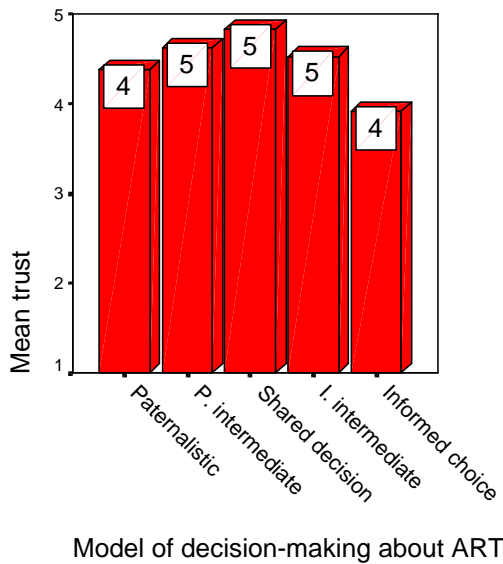
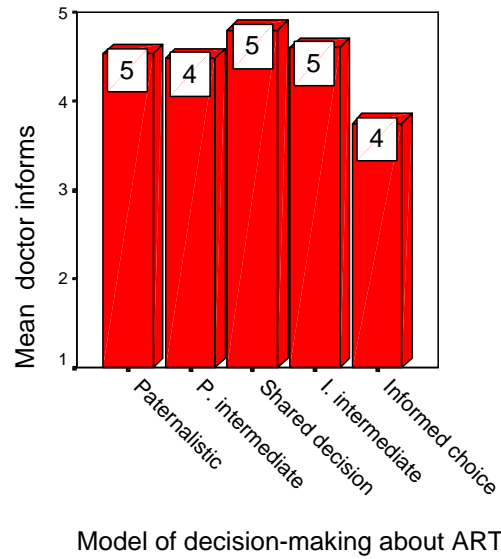
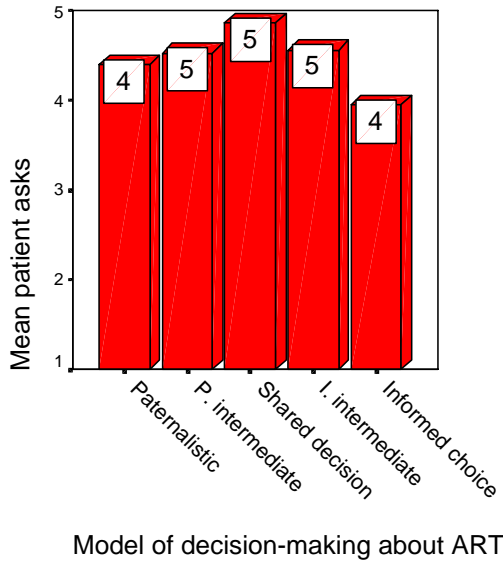


Figure 105: Relationship between the models of decision-making about ART in the interviews and the qualities in the DPR (scale from 1 = *very little* to 5 = *very high*) (patient asks, trust, doctor informs n=77¹, doctor's availability n=78²).

¹ Two participants did not fill out the questionnaires

² One participant did not fill out the questionnaire

5.1.6. The associations between models of decision-making about ART in the interviews and beliefs about medication in the BMQ

Between the models of decision-making about ART significant differences were found on the perceived personal necessity for ART ($F_{4,74} = 4.72^{**}$), but no significant differences were found on the concerns about potential adverse effects of ART ($F_{4,74} = 1.66, p = .17$) in the BMQ (see figure 106). In the informed choice models (pure/intermediate) participants reported significantly less perceived personal necessity for ART ($z = -2.79^{**}$) in the BMQ than the participants in the paternalistic/shared decision-making models.

- A *high* personal necessity for ART was perceived on average in the intermediate paternalistic model (mean 3.89, SD .82), followed by the shared decision-making model (mean 3.80, SD .82) and the pure paternalistic model (mean 3.65, SD .42). A *moderate* to *high* score was rated on average in the pure informed choice model (mean 3.56, SD .89) and a *moderate* score in the intermediate informed choice model (mean 3.42, SD 1.15).
- Concerns about potential adverse effects of ART were on average *moderate* in each medical model: mean 3.09 (SD .55) in the pure informed choice model, mean 3.05 (SD .68) in the pure paternalistic model, mean 3.02 (.47) in the shared decision-making model, mean 2.75, SD 1.51 in the intermediate informed choice model and mean 2.72 (SD .53) in the intermediate paternalistic model.

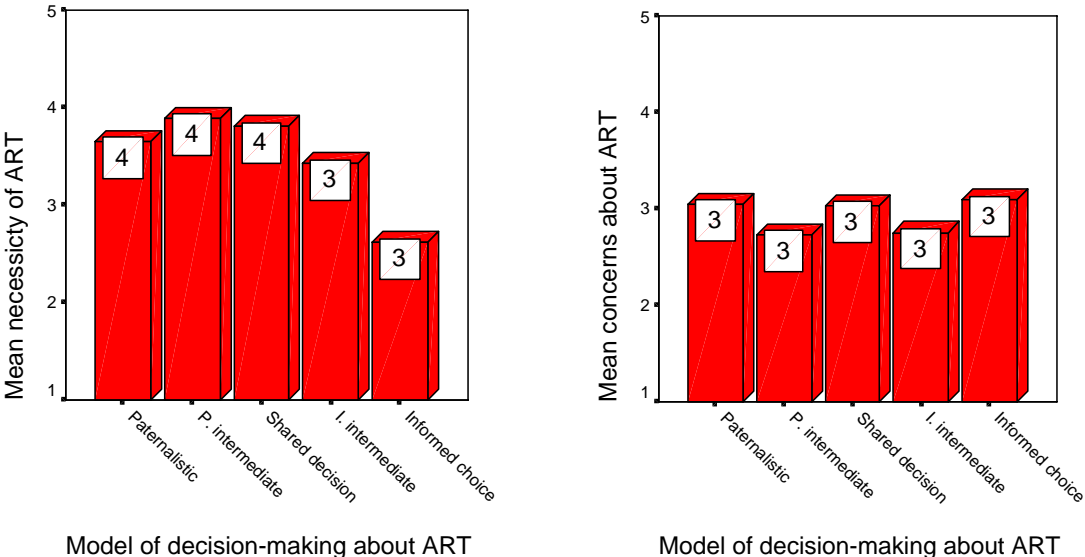


Figure 106: Relationship between the models of decision-making about ART in the interviews and the perceived personal necessity for ART and concerns about ART in the BMQ (scale from 1 = *very little* to 5 = *very high*).

5.1.7. Summary of the relations between models of decision-making about ART in the qualitative part of the study and the quantitative results of the study (*aim 10*)

The first part of *aim 10* was to give an overview of the relationships between the models of decision-making about ART in the qualitative part of this study and the quantitative results on

- decisional control on the **CPS**,
- decisional conflict on the **GDCS**,
- self-reported adherence in the **ACTG adherence questionnaire**, and
- quality of life in the **HAT-QoL**, as well as the quality of life related scales *trust* in the **DPR** and *medication concerns* in the **BMQ**.

The qualitative study of models of decision-making about ART matches well with the results of the **CPS**, except for the pure paternalistic model. If the pure paternalistic model was rated in the interview, participants indicated on the CPS on average that they perceived that their doctor decided considering patient's opinion. For a pure paternalistic model, it would have been expected that participants perceived that the doctor made the decision alone.

Hypothesis 2 examines whether decisional control preferences are met in the clinical encounter or not. The qualitative study rating the models of decision-making from the interviews supports this hypothesis partially: Most (45 of 79, 57%) did not perceive the decisional control they preferred, 34% (27 of 79) perceived less and 23% (18 of 79) more involvement than preferred. However 34 (43%) of the 79 participants perceived the decisional control they preferred. If participants perceived a shared-decision-making or intermediate informed choice model, their decisional control preferences were met in the clinical encounter. In the informed choice models (pure/intermediate) participants perceived significantly more control than preferred on the CPS compared to the paternalistic/shared decision-making models ($z = -5.91^{***}$). Conversely, in the paternalistic models participants (pure/intermediate) perceived significantly less control than preferred compared to the shared decision-making/informed choice models ($z = -5.23^{***}$).

Decisional conflict on the **GDCS** was not significantly associated with the models of decision-making about ART in the interviews and was on average low in all models.

The frequency of non-adherence and the sum of reasons for non-adherence in the **ACTG adherence questionnaire** were not significantly associated with the models of decision-making about ART. However, regarding the symptoms of HIV or ART, peripheral neuropathy was significantly more frequent in the shared decision-making model and ($z = -2.86^{**}$) and conversely significantly less frequent in the informed choice models ($z = -2.23^*$) than in the

paternalistic models. Taking ART continuously over the past year was significantly more common in the shared decision-making model than in the paternalistic/informed choice models ($z = -.256^*$). Conversely taking ART continuously over the past year was significantly less common in the informed choice models (pure/intermediate) than in the paternalistic/shared-decision-making models ($z = -2.23^*$). Importantly, treatment interruptions over the past year were significantly more common in the pure paternalistic/informed choice models than in the intermediate paternalistic/informed choice models and the shared decision-making model in the 72 participants who took ART over the past year ($F_{4,67} = 7.37^{***}$). Not taking ART at all over the past year was significantly more common in the informed choice models ($z = -3.72^{***}$) and conversely less common in the shared decision-making model ($z = -2.04^*$) than in the paternalistic models.

Significant differences between the models of decision-making about ART were found on 2 of 7 subscales of the **HAT-QoL**: health worries ($F_{4,74} = 3.52^*$) and overall function ($F_{4,74} = 2.47^*$). Participants in the shared decision-making model had significantly less health worries than participants in the paternalistic/informed choice models ($z = -2.79^{**}$). Overall function was on average *high* in the intermediate models (paternalistic/informed choice), compared to *moderate* to *high* in the other models of decision-making about ART.

In the shared decision-making model participants reported significantly more collaborative ($z = -3.50^{***}$) and less ($z = -2.31^*$) defiant styles and more patient asks ($z = -2.93^{**}$) and trust ($z = -2.03^*$) qualities in the **DPR** than participants in the paternalistic/informed choice model. Conversely in the informed choice models participants reported significantly less collaborative ($z = -2.90^{**}$), less compliant ($z = -2.62^{**}$), and more defiant ($z = -2.65^{**}$) styles, but less patient asks (-3.13^{**}) and trust (-2.48^*) qualities in the DPR than the participants in the paternalistic/shared decision-making models.

Regarding the **BMQ**, participants reported significantly less perceived personal necessity for ART in the informed choice models than the participants in the paternalistic/shared decision-making models ($z = -2.79^{**}$). Concerns about potential adverse effects of ART in the BMQ were not significantly associated with the models of decision-making about ART rated in the interviews.

Table 23 summarizes the significant associations between models of medical decision-making about ART and decisional control on the CPS, decisional conflict on the GDCS, self-reported adherence in the ACTG adherence questionnaire, and quality of life in the HAT-QoL, doctor patient relationship in the DPR and beliefs about medication in the BMQ.

Table 23: Significant associations between models of medical decision-making about ART and decisional control on the CPS, decisional conflict on the GDCS, self-reported adherence in the ACTG adherence questionnaire, and quality of life in the HAT-QoL, doctor patient relationship in the DPR and beliefs about medication in the BMQ.

	Paternalistic models (pure/intermediate)	Shared decision-making model	Informed choice models (pure/intermediate)
Decisional control (CPS)	Perceive less decisional control than preferred (pure/intermediate)	Decisional control perceptions match best with preferences	Perceive more decisional control than preferred (pure)
			Decisional control perceptions match with preferences (intermediate)
Decisional conflict (GDCS)	Very little	Very little	Very little
Self-reported adherence (ACTG adherence questionnaire)		More signs of peripheral neuropathy	Less signs of peripheral neuropathy
		More continuity of taking ART	
	More treatment interruptions over past year (pure)		More treatment interruptions over past year (pure)
		More taking ART	More not taking ART
Quality of life (HAT-QoL)		Less health worries	
	Better overall function (intermediate)		Better overall function (intermediate)
Doctor-patient relationship (DPR)			Less compliant DPR
		More collaborative DPR	Less collaborative DPR
		Less defiant DPR	More defiant DPR
		More patients asking doctor	Less patients asking doctor
		More trust in DPR	Less trust in DPR
Beliefs about medication (BMQ)			Less perceived personal necessity for ART

5.2. Model to improve the quality of decision-making about ART (aim 10)

The GDCS scale is an instrument to assess intervention needs to improve the quality of decision-making about treatment (O'Connor 1999). In this study, several factors were associated with decisional conflict (indicated by the total GDCS) that may play an important role for interventions to improve the quality of decision-making about ART in PWHA. As already assumed in **hypothesis 3**, PWHA who perceive less control than preferred have more decisional conflict in the decision about ART ($r = .22^*$), especially if they decide to take ART ($r = .31^*$) or if they prefer shared decision making ($r = .47^{**}$, $F_{1,45} = 11,24$).

Nevertheless, perceiving less control than preferred was not significantly correlated with other important factors that were found to be associated with decisional conflict by means of regression analysis, such as symptoms of HIV or side effects of ART from the checklist of the ACTG adherence questionnaire ($r = .36^{**}$, $F_{1,77} = 11.53^{**}$), medication concerns in the BMQ ($r = .42^{***}$, $F_{1,77} = 16.03$), perceived stress on the PSS ($r = .51^{***}$, $F_{1,77} = 27.17^{***}$) and depression according to the BDI ($r = .38^{**}$, $F_{1,77} = 9.26^{***}$).

The following interview illustrates the meaningful relationship between symptoms of HIV or side effects of ART, concerns about ART, depression, stress and decisional conflict:

- A 44-year old homosexual Hispanic man, living on disability, not having a partner but living with a roommate, has been diagnosed with HIV 11 years ago (CD4 nadir 110 cell/ μ l). Currently he has 302 CD4 cells/ μ l and 8.337 viral load copies/ml but he has not been tested for resistance. He maintained ART over the past year, despite reporting *high* medication concerns in the BMQ (mean 3.73) and a very high sum (total = 28) of symptoms related to ART or HIV on the checklist of the ACTG adherence questionnaire. According to the BDI he had moderate clinical depression (total = 22) and in the PSS he perceived much stress (total = 29) compared to the average norm for HIV-negative Hispanic individuals (mean 14.0, SD 6.9) (Cohen & Williamson 1988, pp 31-69). According to the CPS he preferred deciding about ART alone considering his doctors opinion, but perceived that he made the decision to maintain ART over the past year alone without considering his doctors opinion. According to the GDCS (ranging from 1 = very little to 5 = very high) he perceived moderate decisional conflict (total mean 3.33); perceiving a low quality of the decision (mean 3.50), feeling uncertain (mean 3.33), unsupported (mean 3.33), uninformed (mean 2.67) and unclear about values (mean 2.67): *“Actually, I’ve never had one of the defining illnesses, I’ve never had opportunistic pneumonia, I’ve had bacterial pneumonia, it’s been mainly a lot smaller cumulative things. I’ve had oral thrush, but not esophageal thrush, the severe diarrhea. I’ve had wasting. I got down to 135 pounds at one point. But I have not had KS. I have not had PCP. I’ve never had anything like toxoplasmosis or cytomegalovirus. It’s always been a*

collection of smaller things that make me feel pretty miserable... I've had all kinds of side effects. I've had neuropathy, from Zerit, which has never really gone away. I had diarrhea, which is always a major concern for me cause I've had that for a long time. Headaches, muscle cramps, rash. It was a rash to ..., I forget which medication it was, I had a major reaction to that." The interviewer asked how he dealt with the side effects. "I would talk to the doctor about them, and he'd say give it some time, and see if they go away, and sometimes they did, most of the times they did, sometimes they didn't, and I'd have to stop taking it. ... The Norvir was the one that was really killing me, and I almost quit, but after two months it finally started going away, and now it doesn't really cause me problems. Right now I've this fairly severe diarrhea for three months. I don't go out nearly as much as I used to. I only go out when I have a purpose for going out. Every Wednesday I go to a bar, I run a bar contest, and that's almost the only time I go out anymore. When I need to be there. It's cut down on me going out and having dates or anything like that, because I know every time I eat, I'm going to be sick, and I hate that. I know within half an hour I'm going to have to find a bathroom." The reason why he is still taking them is the mom factor: "To me they're poison, I feel like I'm putting poison in my body. I mean I know basically they're probably keeping me alive, and that's why I keep taking them. But if I stop them, I just feel so much better. I have more energy. So I know the medicines have an effect on me, and I know I need them to keep the virus in check, but it also, they just don't make me feel good. They make me feel pretty crappy most of the time. I guess one of the main reasons I do it still, is what I call the "mom factor." After my dad died, she was so broken up, that I just determined I have to stay as healthy as I can to make her feel better, cause I know it would kill her to loose a child. I've never ever talked to her about it, and it's not something she, I mean obviously she wants me to take my medicine, but it's not anything that she's ever said or done, it's my own desire to do that. Stay healthy, so that she's not upset."

Looking at the quantitative study, there were four variables related to decisional conflict that needed to be explained:

- Symptoms of HIV/ART
- Depression
- Concerns about ART
- Perceived stress

To explain the nature of the relationships among symptoms of HIV or ART, concerns about ART, depression, perceived stress and decisional conflict were tested using mediation analysis. Mediation analysis implies a causal sequence among three variables (independent variable causes the mediator and the mediator causes the dependent variable).

According to the interviews the following causal sequences seemed plausible to test:

- | Independent variable | ⇒ | Mediator | ⇒ | Dependent variable |
|-----------------------------|---|--------------------|---|---------------------------|
| • Symptoms of HIV/ART | ⇒ | Concerns about ART | ⇒ | Decisional conflict |
| • Symptoms of HIV/ART | ⇒ | Perceived stress | ⇒ | Decisional conflict |
| • Depression | ⇒ | Concerns about ART | ⇒ | Decisional conflict |
| • Depression | ⇒ | Perceived stress | ⇒ | Decisional conflict |

As many symptoms of HIV/ART from the checklist of the ACTG adherence questionnaire were also signs of depression (see table 24), there was a strong overlap between the depression and the symptoms of HIV/ART, which was reflected in a high correlation between BDI and the sum of symptoms of HIV/ART from the checklist of the ACTG adherence protocol ($r = .69^{**}$). After elimination of the overlapping items the BDI and the symptom checklist ($\alpha = .77$) no longer had sufficient reliability. Due to the strong overlap of the items the relationship between the three variables symptoms of HIV/ART, depression, and decisional conflict could not be tested.

Table 24: Overlapping items in the BDI and symptom checklist of the ACTG adherence questionnaire

BDI	Symptom checklist of the ACTG adherence questionnaire over the past 4 weeks
• I do not feel sad	• Felt sad, down or depressed
• I don't get more tired than usual • I can work about as well as before	• Fatigue or loss of energy, that keeps you from doing the things you need or want to do. • Trouble remembering so that you had to keep lists
• I can sleep as well as usual	• Difficulty falling or staying asleep, or unusual daytime sleepiness

As Baron and Kenny (1986) proposed multiple regression analyses are conducted to examine the following four criteria:

- The independent variable should be significantly related to the mediator variable
- The mediator variable should be significantly related to the dependent variable
- The independent variable should be significantly related to the dependent variable
- The independent variable should no longer be significantly associated with the dependent variable, after the mediator variable is controlled.

5.2.1. The relationship between symptoms of HIV/ART, concerns about ART in the BMQ and decisional conflict on the GDSCS

To test if concerns about ART mediate the relationship between symptoms of HIV/ART and decisional conflict the four criteria of Baron and Kenny (1986) were examined:

- Symptoms of HIV/ART (independent variable) were significantly associated with concerns about ART (mediator variable) ($r = .44^{***}$, $F_{1,77} = 18.23^{***}$, $R^2 = .19$).
- Concerns about ART (mediator variable) were significantly associated with decisional conflict (dependent variable) ($r = .42^{***}$, $F_{1,77} = 16.03^{***}$, $R^2 = .17$).
- Symptoms of HIV/ART (independent variable) were significantly associated with decisional conflict (dependent variable) ($r = .36^{**}$, $F_{1,77} = 11.53^{**}$, $R^2 = .13$).
- After concerns about ART (mediator variable) were controlled, symptoms of HIV/ART (independent variable) was no longer significantly associated with decisional conflict (dependent variable), although it has to be noted that the standardized coefficient ($\beta = .22$, $p = .054$) remained still close to significance; and concerns about ART remained significantly associated with decisional conflict ($\beta = .32^{**}$) ($F_{2,76} = 10.23^{***}$, $R^2 = .21$) (see figure 107).

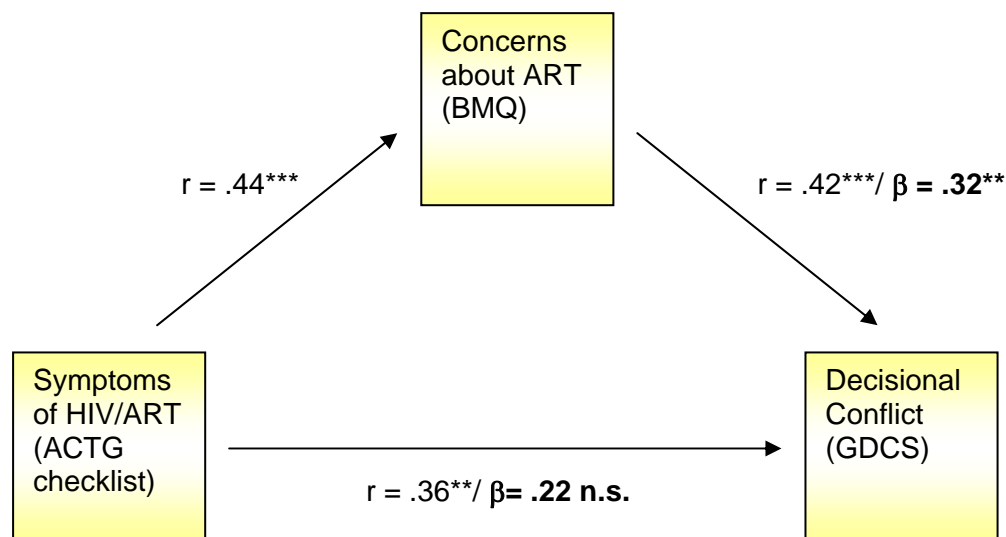


Figure 107: Path diagram for testing concerns about ART as a mediator of the relationship between symptoms of HIV/ART and decisional conflict (r = zero-order correlations, β = standardized coefficients in regression model with decisional conflict as the dependent variable and symptoms of HIV/ART and concerns about ART as independent variables).

Thus, concerns about ART fulfilled the criteria for a mediator of the relationship between symptoms of HIV/ART and decisional conflict. The magnitude of mediation was quantified by

the change in analysis of variance sums of squares for the regression of the dependent variable on the independent variable before versus after statistical control for the mediator variable. Concerns about ART accounted for 62% of the covariance between symptoms of HIV/ART and decisional conflict. To test for significance the z-value for the model was calculated using the Goodman (I) version of the Sobel test (Sobel 1982, pp 290-312) as suggested in Baron & Kenny (1986). In this model the z-value was significant ($z = 2.88^{**}$).

5.2.2. The relationship between symptoms of HIV/ART, perceived stress on the PSS and decisional conflict on the GDCS

Analogue to concerns about it was tested if perceived stress mediates the relationship between symptoms of HIV/ART and decisional conflict:

- Symptoms of HIV/ART (independent variable) were significantly associated with perceived stress (mediator variable) ($r = .44^{***}$, $F_{1,77} = 18.05^{***}$, $R^2 = .19$).
- Perceived stress (mediator variable) was significantly associated with decisional conflict (dependent variable) ($r = .51^{***}$, $F_{1,77} = 27.17^{***}$, $R^2 = .26$).
- Symptoms of HIV/ART (independent variable) were significantly associated with decisional conflict (dependent variable) ($r = .36^{**}$, $F_{1,77} = 11.53^{**}$, $R^2 = .13$).
- Symptoms of HIV/ART (independent variable) was no longer significantly associated with decisional conflict (dependent variable), after perceived stress (mediator variable) was controlled (standardized coefficient $\beta = .17$, $p = .12$) and perceived stress remained significantly associated with decisional conflict ($\beta = .44^{***}$) ($F_{2,76} = 15.06^{***}$, $R^2 = .21$) (see figure 108).

Therefore, perceived stress fulfilled the criteria for a mediator of the relationship between symptoms of HIV/ART and decisional conflict. Perceived stress accounted for 78% of the covariance between symptoms of HIV/ART and decisional conflict and the z-value was significant ($z = 3.23^{**}$).

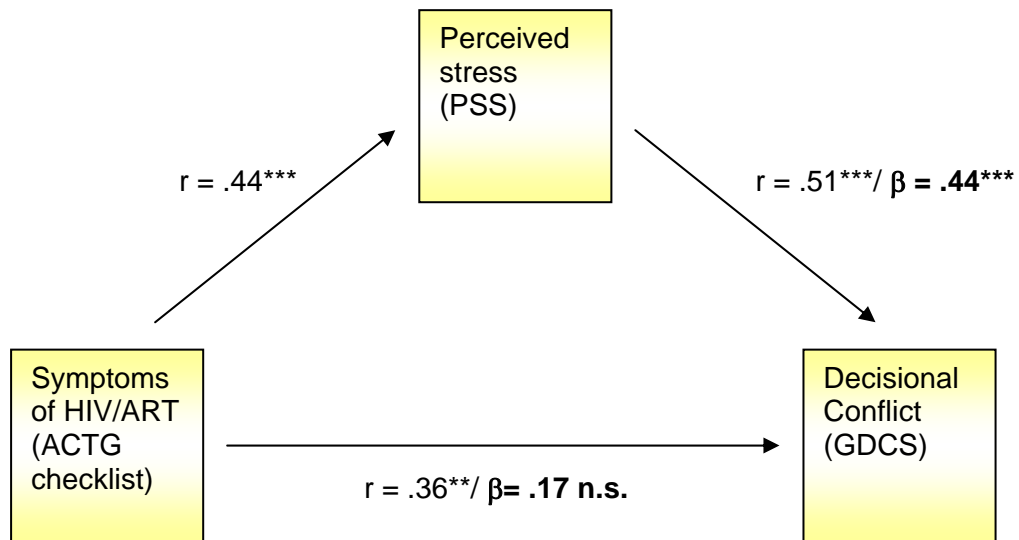


Figure 108: Path diagram for testing perceived stress as a mediator of the relationship between symptoms of HIV/ART and decisional conflict (r = zero-order correlations, β = standardized coefficients in regression model with decisional conflict as the dependent variable and symptoms of HIV/ART and perceived stress as independent variables).

5.2.3. The relationship between depression according to the BDI, concerns about ART in the BMQ and decisional conflict on the GDACS

To test if concerns about ART also mediate the relationship between depression and decisional conflict the four criteria of Baron and Kenny (1986) were tested:

- Depression (independent variable) was significantly associated with concerns about ART (mediator variable) ($r = .42^{***}$, $F_{1,77} = 16.03^{***}$, $R^2 = .17$).
- Concerns about ART (mediator variable) were significantly associated with decisional conflict (dependent variable) ($r = .36^{**}$, $F_{1,77} = 11.53^{**}$, $R^2 = .17$).
- Depression (independent variable) was significantly associated with decisional conflict (dependent variable) ($r = .40^{***}$, $F_{1,77} = 14.57^{***}$, $R^2 = .16$).
- After concerns about ART (mediator variable) were controlled, depression (independent variable) were still significantly associated with decisional conflict (dependent variable) (standardized coefficient $\beta = .29^{***}$) and concerns about ART remained significantly associated with decisional conflict ($\beta = .31^{***}$) ($F_{2,76} = 12.28^{***}$, $R^2 = .24$) (see figure 109).

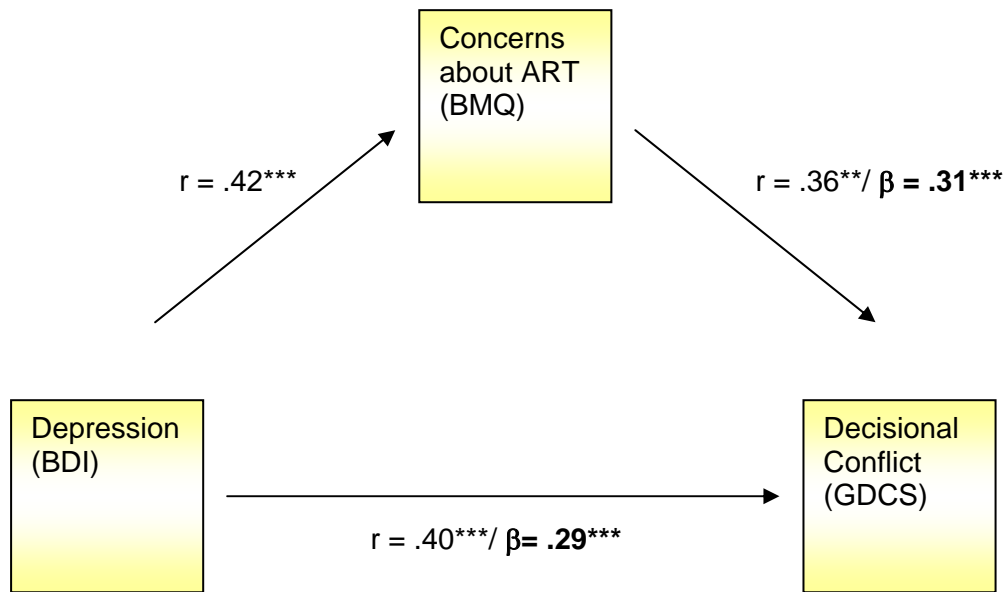


Figure 109: Path diagram for testing concerns about ART as a mediator of the relationship between depression and decisional conflict (r = zero-order correlations, β = standardized coefficients in regression model with decisional conflict as the dependent variable and depression and concerns about ART as independent variables).

Concerns about ART fulfilled the first three criteria for a full mediation of the relationship between symptoms of HIV/ART and decisional conflict, but the fourth criterion was not met. Concerns about ART cannot mediate completely the relationship between depression and decisional conflict. Nevertheless the effect of the depression (independent variable) on decisional conflict (dependent variable) shrunk upon the addition of the mediator to the model from $r = .40^{***}$ to $\beta = .29^{***}$. Concerns about ART accounted for 48% of the covariance between depression and decisional conflict. A z value that exceeds ± 1.96 suggests the partial mediation is significant at the 0.05 level. In this model the z value was significant ($z = 2.54^*$) which corroborates the partial mediation of the relation between depression and decisional conflict through concerns about ART. In other words, depression was related to decisional conflict through both concerns about medication as well as other variables.

5.2.4. The relationship between depression according to the BDI, perceived stress on the PSS and decisional conflict on the GDCS

Finally, it was tested if perceived stress mediates the relationship between stress and decisional conflict:

- Depression (independent variable) was significantly associated with perceived stress (mediator variable) ($r = .57^{***}$, $F_{1,77} = 37.80^{***}$, $R^2 = .33$).
- Perceived stress (mediator variable) was significantly associated with decisional conflict (dependent variable) ($r = .51^{***}$, $F_{1,77} = 27.17^{***}$, $R^2 = .26$).
- Depression (independent variable) was significantly associated with decisional conflict (dependent variable) ($r = .40^{***}$, $F_{1,77} = 14.59^{**}$, $R^2 = .16$).
- Depression (independent variable) was no longer significantly associated with decisional conflict (dependent variable), after perceived stress (mediator variable) was controlled (standardized coefficient $\beta = .16$, $p = .19$) and perceived stress remained significantly associated with decisional conflict ($\beta = .42^{***}$) ($F_{2,76} = 16.60^{***}$, $R^2 = .28$)(see figure 110).

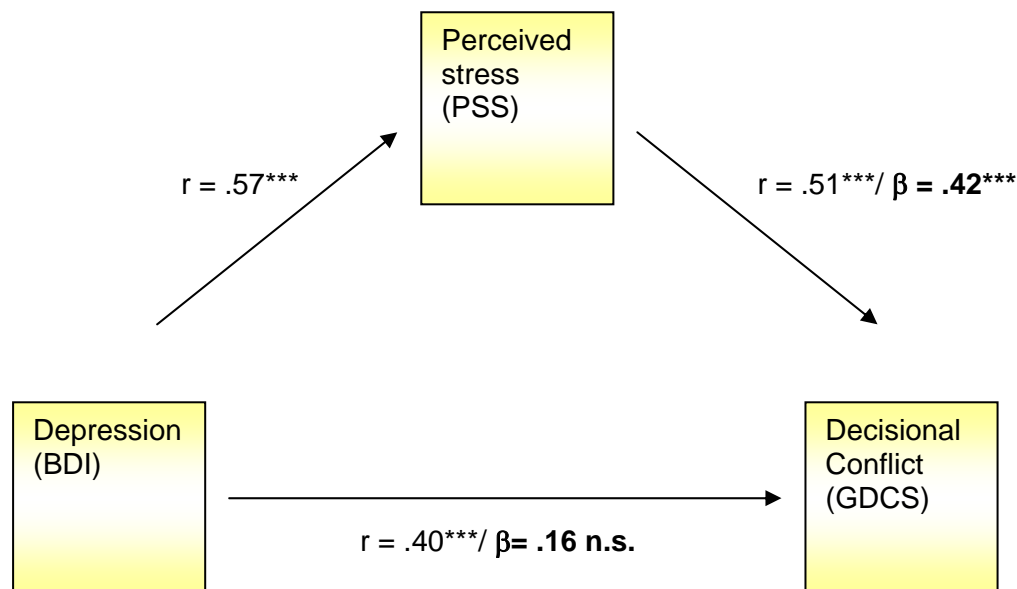


Figure 110: Path diagram for testing perceived stress as a mediator of the relationship between depression and decisional conflict (r = zero-order correlations, β = standardized coefficients in regression model with decisional conflict as the dependent variable and depression and perceived stress about ART as independent variables).

These findings indicate that stress was the most important mediator of the relationship between depression and decisional conflict. Perceived stress accounted for 84% of the covariance between depression and decisional conflict. In this model the z-value was significant ($z = 3.84^{***}$).

5.2.4. Relationship between the doctor-patient relationship, perceived stress and decisional conflict

The quality doctor informs in the DPR explained 9% of variance in decisional conflict. The more the doctor informs, the less decisional conflict ($r = .29^*$, $F_{1,75} = 6.94^*$). Interestingly, the quality *doctor informs* was also inversely correlated with perceived stress ($r = -.25^*$), but it was not significantly associated with depression, symptoms of HIV/ART and concerns about ART. As stress was identified as a mediator of the relationships between depression and symptoms of HIV/ART and decisional conflict, mediation analysis was used to test the following path:

Doctor informs \Rightarrow Less perceived stress \Rightarrow Less decisional conflict

The following criteria were fulfilled:

- The quality *doctor informs* (independent variable) was significantly associated with perceived stress (mediator variable) ($r = -.27^*$, $F_{1,75} = 5.74^*$, $R^2 = .07$).
- Perceived stress (mediator variable) was significantly associated with decisional conflict (dependent variable) ($r = .51^{***}$, $F_{1,77} = 27.17^{***}$, $R^2 = .26$).
- The quality *doctor informs* (independent variable) was significantly associated with decisional conflict (dependent variable) ($r = .29^*$, $F_{1,75} = 6.94^*$, $R^2 = .09$).
- Doctor informs (independent variable) was no longer significantly associated with decisional conflict (dependent variable), after perceived stress (mediator variable) was controlled (standardized coefficient $\beta = -.17$, $p = .10$) and perceived stress remained significantly associated with decisional conflict ($\beta = .44^{***}$), ($F_{2,74} = 13.45^{***}$, $R^2 = .27$) (see figure 111).

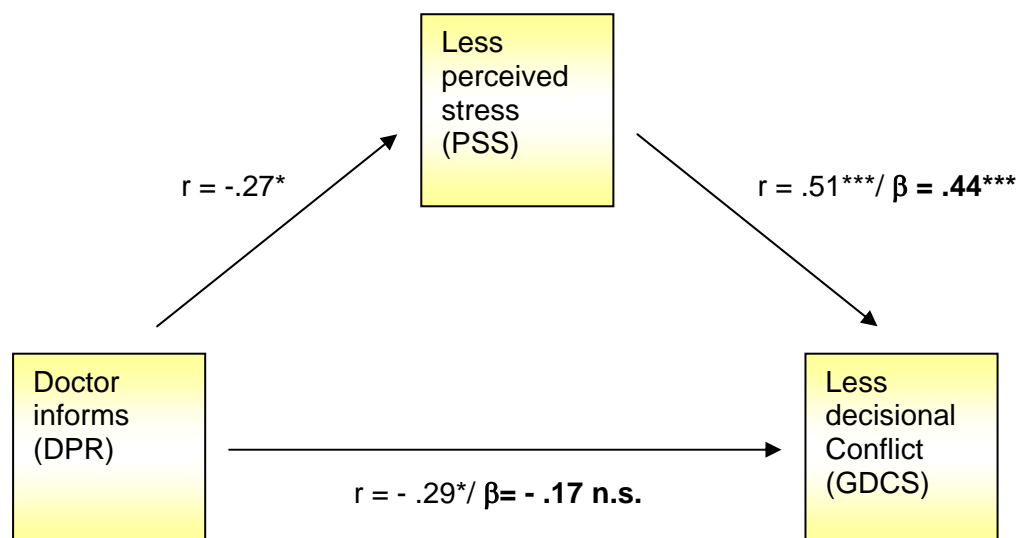


Figure 111: Path diagram for testing reduction of perceived stress as a mediator of the relationship between quality *doctor informs* and less decisional conflict ($r =$ zero-order correlations, $\beta =$ standardized coefficients in regression model with decisional conflict as the dependent variable and symptoms of HIV/ART and perceived stress as independent variables).

Mediation analysis suggested that perceived stress could be reduced if the doctor informs the patient, which in turn reduces decisional conflict. Perceived stress accounted for 65% of the covariance between the quality *doctor informs* and decisional conflict. In this model the z-value was significant ($z = 2.01^*$).

5.2.5. Summary of the model to improve the quality of decision-making about ART

Perceived stress and concerns about ART were found as mediators of the relationship between several variables (i.e., symptoms of HIV/ART, depression) associated with decisional conflict. Regression analysis showed that perceived stress ($\beta = .41^{***}$) and concerns about ART ($\beta = .26^*$) explained 32% of variance in decisional conflict ($r = .57$, $F_{2,76} = 18.00^{***}$) (see figure 112).

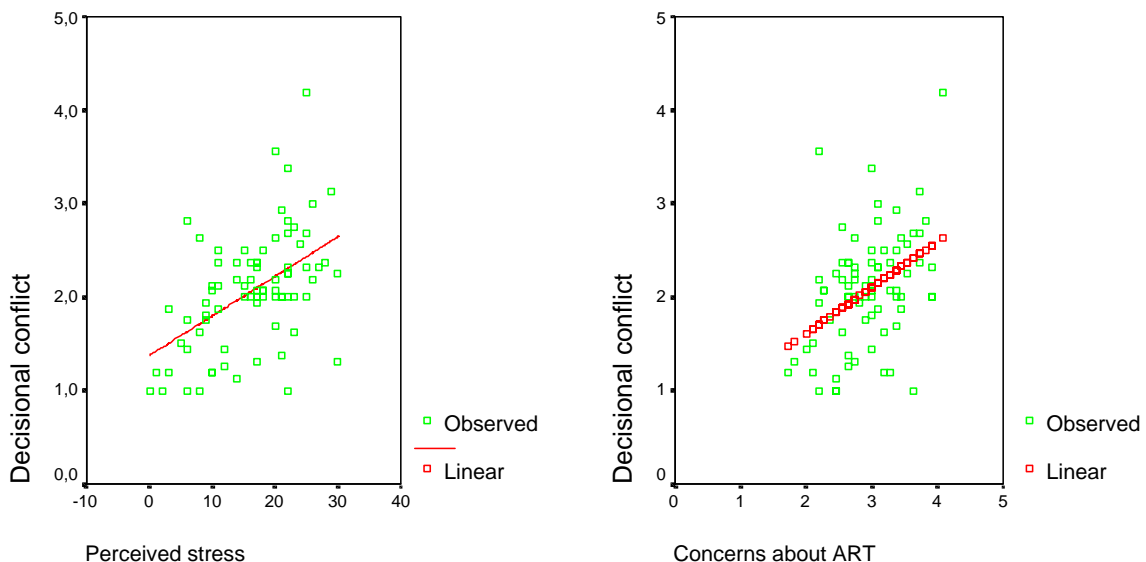


Figure 112: Plots of models of the relationship between perceived stress on the PSS (scale from minimum 0 to maximal 40) and concerns about ART in the BMQ (scale from 1 = *very little* to 5 = *very high*) and decisional conflict (dependent variable) in the GDCS (scale from 1 = *very little* to 5 = *very high*) ($n=79$).

- The relationship between symptoms of HIV or ART (some of which are also signs of depression) and decisional conflict was mediated through perceived stress and concerns about ART. *Fewer symptoms of HIV or ART were related to less perceived stress and concerns about ART, which in turn was associated with reduced decisional conflict.*
- The relationship between depression (which was often associated with HIV/AIDS) and decisional conflict was mediated through perceived stress and partially also through concerns about ART. *Particularly if PWHA felt less depressed they perceived less stress*

and partially less concerns about ART, which had an indirect positive association with the quality of decision-making.

- The relationship between the doctor information and less decisional conflict was mediated through a reduction in perceived stress. *The more the doctor informs was related to a reduced perceived stress; which was in turn related to PWHA perceiving a better quality of decision-making.*

Beside the relationships that were mediated by perceived stress and concerns about ART, regression analysis indicated another direct association:

- Patients perceiving less control than preferred reported more decisional conflict **(hypothesis 3)**. This accounted particularly for patients perceiving shared responsibility in decision-making or patients deciding to take ART. *If a patient's preference for shared-responsibility was met in the clinical encounter, this was significantly associated with a better quality of decision-making (less decisional conflict).*

Figure 113 summarizes the factors with a significant association with reducing decisional conflict and improving the quality of decision-making (indicated by the GDCS) according to the results of the qualitative and qualitative part of the study.

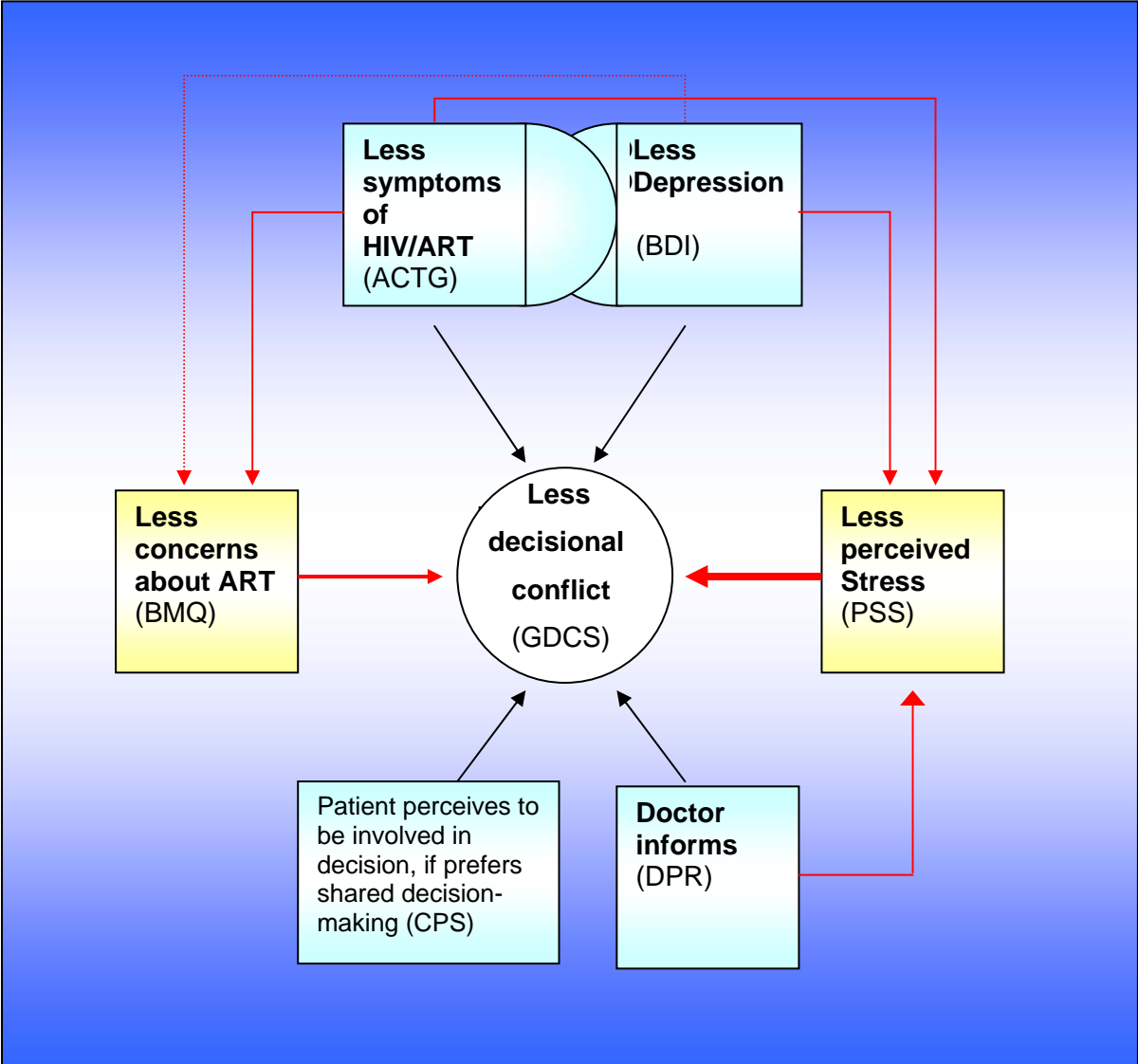


Figure 113: Path diagram model to reduce decisional conflict: Multiple regression analysis followed by mediational analyses indicated that perceived stress and concerns about ART mediate \longrightarrow and partially mediate $\cdots\longrightarrow$ the relationship between symptoms of HIV/ART, depression and doctor informs (independent variables) and decisional conflict (dependent variables) (n=79). In addition, partial regression analysis indicated that for patients who prefer shared decision-making decisional conflict (n=47) the perception to be involved in the decision about ART is directly associated with less decisional conflict.

5.3. Model to improve the quality of life in PHHA (aim 10)

5.3.1. How was the quality of decision-making related to the quality of life according to the qualitative study?

The following case presentation illustrates the association between decisional conflict and quality of life.

- A 44 year-old homosexual Hispanic man, living in a monogamous relationship and full-time working as an HIV service provider, was diagnosed with HIV 13 years ago (CD4 nadir 91 cells/ μ l). At the interview, he had 435 CD4 cells/ μ l and 3,326 viral load copies/ μ l and presented with oral hairy leukoplakia, which he did not attribute to his HIV infection. As he suffered from idiopathic thrombocytopenic purpura, which had occurred after onset of ART in 1997, he required a splenectomy, which was done eight months prior to the interview. In conjunction with the splenectomy a liver biopsy was performed and confirmed the diagnosis of hepatitis C infection. According to the patient, there was liver enlargement but no cirrhosis. He said that the biggest stress factor over the last year were all the side effects of ART (which also includes sexual dysfunction) and his vision impairment due to degenerative eye disease, both leading to severe depression. According to the BDI he had a moderate clinical depression (total = 21) and he perceived more stress (total = 22) than average for HIV-negative Hispanic individuals living in the USA (mean 14.0, SD 6.9) (Cohen & Williamson 1988, pp 31-69). He also reported a *low* doctor availability (mean 1.81) compared to the average of the study participants (mean 4.00, SD.90). Overall, he rated a moderate decisional conflict (mean 2.81) on the total GDCS, compared to all participants (mean 2.07, SD .62). With a dimensional score of 38.0 for the total HAT-QOL on a 1 to 100 scale (where 0 indicated worst possible and 100 best possible quality of life) his quality of life was lower than the average of the participants on the total HAT-QoL (mean 69.93 SD 16.72). Mainly his quality of life was low due to financial worries (score = 0, which indicates worst possible financial worries), life-satisfaction (score = 6.3), sexual function (score = 16.7), and overall function (score = 25.0), although he had few problems with health worries (score = 62.5), and disclosure worries (score = 75.0) and he rated a good HIV mastery (score = 87.5). According to the CPS he preferred shared responsibility in decision-making but perceived to make his decision about ART alone: *"The last changes, for example, due to higher liver enzymes again; I stopped. It was too harmful. My cholesterol has just always been in order and it went out of control. Triglycerides went up to 600. Headaches, high blood pressure. My hemoglobin higher than ever that they needed to do phlebotomies. So I was feeling really terrible. The headaches were so intense. The pressure in my head, I was so much that I had to stop. Those things were killing me. So I stopped it and*

it went back to normal. It was killing me. I did the right decision. Otherwise, I would not be here now. ... It is important to me to have a good relationship with my doctor. I am having problems in communicating with the doctors. I may express my concerns with some certain anger, which I started to regulate to a certain extend. What creates a little friction between us is that they don't like to be told things. I really know, that they don't like, when the patients try to manage their things on their own. If I could trust the doctor, I would rather make a joint decision. I have responsibility too, part of it, in terms of making choices, because I am the one, who is taking them. I learned, that I better be involved with it and be knowledgeable about it. I want to minimize as much as possible the side effects. It is very difficult, because I need the medications to stop the viral replication, which is the only benefit that I receive from them. On the other side, all I receive is harm, harm from them. And there is no further benefit whatsoever, mental or physically.” On top of the challenges of an expert patient in the doctor-patient relationship, this interview clearly illustrates that the decisional dilemma between taking or not taking ART: The decision between HIV disease progression or the side effects of ART, is perceived as a stressor. He continues to describe his path: *“I have been diagnosed back in 1988. Of course after three or four years of being infected, that I already knew. From 1988, I decided consciously not to take any medications up to 1997, which was, I still regret, that I ever started. It just happened the first time, when I was in clinic, we were having a support-group, I was not working, due to severe depression, for a couple of months already, and that is what I believe, that caused my T-cells to drop. Not because of symptoms, I was asymptomatic anyhow. Asymptomatic! ...and complications started and came through taking medications.”* He looked very sad, almost tearful. *“I felt some pressure: do better start now, because you are already classified as having AIDS, not that being just HIV, although I never had any opportunistic infection and was not being sick at all. I got very depressed. I believe by now, that if I had chosen having a good anti-depressant treatment and a good nutritional base, I might as well would have come to the other side without taking such medications. There was no viral load at time. I was not conscious about viral load at that point anyway. I became conscious after, when I started learning about the process and about the disease. I did not have any previous serious knowledge about it. I did not have a clue, really, of what was this all about. Just when I started working with the government and getting involved with this, I work in the office of HIV/AIDS services. I did this on purpose, so that I could get more knowledge of the subject.”*

5.3.2. Factors negatively associated with quality of life in the quantitative part of the study

In the quantitative part of the study, the following factors were found to be significantly negatively associated with quality of life as indicated by the total of the 7 subscales of the HAT-QoL:

- Decisional conflict (total GDCS) ($r = .48^{***}$, $F_{1,77} = 23.27^{***}$, $R^2 .23$)
- Perceived stress (PSS) ($r = .68^{***}$, $F_{1,77} = 66.10^{***}$, $R^2 .46$)
- Depression (BDI) ($r = .68^{***}$, $F_{1,77} = 67.05^{***}$, $R^2 .47$)
- Symptoms of HIV/ART (ACTG adherence questionnaire checklist ($r = .68^{***}$, $F_{1,77} = 67.23$, $R^2 .47$)

The fewer decisional conflict, perceived stress, depression and symptoms of HIV/ART; the better quality of life.

Also, in the 58 participants who decided to take ART more reasons for non-adherence were significantly negatively associated with quality of life as indicated by the HAT-QoL ($r = .33^*$, $F_{1,56} = 6.78^*$, $R^2 = .11$). *The less reasons for non-adherence, the better quality of life.*

a) The relationship between symptoms of HIV/ART in the ACTG adherence questionnaire and quality of life in the HAT-QoL

It has to be noted that there is a conceptual overlap between symptoms of HIV/ART in the checklist of the ACTG adherence protocol and the items in the HAT-QoL (see table 25). As the HAT-QoL was constructed to measure HIV/AIDS related quality, many items in the scales overall function, life satisfaction and health worries focus on health and physical activity related to symptoms of HIV/AIDS.

Table 25: Overlapping items of the symptom checklist of the ACTG adherence questionnaire and subscale overall function of the HAT-QoL subscale

ACTG adherence questionnaire (over the past 2 weeks):	HAT-QoL subscale overall function (In the past 4 weeks):
<i>How often did you have fatigue, or loss of energy, that keeps you from doing the things you need or want to do</i>	<i>I've been too tired to be socially active;</i>
<i>How often did you have pain, numbness or tingling in the hands or feet</i>	<i>Pain has limited my ability to be physically active</i>

In the items of the HAT-QoL specific symptoms related to HIV or ART are confounded with social and physical activity. After removal of the overlapping items the α coefficients of subscales overall satisfaction ($\alpha = .79$) in the HAT-QoL and the sum of the symptom checklist ($\alpha = .79$) were no longer above .80.

b) The relationship between depression on the BDI and quality of life in the HAT-QOL

Also the strong association between depression and quality of life may be explained through an overlap between the items of the BDI and the HAT-QoL, as shown in table 26.

Table 26: Overlapping items of the BDI (somatic and affective scale) and the subscales life satisfaction, overall function, health worries, and sexual function of the HAT-QoL subscale

BDI (somatic and affective scale)	HAT-QoL subscales (life satisfaction, overall function, health worries, sexual function)
I get as much satisfaction out of the things as I used to	<ul style="list-style-type: none"> • I've been satisfied with how socially active I am
I can work about as well as before	<ul style="list-style-type: none"> • I've been physically limited in my ability to do routine household chores • I've been worried about not being able to do my job/routine daily activities as I have in the past • I've felt that having HIV has limited the amount of work I can do at my job
I don't get more tired than usual	<ul style="list-style-type: none"> • I've been too tired to be socially active
I am no more worried about my health than usual	<ul style="list-style-type: none"> • I haven't been able to live the way I'd like to because I'm so worried about my health • I've been pleased with how healthy I have been
I have not noticed any change in my interest in sex	<ul style="list-style-type: none"> • I have been interested in sex

After removal of the overlapping items the α coefficients of subscale overall satisfaction ($\alpha = .65$), life satisfaction ($\alpha = .71$), health worries ($\alpha = .75$) and sexual function ($\alpha = .48$) in the HAT-QoL was no longer above .80.

c) The relationship between stress on the PSS and quality of life in the HAT-QoL

Also the perceived stress scale overlaps with one item in the subscale of the HAT-QoL (see table 27).

Table 27: Overlapping items of the PSS and the subscale life satisfaction of the HAT-QoL subscale

PSS	HAT-QoL (life satisfaction)
<ul style="list-style-type: none"> • How often have you felt that you were unable to control the important things in your life? • How often have you been able to control irritations in your life? • How often have you felt that you were on top of things? • How often have you been angered because of things that were out of your control? 	<p>I've felt in control of my life</p>

After removal of the overlapping item from the Hat-QoL the subscale life satisfaction still had a sufficient α coefficient ($\alpha = .82$). After excluding the item from the HAT-QoL and windsorizing for one small outlier, there was still a strong negative association between perceived stress on the PSS and quality of life on the HAT-QoL ($r = .69^{***}$, $F_{1,77} = 70.78$, $R^2 = .48$). Whereas it was difficult to separate the constructs of quality of life in the HAT-QoL, symptoms of HIV/ART on the symptom checklist and depression on the BDI, it seemed that the association between perceived stress and quality of life in the HAT-QoL was not explained through overlap in constructs.

d) The relationship between decisional conflict and quality of life

According to the case presentation it seemed plausible, that the relationship between the quality of decision-making about ART and the quality of life in PLWH was mediated through perceived stress. Mediation analysis was used to test the following pathway excluding the overlapping item between the PSS and the HAT-QoL:

Less decisional conflict \Rightarrow less perceived stress \Rightarrow better quality of life

Again the four steps in regression analysis, as suggested by Baron and Kenny (1986), were performed to test the plausible causal pathway:

- Decisional conflict (independent variable) was significantly associated with perceived stress (mediator variable) ($r = .44^{***}$, $F_{1,77} = 18.05^{***}$, $R^2 = .19$).
- Perceived stress (mediator variable) was significantly inversely associated with quality of life (dependent variable) ($r = -.69^{***}$, $F_{1,77} = 70.78$, $R^2 = .48$).¹
- Decisional conflict (independent variable) was significantly inversely associated with quality of life (dependent variable) ($r = -.49^{***}$, $F_{1,77} = 23.57^{**}$, $R^2 = .23$).¹
- Decisional conflict (independent variable) was no longer significantly associated with quality of life (dependent variable), after perceived stress (mediator variable) was controlled (standardized coefficient $\beta = -.18$, $p = .064$)¹ and perceived stress remained significantly associated with quality of life ($\beta = .60^{***}$), ($F_{2,76} = 35.99^{***}$, $R^2 = .49$) (see figure 114).

Perceived stress fulfilled the criteria for a mediator of the relationship between decisional conflict and quality of life in people living with HIV. Perceived stress accounted for 86% of the covariance between decisional conflict and quality of life. In this model the z-value was significant ($z = 4.30^{***}$).

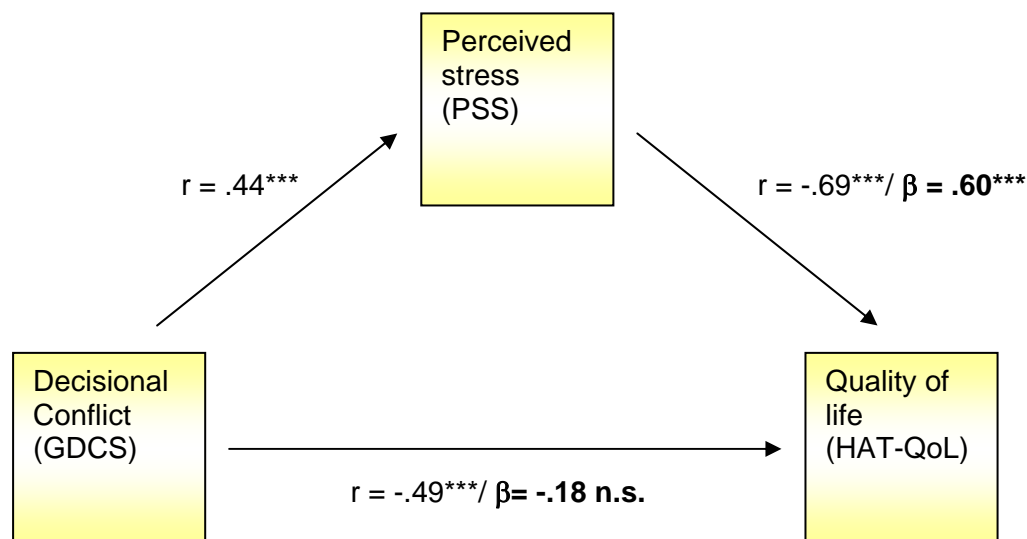


Figure 114: Path diagram for testing perceived stress as a mediator of the relationship between decisional conflict and quality of life (r = zero-order correlations, β = standardized coefficients in regression model with decisional conflict as the dependent variable and symptoms of HIV/ART and perceived stress as independent variables).

¹ Regression analysis was performed with the total of the HAT-QoL, excluding the item *I've felt in control of my life*, windsorized for one outlier.

5.3.3. Factors positively associated with quality of life in the quantitative part of the study

As the doctor availability was also significantly inversely correlated with stress ($r = .35^{**}$), it was tested whether the relationship between doctor availability and better quality of life was mediated through a reduction in stress. To test the path:

Doctor availability \Rightarrow less perceived stress \Rightarrow better quality of life

the four steps of regression analysis were performed as described by Baron and Kenny (1986):

- Doctor availability (independent variable) was significantly inversely associated with perceived stress (mediator variable) ($r = .35^{***}$, $F_{1,77} = 10.33^{***}$, $R^2 = .12$).
- Perceived stress (mediator variable) was significantly inversely associated with quality of life (dependent variable) ($r = -.69^{***}$, $F_{1,77} = 70.78$, $R^2 = .48$).¹
- Doctor availability (independent variable) was significantly associated with quality of life (dependent variable) ($r = .43^{***}$, $F_{1,75} = 16.76^{***}$, $R^2 = .18$).¹
- Doctor availability (independent variable) was still significantly associated with quality of life (dependent variable), after perceived stress (mediator variable) was controlled (standardized coefficient $\beta = .22^*$)¹ and perceived stress remained significantly associated with quality of life ($\beta = .61^{***}$), ($F_{2,75} = 36.25^{***}$, $R^2 = .49$) (see figure 115).

Perceived stress fulfilled the first three criteria for a full mediation of the relationship between the quality doctor availability and quality of life, but the fourth criterion was not met.

Nevertheless the effect of the doctor availability (independent variable) on quality of life (dependent variable) shrunk upon the addition of the mediator to the model from $r = .35^{***}$ to $\beta = .22^{***}$, suggesting a possible partial mediation. Perceived stress accounted for 72% of the covariance between doctor availability and quality of life. In this model the z-value was 2.98^{**} which supported that a reduction of perceived stress was a partial mediator of the relation between doctor availability and quality of life.

¹ Regression analysis was performed with the total of the HAT-QoL, excluding the item *I've felt in control of my life*, windsorized for one outlier.

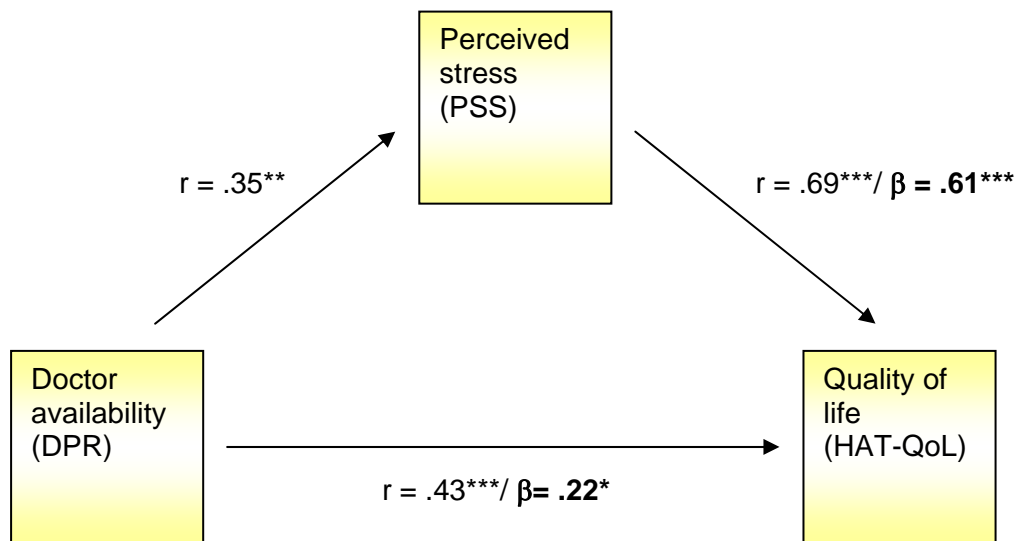


Figure 115: Path diagram for testing perceived stress as a mediator of the relationship between doctor availability and quality of life (r = zero-order correlations, β = standardized coefficients in regression model with decisional conflict as the dependent variable and symptoms of HIV/ART and perceived stress as independent variables).

5.3.4 Summary of the model to improve the quality of life in PHHA

There was a conceptual overlap between the construct of quality of life in the HAT-QoL and the symptoms of HIV/ART on the checklist of the ACTG adherence questionnaire and depression indicated by the BDI, which explained partially the strong associations between the scales. It was difficult to assess the relationship between these instruments, because after excluding the overlapping items the subscales of the instruments were no longer reliable ($\alpha < .80$). After excluding the overlapping item *I've felt in control of my life* from the HAT-QoL subscale life satisfaction the scale remains reliable ($\alpha = .82$) and perceived stress remained significantly associated with quality of life on the HAT-QoL ($r = -.69^{***}$, $F_{1,77} = 70.78$, $R^2 = .48$) (see figure 116).

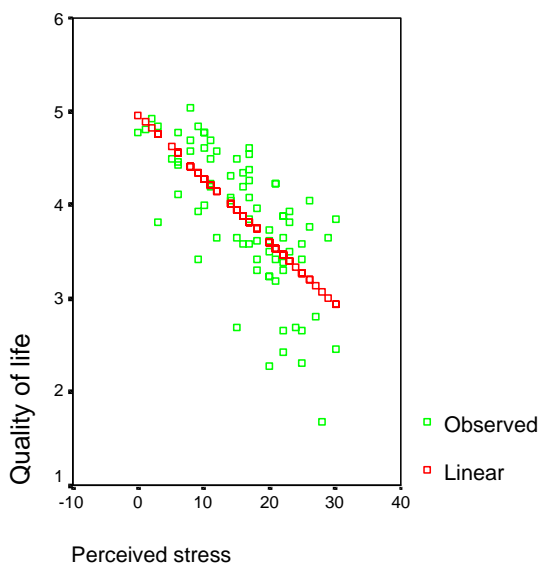


Figure 116: Plot models of the negative relationship between perceived stress on the PSS (scale from minimum 0 to maximal 40) and quality of life in the HAT-QoL (scale from 1 = *very little* to 5 = *very high*) ($n=79$)¹.

Support was found that perceived stress mediates the relationship among decisional conflict and other variables (see figure 117):

- The inverse relationship between decisional conflict and quality of life was mediated through perceived stress. *Less decisional conflict was significantly associated with less stress, which in turn was related to a better on quality of life.*
- The positive relationship between doctor availability and quality of life was partially mediated through a reduction in perceived stress. *Better doctor availability was significantly associated with less stress, which in turn was related to a better on quality of*

¹ In the HAT-QoL the overlapping item *I've felt in control of my life* was excluded.

- In addition, partial regression analysis indicated that there was a direct relationship between adherence among PWHA taking ART and quality of life. *The less participants taking ART reported reasons for non-adherence, the better quality of life.*

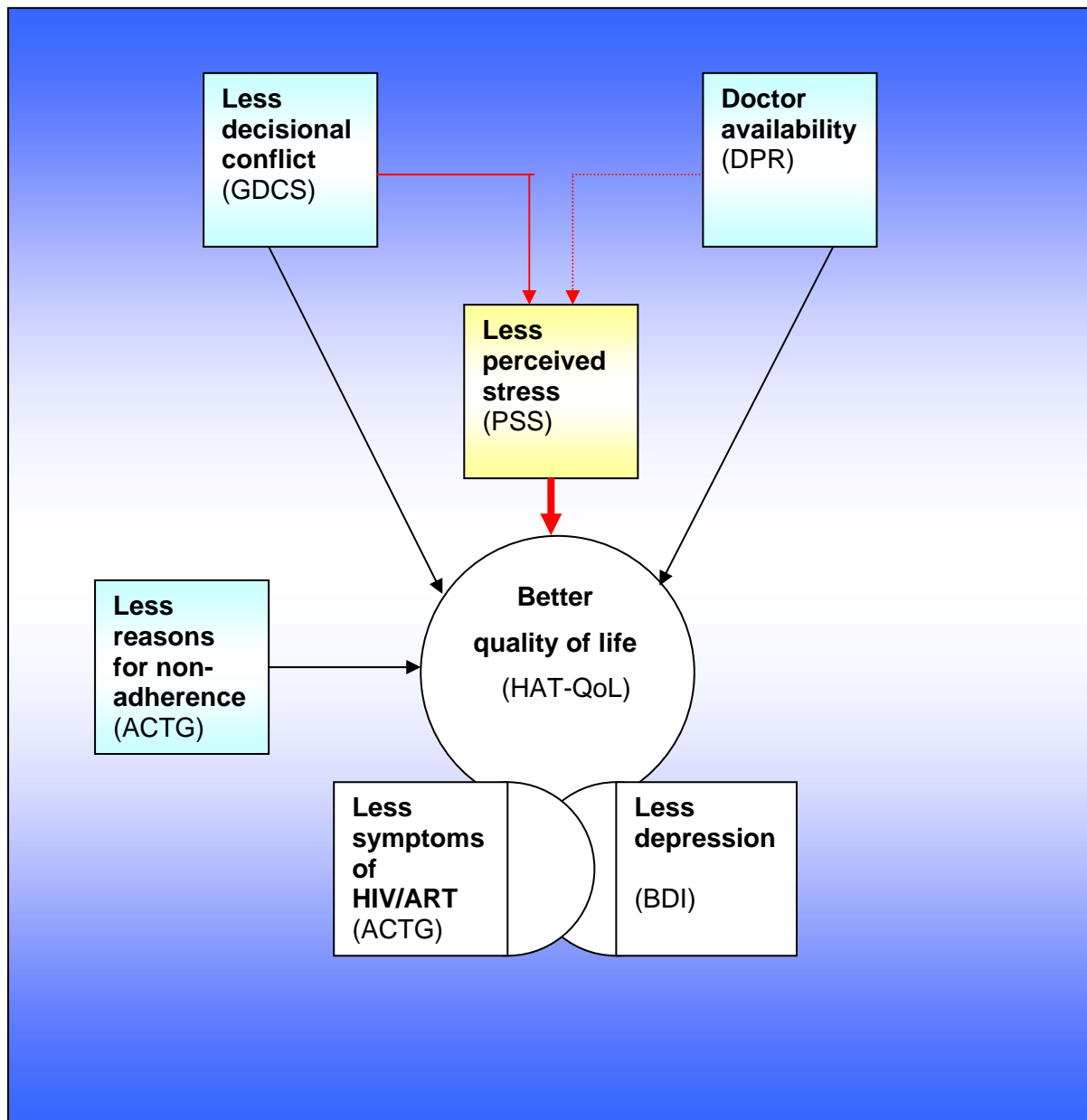


Figure 117: Path diagram model to improve quality of life: Multiple regression analysis followed by mediational analyses indicated that perceived stress mediates \longrightarrow and partially mediates $\cdots\longrightarrow$ the relationship between decisional conflict and doctor availability (independent variables) and quality of life (dependent variable) (n=79). In addition, partial regression analysis indicated that for patients taking ART (n=58) reporting fewer reasons for non-adherence is directly associated with a better quality of life. There is an overlap between the constructs symptoms of HIV/AIDS, depression and quality of life.

IV. Discussion

1. The qualitative part of the study - Voices and choices of PWHA in medical decision-making

The qualitative part of the study addressed decision-making about ART from the patients point of view, examining the decisions made about ART (**aim 1**), the reasons for the decision made about ART (**aim 2**), the motives to tell or not to tell the doctor or not why they have decided to take or not to take ART, or why they were non-adherent (**aim 3**), and which sources of information were used in the decision about ART (**aim 4**). After discussing the results of the quantitative study in the second section, the third section of the discussion will also address the question of which model of decision-making about treatment is best (**aim 5**).

1.1. To take or not to take ART- The lesson to learn from PWHA (aims 1-2)

1.1.1. Early versus late – the continuous debate

This study was conducted between February and September 2003, a period during which the DHSS Guidelines (2002) (updated February 4th and July 14th 2002) recommended offering treatment at CD4 cells below 350 cells/ μ l. Prior to this study, until February 5th 2001 the national recommendation was to start ART in any patient with CD4 counts below 500 cells/ μ l (DHSS Guidelines 2000/2001). Only about one month after the study ended, on November 10th 2003, the DHSS Guidelines (2003) lowered the cut-off point for starting ART to CD4 cells to below 200 cells/ μ l. Although the debate about early versus late initiation of ART remains a scientific mystery (Hirsch & Sterritt 2003) only 5 PWHA of the LTS study (enrolling 220 participants since February 1997) were known to be ART naïve at a CD4 nadir below 350 cells/ μ l when this sub-study started six years later in 2003 and participated in this sub-study. Interestingly the 5 ART naïve patients in this study, who also had a higher socioeconomic status in comparison to the other participants, decided to defer treatment, not because of problems with access to treatment but because of cost benefit considerations outweighing the potential side effects of ART against the progression risks of their HIV infection. Apart from this they preferred and utilized complementary/alternative medicine (CAM) and had a strong belief in body mind connection and considered spiritual aspects in their treatment decision. They were very conscious about their health, which is not only reflected in the fact that all were non-smokers, but also in the fact that they considered the decision to defer initiation of treatment as most important.

Similar to the decision-making rationale of the ART naïve participants of this study the DHSS Guidelines introduced for the first time in February 2002 a chart to weigh the potential benefits of delayed treatment versus the potential risks of delayed therapy (see table 28).

Table 28: Potential benefits and risks of delayed vs. early onset of ART (DHSS Guidelines February 2002)

Potential benefits of delayed therapy	Potential risks of early therapy
Avoid negative effects on quality of life (i.e., inconvenience)	Drug related reduction in quality of life
Avoid drug related adverse events	Greater cumulative drug related events
Preserve treatment options for future	Limitation of future antiretroviral treatment options
Delay in development of drug resistance	Earlier development of drug-resistance if viral suppression is suboptimal
Potential benefits of early therapy	Potential risks delayed therapy
Control of viral replication easier to achieve and maintain and lower risk of resistance with complete viral suppression	Possible greater difficulty in suppressing viral replication
Delay or prevention of immune system compromise	Possible risk of irreversible immune system depletion
Possible decreased risk of HIV transmission	Possible increased risk of HIV transmission

In light of the facts that HIV treatment will probably span decades, that doctors only have a few years of experience with the antiretroviral therapies that are used today, and that clinical outcomes data from randomized controlled trials are lacking, we need to focus on the individual aspects that are important for PWHA in their decision about treatment. The distinction between starting treatment at CD4 cells below 200 rather than below 350 is a matter of about or approximately 2-3 years, in a time span of patients who are likely to live 3-4 decades (Hirsch & Sterritt 2003), but these few more years without taking treatment might be of major importance for some individuals. As one of the ART naïve patients stated: *“And obviously I am doing what is right; because now they keep lowering the guidelines to even start meds at 200 T-cells, to see there is no difference between 200 and 350. I might as well wait a little bit longer. So I am glad that I did not jump on the band wagon, because you know everyone having diabetes and neuropathy and lipodystrophy and I don’t deal with any of that. I am the only girl who still has a butt.”*

It seems that most of the participants in this study had decided to defer initiation of treatment, as only 21 (23%) of 79 participants had a CD4 nadir between 200 and 350 cells/ μ l. It has to be said retrospectively that the participants who did not start ART at CD4 cells between 200 and 350 cells/ μ l were ahead of the medical experts as initiation of ART would now no longer be recommended for them according to the new amendments in US treatment guidelines. What medical experts can still learn from the decision-making rationale of the ART naïve PWHA: They were very conscious about positive health behavior, such as non-smoking, exercise, healthy nutrition, nutritional supplements and complementary treatments such as relaxation techniques, acupuncture, etc. From the perspective of those patients promotion of health related behavior and offering complementary treatment should be integrated in the therapy of HIV infection. The first steps are recently in process suggesting the integration of nutrition therapy in the “medical management” of HIV infection (Bartlett 2003).

The DHSS Guidelines (2000/2001) suggest already since April 4th 1998 that the strength of the recommendation to treat asymptomatic patients should be based on the willingness and readiness of the individual to begin. Although this seems to be germane to maintain a good patient-doctor relationship, participants of this study sometimes felt under pressure to start treatment. One very athletic ART naïve asymptomatic participant, who was diagnosed with HIV 16 years ago, (CD4 nadir 172 cells/ μ l, currently 176 CD4 cells/ μ l, viral load 45.825) stated: *“I don’t really have a doctor. They all think I’m crazy. They gave me from six months to two years to live, and I said: ‘Are you kidding? I’m in top shape!’ I think they are trying to scare me into it.”*

1.1.2. Treatment interruptions – rationale of patients versus medical experts

Patients seem to be more prepared for treatment interruptions than doctors. Of the 24 patients who interrupted ART over the past year 17 (71%) made the decision to interrupt ART alone. The DHSS Guidelines (2002, 2003) only consider discontinuation of treatment in patients who began ART at CD4 cells above 350 cells/ μ l: no clinical data exist whether it should be done or if it can be accomplished safely. Potential benefits include reduction of toxicity and drug interactions, decreased risk for drug-selecting resistant variants and improvement of quality of life. Potential risks include rebound in viral replication and renewed immunologic deterioration (DHSS Guidelines 2002, 2003). None of the participants had a CD4 cell nadir above 350 cells/ μ l so that there were concerns about the safety of treatment interruptions according to the DHSS Guidelines (2002, 2003). However 24 patients decided to discontinue treatment because of the following reasons: toxicity of ART in 9 (38%) participants, drug-resistance in 6 (25%) participants, preference for CAM in 4 (17%) participants, substance use in 2 (8%) participants, lack of health insurance in 1 (4%) participant and becoming homeless in 1 (4%) participant (see table 29). From a patient’s

perspective the benefits of treatment interruptions outweighed the medical risks, so that they decided to discontinue ART against medical advice. The decision to interrupt ART depends on patient's values and attitudes towards risks (Cher et al. 1997), which is one of several reasons why patient's decisions and behaviors are sometimes at odds with the medical opinion (Montgomery et al. 2001). Again doctors need to be more aware of patient's attitudes towards risks, their treatment preferences, and their psychosocial problems such as substance abuse, health-insurance and housing to understand patients' rationale for treatment interruptions.

Table 29: Considering treatment interruptions: Participants decision to interrupt ART (n=24) vs. the recommendation of DHSS Guidelines (2002, 2003)

Participants decision	DHSS Guidelines
CD4 nadir below 350/μl	CD4 nadir above 350 cells/μl
Main reasons for interruption: <ul style="list-style-type: none"> • toxicity of ART (9 of 24, 38%) • drug-resistance (6 of 24, 25%) • preference for CAM (4 of 24, 17%) • substance use (2 of 24, 8%) • lack of health insurance (1 of 24, 4%) • becoming homeless (1 of 24, 4%) 	Potential benefits: <ul style="list-style-type: none"> • reduction of toxicity and drug interactions • decreased risk for drug-selecting resistant variants • improvement of quality of life Potential risks: <ul style="list-style-type: none"> • rebound in viral replication • renewed immunologic deterioration

1.1.3. Treatment choices – Patient's voices versus doctor's voices

For the treatment of HIV infection the DHSS Guidelines (2002, 2003) recommend to choose a potent combination of ART, which is considered as HAART. Most (55 of 79, 69.5%) of the participants in this study had decided to take HAART, only 3 (3.5%) took a less potent combination therapy which was not considered as HAART, and 21 (27%) decided not to take ART. In the following the choice to take HAART or a less potent combination therapy will both be referred to as taking ART. Anthony S. Fauci (2000) Director of the National Institute of Allergy and Infectious Diseases emphasized at a US conference; that while the guidelines are important, they do not mean that everyone must be treated - and patients' rights to choose not to be treated should be respected.

The decision about ART is more than just the decision to take or not to take ART. The treatment choices of the participants could be classified in 5 categories: to maintain, to change, to restart, to stop or not to start treatment. None of the participants had made the decision to initiate ART. Table 30 summarizes the criteria of the participants of this study vs. the criteria relevant according to the DHSS treatment guidelines for the decision about ART.

Table 30: Criteria for decision about ART: Participants of this study (n=79) vs. DHSS guidelines (2002, 2003).

Criteria for decision about ART	
Participants	DHSS Guidelines
Surrogate markers: 69 (87%) considered surrogate markers as important or partially important, but 10 (13%) as not important.	Maximal and durable suppression of viral load and preservation of immunologic function
Better quality of life: 67 (85 %) improved in physical/psychosocial function.	Improvement of quality of life
Beliefs/knowledge about resistance: 62 (66%) believed in a link or possible link between adherence and drug resistance, but 23 (29%) had no knowledge of resistance.	Patients education should include the reason for adherence
Body-mind belief: 51 (65%) mentioned a belief or partial belief in body-mind connection.	
Side effects: 47 (59%) considered to change or to stop ART for experienced or anticipated side effects.	Side effects of ART should be assessed, addressed and managed (symptomatic treatment or change of ART)
Easy to take regimen: 46 (58%) mentioned the importance of an easy to take regimen	Regimens should be simplified as much as possible by reducing the number of pills, food requirements and therapy frequency, and by minimizing drug interactions and side effects.
Spirituality/worldview: 46 (58%) considered spirituality or worldview in their decision about ART.	
Drug resistance: Only 19 (58%) of 33 participants in which resistance testing was recommended reported resistance testing.	Resistance testing is recommended if viral load if above > 1000 copies/ml after 6 months ART
Experience of HIV/AIDS symptoms: 31 (39%) reported the experience of HIV/AIDS symptoms, although symptoms were underreported in the interviews.	Reduction of HIV related morbidity and mortality
Preference for CAM: 13 (17%) mentioned a preference for CAM and 40 (51%) used CAM.	

Many but not all criteria which the participants of this study considered as relevant in their decision about ART were reflected in the DHSS Guidelines (2002, 2003). Body mind belief, spirituality/worldview, and preference for CAM were relevant from the patient's perspective but not included in the DHSS guidelines.

a) Surrogate markers

Many but not all participants considered surrogate markers as important in their decision about ART. Similar to results of other studies (Cooper et al. 2002, Kremer 2001, Laws et al. 2000) some felt that surrogate markers were too abstract, or so far removed from how they felt within themselves that to make a decision based on these figures did not make sense. In particular African American participants considered surrogate markers significantly as less important in the decision about ART than Hispanics, Caucasians and other ethnic groups in this study. It is important that doctors ask all patients about their view of surrogate markers in decision-making about ART. This allows them to be aware if patients do not consider surrogate markers as important and to ensure that patients understand the important role of surrogate markers in decision making about ART. According to the DHSS Guidelines (2002, 2003) patient education should include the goals of therapy, including a review of expected outcomes that are based on baseline viral load and CD4 cell counts. Participants who considered surrogate markers as important achieved a better viral load suppression. Thus the patient's knowledge about the importance of surrogate markers may contribute to achieve viral load suppression.

b) Quality of life

The DHSS Guidelines (2002, 2003) point out that “*the primary goals of ART are maximal and durable suppression of viral load, restoration and preservation of immunologic function, improvement of quality of life, and reduction of HIV-related morbidity and mortality.*” Although improvement of quality of life is a major goal in the decision about HIV treatment from the perspective of patients as well as medical experts, monitoring of quality of life does not seem as important from the medical perspective as a regular monitoring of surrogate markers.

Most of the participants perceived a benefit in quality of life from their decision about ART. Particularly participants perceived that they would improve their psychosocial quality of life by declining to take ART, which is similar to results of other studies (Cooper et al. 2002, Kremer 2001). However, the perceived temporary benefit in quality of life was at the cost of a decline in CD4 cells. The short term benefit in quality of life may be at the risk of renewed immunologic deterioration. To support patients in making a good decision about ART it is important for doctors to assess patients self perception of the impact of the decision about ART on quality of life. It is important to negotiate a treatment plan that achieves both goals, improvement of quality of life and preservation of immune function. Thus for a patient centered approach monitoring of quality of life may be as important as monitoring of surrogate markers.

Regarding financial worries as one aspect of quality of life it is important to stress that given that medication costs so much, the financial situation had no influence on the decision about ART in 76 (96%) of the 79 participants. However, one participant did not take ART, as he lost health insurance and could not afford to pay for his medications, and two participants with a middle class income had to pay partially for their medication. These encouraging results are a product of the drug access programs covering the costs of ART for PWHA who have a low income level. Nevertheless participants who do not qualify for drug access programs may consider financial constraints in their decision-making about ART. Assessing quality of life it is important for doctors to address potential financial worries in patients who do not have insurance or do not qualify for drug access programs covering the cost of HIV-related medication.

c) Knowledge and beliefs about resistance

Although the DHSS guidelines recommend spending time and multiple encounters to educate and explain the goals of therapy and the need of adherence it seems that doctors do not spend enough time focusing on patient related strategies to ensure treatment success. There is still much need to educate PWHA about resistance, as 23 (29%) of 79 participants had no knowledge of resistance. Similar figures on lack of resistance knowledge were found in other studies in the US (Laws et al. 2000, Stone et al. 1998). In this study lack of knowledge of

resistance was particularly prevalent in PWHA of lower socio-economic status, female gender and African American ethnicity. This may be one of the reasons for the lower rates of adherence in African American (Paterson et al. 2000, Golin et al. 2002) and female populations (Wenger et al. 1999), as patients who agreed strongly that non-adherence would lead to resistance had significantly better adherence (Wenger et al. 1999). Thus educating patients about the reasons for adherence (DHSS Guidelines 2002, 2003) is one influential factor in the context of treatment adherence. The lesson to learn is that doctors should ensure that patients understand the relationship between resistance and non-adherence.

d) Body-mind belief

Interestingly two-thirds of the participants mentioned spontaneously a belief or partial belief in body-mind connection when asked about the reasons for their decision made about ART. Mind-body medicine is an approach to healing that harnesses the power of thoughts, beliefs, and emotions to affect health positively (Cassileth 1998). The field includes a range of approaches and techniques including but not limited to social support, cognitive and behavioral therapy, yoga, meditation, biofeedback, guided imagery, hypnosis, relaxation, massage and other therapies, which have been used by more than half of the participants in this study, as well as other larger studies (Colebunders et al. 2003). Recent studies demonstrate the beneficial effect of stress management interventions on immune function (Antoni et al. 2002, Blanch et al. 2002, Chesney et al. 2003, Cruess et al. 1999, 2000, 2002, Ironson et al. 2000, pp. 317-356, Robinson et al. 2000).

The connection between mind and body is meanwhile scientifically established. In the early 1980s, George F. Solomon (†2001) was a pioneer the field of psychoneuroimmunology, which has provided the greatest evidence of the interconnectedness of body, mind and attitude (Solomon 2000). To some extent, the field of psychoneuroimmunology has suggested that the “mind” is part of every cell (Shealy et al. 2003). Solomon also was one of the main initiators of the parent LTS study. In a pilot study on 18 long-term survivors (who had survived more than 2-3 years after the initial opportunistic infection in the pre-HAART era) the LTS research team (Solomon 2000, p. 93) distilled a list of characteristics hypothesized to be associated with long-term survival: identified these characteristics among long-term survivors of HIV:

- Perceiving the treating doctor as a collaborator and not interacting in a passive compliant (or defiant) mode.
- Having a sense of personal responsibility for one’s health and a sense that one can influence health outcome.
- Having a commitment in life in terms of “unfinished business.”

- Having a sense of meaningfulness and purpose in life.
- Finding a new meaning as a result of the illness itself.
- Engaging in physical fitness or exercise programs.
- Deriving useful information from and supportive contact with a HIV-positive person.
- Being altruistically involved with other HIV/AIDS patients.
- Acceptance of the reality of the diagnosis and refusal to perceive the condition as a death sentence.
- An altered lifestyle to accommodate the disease in an adaptive manner
- Assertiveness and the ability to say “no”.
- The ability to withdraw from taxing involvements and to nurture oneself.
- Sensitivity to one’s body and ones’ inner self, both physically and psychologically
- An ability to communicate openly about concerns, including illness.

The suggestion here is that the doctors should watch out for these patients’ characteristics and try to assist patients in developing these characteristics and to support the individual’s ability to take an active role in the process of health. PWHA should not just be offered ART; they should also be offered a way to learn how to better assist the body in healing, to perceive a sense of power and control over living with HIV. From the patient’s perspective mind-body medicine is an integral part of HIV treatment and should thus be incorporated in treatment guidelines.

e) Side effects

It is important to note that the participants who decided to stop treatment did experience more side effects and tolerated side effects less well than participants who maintained or changed treatment. Nevertheless this decision (mostly made by the patients themselves) was at the risk of a higher HIV mortality and a relapse in viral load. Other studies also found that anticipated or experienced side effects were an important reason to decline or defer ART (Cooper et al. 2002, Gold et al. 2000, Kremer 2001). Side effects of ART are known to be one of the main reasons for non-adherence (Gallant & Block 1998). Doctors should inform patients in advance of possible side effects and when they are likely to occur, treatment for side effects should be included with the first prescription (e.g., to prescribe medication for diarrhea together with DDI as diarrhea occurs in one third of the patients). The side effects of ART should be assessed, addressed and managed (DHSS Guidelines 2002, 2003). In this study some participants suffered obviously from serious adverse events such as lipodystrophy or peripheral neuropathy without being aware that these were side effects of ART, others did not discuss their side effects with their doctors but just stopped treatment. To avoid such instances, it is important to give patients checklists to assess

side effects, address the underlying causes and discuss the best treatment options with the patients.

f) Easy to take regimen

It is encouraging to find out that most of the patients were already on a simplified regimen. Bearing in mind that 8 of 22 patients who had to take their medication on an empty stomach did not recall their food instructions correctly doctors should choose regimens after review and discussion of specific food requirements with the patient and after patients understanding of and agreement to such restrictions, as the DHSS Guidelines (2002, 2003) recommend.

g) Spirituality and worldview

More than half of the participants considered spirituality or worldview in their decision about ART. Spirituality/worldview could be used for the decision in both ways, either in the decision to take ART or in the decision not to take ART. Participants who considered spirituality/worldview as important in their decision about ART reported less use of alcohol than participants who did not consider spirituality/worldview as important in their decision about ART.

In a poll of 1000 US adults, 79% of the respondents believed that spiritual faith can help people recover from disease, and 63% believed that doctors should talk to patients about spiritual faith (McNicholl 1996). In another study (King & Bushwick 1994) 77% of patients said that doctors should consider patients' spiritual needs, 37% wanted their doctor to discuss their beliefs with them more, and 48% wanted their doctors to pray with them. The parent LTS study established that spirituality/religiousness (as indicated by 4 factors of the Ironson-Woods Spirituality/Religiousness Index: sense of peace, faith in God, religious behavior, and compassionate view of others) is associated with long survival, health behaviors, less distress and low cortisol in PWA (Ironson et al. 2002). An additional 350 studies have examined spiritual involvement and health; the majority of these have found that spiritual people are physically healthier, lead healthier lifestyles, and require fewer health services (Koenig et al. 2000, pp. 7-14). Although medical research, particularly the field of psychoneuroimmunology, has established a link between spirituality /religiousness and immune function in HIV/AIDS (Ironson & Schneiderman 2002, pp 139-159), treatment guidelines have not yet incorporated the spiritual beliefs or the beliefs about the world in decision-making about ART. It might be premature to promote spirituality or worldview as adjunctive medical treatments. However, between the extremes of ignoring the idea that spirituality can bring comfort to some people coping with HIV/AIDS and endorsing the view that doctors should actively include patient's spirituality and worldview in decision-making about treatment lies a vast uncharted territory in which guidelines for appropriate behavior are needed urgently. Koenig (2000) recommended that in-depth religious counseling is best done by a trained clergy and doctors should not "prescribe" religious beliefs or activities for health reasons and they should not impose their religious beliefs on patients or initiate prayer without knowledge of the patient's religious background and likely appreciation of such activity; however taking a spiritual history is often a powerful intervention in itself. A consensus panel of the American College of Physicians (Lo et al. 1999) suggested four simple questions that doctors might ask patients acknowledging their spiritual beliefs:

- Is faith (religion, spirituality) important to you in this illness?
- Has faith (religion, spirituality) been important to you at other times in your life?"
- "Do you have someone to talk to about religious (spiritual) matters?" and

- "Would you like to explore religious (spiritual) matters with someone?"

The results of this study suggest that doctors should communicate with PWHA about spiritual and moral issues, as patients' feeling of not being able to discuss spiritual and moral issues with the doctor was one of the reasons why they did not share their reasons for decision-making with their doctors. The doctor may consider supporting the patient's spiritual beliefs and worldviews that aid in coping and can thus send an important message that he or she is concerned with the whole person, a message that enhances the patient-doctor relationship and may increase the therapeutic impact of medical interventions (Koenig 2000).

h) Drug resistance

Although DHSS Guidelines recommend resistance testing if the viral load exceeds 1000 copies/ml after 6 months ART, only 19 (58%) of 33 participants in which resistance testing was recommended reported resistance testing. African American women (particularly if they needed a resistance test!) were less likely to have a resistance test performed than homosexual men if they were not African American. Are patient's barriers to knowledge a barrier to care? The higher the level of education the more participants had a resistance test performed and participants with resistance knowledge were more likely to be tested. Again these results demonstrate that disparities in quality of treatment depending on ethnicity, gender, education and treatment knowledge. The African American community, in particular women, was more likely to be taking a failing treatment without being appropriately counseled and offered resistance testing.

i) Experience of HIV/AIDS symptoms

Participants taking ART were less likely to have experienced HIV/AIDS symptoms than participants not taking ART, which underlines the risk of HIV morbidity and mortality if patients decline ART at an advanced stage of their disease. It is also important to note that symptoms of HIV/AIDS were underreported in the interviews, asking the patients the general question whether they had experienced symptoms of HIV/AIDS in the past or not. In contrast, the symptom checklists (Physical Symptoms Checklist, ACTG-Adherence Questionnaire) had a higher pick-up rate than the interviews. Assessing symptoms of HIV/AIDS or side effects of ART doctors should rather rely on detailed checklists than asking general questions.

j) Preference for and use of complementary or alternative medicine

In this study 13 (17%) of 79 participants mentioned a preference for complementary or alternative medicine (CAM). The preference for CAM and distrust of conventional medical approaches to treatment was one of the main reasons for participants to decide not to take ART in this study as well as other studies (Cooper et al. 2002, Gold et al. 2000, Kremer 2001).

Participants with a higher level of education and also participants who did not have health insurance covering the cost for ART reported a higher preference for CAM. The reasons for these findings remain to be established.

The preference for CAM includes a critical attitude towards ART or orthodox medicine in general (Kremer 2001). Patients often complain of a feeling of loss of individual control in the medical system and a switch to CAM evinces a desire to take personal responsibility in health care and thus open up patient choice (Haigh 1998). Patient's preference for CAM and the decision to forgo ART prevents them from letting the medical profession take over control, and as a potential impediment to subsequent adherence or willingness to tolerate adverse effects of ART (Cooper et al. 2002).

Participants were well aware of the adverse effect of ART, the impact on quality of life, and the limitations of ART (as it is not a cure). Patients declining ART perceived doctors apt to put too much faith in ART (Cooper et al. 2002, Kremer 2001). Initiatives to support informed decisions should take account of these perceptions (Cooper et al. 2002, Kremer 2001).

Further, more than half of the participants used CAM and more than half of the patients took vitamins on a regular base, which is similar to results of other studies in the US (Southwell et al. 2001) and Europe (Colebunders et al. 2003).

As it can be very dangerous to combine some complementary medicines with ART and doctors need to be aware of the CAM their patients use. In this study one participant experienced a severe interaction between complementary medicine and ART, developing drug-resistance through high intake of garlic pills decreasing drug plasma levels, which is a known interaction (Priscitelli et al. 2001). Many recent studies reported interactions between CAM and ART, such as St. John's wart (Priscitelli et al. 2000) and high dose vitamin C (Slain et al. 2003) interacting with Indinavir levels. The reason for many of these interactions appears to be the substances' effect on P450 enzymes, which metabolize protease inhibitors and NNRTIs. Much has yet to be learned about the precise mechanism of these interactions, though it is important for doctors to ask patients about their use of CAM as this may have an important impact on decision-making about ART, particularly regarding substances interfering with P450 enzymes. A US study found that most users (59% of 324) told their doctors about their use of CAM but despite the potential for serious interactions of these therapies with ART this information was registered in the patients chart in only 13% of the time (Southwell et al. 2001).

Another aspect that needs to be addressed in larger longitudinal studies is the preliminary finding in this small cross-sectional study that participants using CAM at the interview reported fewer symptoms of HIV or AIDS in the past and had less doctor verified category C symptoms in the past, although the relationship was weak after controlling for the CD4 nadir. It may be that

PWHA discontinued CAM after onset of symptoms of HIV or AIDS. Alternatively the use of certain complementary or alternative treatments (i.e., techniques reducing autonomous nervous system activity) may have beneficial long-term effects. Recent studies (Cole et al. 2003) provide first clinical evidence that differential neural activity mediates relationships between psychological risk factors and response to ART, suggesting novel targets for complementary therapy in long-term control of HIV disease.

1.1.4. To take or not to take ART - Patient's rationale

For patients rationale to decline the offer of ART others came to similar results compared to this study. Cooper et al. (2002) interviewed 26 homosexual men in UK found three types of beliefs associated with the decision to decline ART:

- Perceived personal necessity for ART: lack of symptoms, interpretation of surrogate markers, good health despite long-term diagnosis of HIV, preference for CAM, inclination to let HIV take its natural course.
- Concerns about potential adverse effects of taking ART: concerns about physical and psychological effects of taking ART, perceived practical difficulties of the drug regimen, concerns about validity or effectiveness of ART, concerns about future treatment options, perceived negative effect on self identity and on quality of life, previous negative experience of ART (self or others), negative attitude towards medicines in general.
- Satisfaction with personal control over the decision.

In Germany interviews in 5 men and 6 women not taking ART (Kremer 2001) revealed five most common aspects supporting patients' decision to refuse the offer of ART: autonomous decision-making, quality of life issues, critical attitudes toward traditional medicine, preference for CAM, and perceptions of internal control.

An Australian study (Gold et al. 2000) based on self-administered, anonymous questionnaires (of the 270 respondents, the great majority were homosexual men) found that the most common individual reason was fear of side effects. Important themes that emerged from factor analysis of the reasons data included distrust of conventional medical approaches to treatment, practical problems associated with taking antiretroviral drugs, unpleasant thoughts that being on therapy would evoke, and acceptance of the idea of dying.

Like in this study (the ART naïve participant stating: *"If death was in my front door, accept it."*; he died six months after completing the study) some PWHA also preferred letting HIV its natural course without orthodox medical intervention (Cooper et al. 2002, Gold et al. 2000, Kremer 2001).

Up to our knowledge, this is one of the first studies comparing the rationale for PWHA deciding to take and not to take ART, although this is the subject of future investigation by another European research group (Cooper et al. 2002). The initial thought was that the reasoning of PWHA deciding not to take ART differed from the rationale of PHWA deciding to take ART. Surprisingly of the ten criteria that were relevant in the decision about ART only four main criteria (i.e., quality of life, side effects, preference for CAM, and experience of HIV/AIDS symptoms) were found to be different in their prevalence between PWHA deciding to take and PWHA deciding not to take ART.

- PWHA deciding not to take ART reported more frequently a positive impact of their decision on their psychosocial quality of life.
- Anticipation of side effects of ART was a main reason for ART-naïve PWHA not to start ART and PHWA who stopped ART experienced more side effects and tolerated them less well than PWHA who decided to take ART.
- PWHA deciding not to take ART had a higher preference for CAM than PWHA who decided to take ART.
- PWHA deciding to stop ART reported a higher previous experience of symptoms of HIV/AIDS compared to the participants taking ART and the ART naïve participants, who all lacked previous experience of HIV-related symptoms.

1.1.5. Lessons to learn from patient's rationale in decision-making about ART

Overall PWHA, whether they decide to take ART or not, consider similar criteria in their decision-making about ART, of which many (i.e., body-mind belief, spirituality/worldview, preference and use of CAM) are not yet reflected in the DHSS Guidelines (2002, 2003). The main overall lesson to learn is that in decision-making about ART, PWHA do not want to be reduced to their HIV-disease, they want to be seen as whole persons, which includes their individual beliefs about health, medicine, spirituality, and the world.

Box 1 summarizes the ten lessons to learn that evolve out of the ten criteria that PWHA use in decision-making about ART.

Box 1: Ten criteria of PWHA and the ten lessons for doctors to learn

Surrogate markers

- Explain the importance of surrogate markers that it is not too abstract and remote of how patients feel.

Better quality of life

- Regular assessments of quality of life are as important as measuring surrogate markers.

Beliefs/knowledge about resistance

- Explain **all** patients the reasons for adherence at the level they understand the importance.

Body-mind belief

- Patients should be offered a way to learn how to better assist the body in healing, to perceive a sense of power and control over living with HIV.

Side effects

- Side effects of ART should be assessed (checklists!), addressed and managed in collaboration with the patient

Easy to take regimen

- Simplify ART as much as possible by reducing the number of pills, food requirements and therapy frequency, and by minimizing drug interactions and side effects.

Spirituality/worldview

- Acknowledge and support the patient's spiritual beliefs and worldviews that aid in coping in living with HIV, but do not impose your own religious beliefs or worldview on patients.

Drug resistance

- Offer drug resistance testing to **all** patients who need it.

Experience of HIV/AIDS symptoms

- Assess regularly the symptoms related to HIV with checklists.

Preference for complementary/alternative medicine (CAM)

- Acknowledge patients preference for CAM and ask (and record!) each patients use of CAM, being aware of potential drug interactions.

1.2. The do's and the don'ts for doctors who want to know why patients take their medication or not (aim 3)

1.2.1. Why did patients tell their doctors what they have decided about ART?

Of the six identified motives, why patients told their doctors the reasons for decision-making about ART two motives were patient centered, two doctor centered and the other two concerned the patient-doctor relationship (see table 31).

Table 31: Motives to share the reasons for decision about ART with the doctor: patient centered, patient-doctor relationship, doctor-centered.

Motives to share the reasons for decision with the doctor		
Patient centered	Patient-Doctor Relationship	Doctor centered
<ul style="list-style-type: none"> want to inform doctor presence of concerns 	<ul style="list-style-type: none"> want/trust doctor's opinion maintain a good relationship 	<ul style="list-style-type: none"> doctor asked lab-results alerted doctor

1.2.2. Why did patients not tell their doctors what they have decided about ART?

Similarly of the seven identified motives, why patients did not tell their doctors the reasons for decision-making about ART one motive was patient centered, two doctor centered and the other four concerned the patient-doctor relationship (see table 32).

Table 32: Motives not to share the reasons for decision about ART with the doctor: patient centered, patient-doctor relationship, doctor-centered.

Motives to not share the reasons for decision with the doctor		
Patient centered	Patient-Doctor Relationship	Doctor centered
<ul style="list-style-type: none"> doctor does not need to know 	<ul style="list-style-type: none"> anticipates doctor would not support decision cannot trust their doctor's opinion cannot discuss spiritual/moral issues with doctor cannot discuss feelings with doctor 	<ul style="list-style-type: none"> doctor did not ask not seen their doctor yet

1.2.3. Doctors usually know why patients take ART but they do not know why they don't take ART

Whereas almost all (47 of 50, 94%) participants taking ART continuously over the past year shared the reasons for their decision with their doctor, only half (12 of 24, 50%) of the participants who interrupted ART (started/restarted) over the past year and only 3 (60%) of the 5 ART naive participants told their doctors why they did not take medications.

Whereas PWHA taking ART usually tell their doctors the reason for their decision because they want to inform their doctor, want/trust the doctor's opinion and have concerns about ART, participants deciding not to take ART mainly fail to share the reasons of their decision with their doctors, because they anticipate that he/she would not support their decision.

In another US study (Laws et al. 2000) five (10%) of 52 PWHA who had prescriptions for ART decided not to take their medication and did not inform their doctor about the reasons why, whereas another 5 refused the offer of ART and shared their reasons for their decision with their doctor. In a German study (Kremer 2001) 4 of 6 women did not share the reasons for their decision to forgo ART with their doctors, as they felt under pressure from their doctors to take ART, but all 5 men did communicate their doctors why they refused the offer of ART, regardless of feeling under pressure or not.

Compared to patients in general practice having at least half of the PWHA sharing the reasons not to take ART with their doctor is still a good result. In a study in general practice in UK (Barry et al. 2000) only four (11%) of 35 patients voiced all their agendas in consultation which led in 14 cases to unwanted prescriptions, non-use of prescriptions, and non-adherence to treatment.

Before writing out a prescription about ART, doctors should assess patient's willingness, ability and readiness to take ART (DHSS Guidelines 2002, 2003). It is also important to acknowledge patients reluctance to take a certain class of ART. In fear of the lipodystrophy syndrome (according to the DHSS Guidelines (2003) available evidence exists that an increased risk for fat accumulation exists with protease inhibitors), participants often expressed reluctance to take a protease inhibitor in the interview. However, changes in ART mostly included switching from one protease inhibitor to another instead of changing to a protease sparing regimen. Interestingly this study could not find any socio-demographic or behavioral characteristics that were associated with a greater willingness to take ART, except one: PWHA having a partner were more likely to decide to take ART than PWHA who did not have a partner. Another study (Kremer 2001) found that PWHA revised their decision to forgo ART because they wanted to live for their partners.

A widely used framework for assessing individual's willingness for behavioral change is the five-stage transtheoretical model (Prochaska & DiClemente 1992, pp. 184–218). These stages include:

- pre-contemplation, when the person is not considering changing the behavior;
- contemplation, when the person is thinking about changing the behavior but has not made a commitment to do so;
- preparation, when there is a firm intention to change soon;
- action, while the change is implemented;
- and maintenance, during which the individual works to avoid relapse.

While health beliefs (e.g., the belief about the necessity for ART) are usually necessary to motivate people to move through the stages of change, doctors should assess the individual's current stage and provide the appropriate information and support to facilitate movement to the next one. Particularly if a patient is in a relapse or not yet in the action phase, patient's action may not be consistent with what their doctors wished for the individual to do, but doctors will often not be aware of this. To improve the communication about patients reasons for the decision not to take ART doctors should signal that they respect patient's freedom of choice not to be treated with ART, even if they personally would not support their patients decision from the medical point of view. Particularly if patients are in an advanced stage of immune-depletion doctors should get across to their patients in a nonjudgmental way that they want to know if patients decide to stop taking ART, as careful monitoring and close cooperation between patient and doctor helps to take this steps more safely. To quote the secret of success of a medical expert: *„I can join in any decision they take in the large spectrum. Not that I find it good or that I find it right. This isn't importantly at all - but is important to make them clear that this is their body, their life, their infection.”* (Kremer 2001).

1.2.4. Assessing patients reasons for non-adherence

Of the identified motives why patients did or did not tell their doctors their reasons for non-adherence again two were patient centered, four were doctor centered and the remaining one concerned the patient-doctor relationship (see table 33).

Table 33: Motives to share or not to share the reasons for non-adherence to ART with the doctor: patient centered, patient-doctor relationship, doctor-centered.

Motives to share or not to share the reasons for non-adherence with the doctor		
Patient centered	Patient-Doctor Relationship	Doctor centered
<ul style="list-style-type: none"> • importance to talk to the doctor or not • rarely/never happens 	<ul style="list-style-type: none"> • keeping up a friendly/honest relationship with doctor 	<ul style="list-style-type: none"> • doctor asked or not • not seen doctor yet • running out of prescriptions • showed up on lab-results or not

The worse the surrogate markers, the more patients talked to their doctors about adherence, which is good, because adherence is a crucial issue in treatment success. The reasons why participants with a higher income communicated less with their doctors about their reasons for non-adherence remain to be established.

As the DHSS Guidelines (2002, 2003) point out regarding adherence, no patient should automatically be excluded from consideration for ART simply because he or she exhibits a behavior or other characteristic judged by the doctor to lend itself to non-adherence; rather doctors should assess and address patients reasons for non-adherence on a regular basis. A doctor's estimate of the likelihood of a patient's adherence is an unreliable predictor of adherence (Crespo-Fierro 1997). Patients self-reporting of optimal adherence is also an unreliable predictor of adherence; however; a patients self-report of non-adherence is a strong predictor of non-adherence (Cheever 1999). Patients self-report of the proportion of missed doses are related to viral load (Chesney & Ickovics 1997). This study showed, that brief checklists of common reasons such as in the ACTG-Adherence Questionnaire are more useful to elicit patients reasons for non-adherence than simply asking patients if they have difficulties following their schedule.

1.2.5. Suggestions for doctors to improve communication about the reasons for not taking ART or being non-adherent to ART

Learning from the stories of PWHA box 2 summarizes doctor's behavior that may build a bridge to open up the communication with patients about their individual reasons for their decision about ART and their reasons for non-adherence.

Box 2: Does for doctors who want to know why patients take their medication or not

- Establish a trustful, non-judgmental relationship
- Ask patients about their feelings about taking ART or not taking ART
- Ask patients about their concerns about ART
- Ask patients if their decision made about ART relates to their spiritual/moral beliefs
- Ask patients about their personal reasons for the decision to take or not to take ART
- Signal that you respect patients right to choose not take ART
- Assess reasons for non-adherence during every visit in all patients taking ART (checklist!)
- Assess surrogate markers regularly
- Schedule regular appointments

Don'ts for doctors who want to know why patients take their medication or not

- Don't write a prescription for ART before assessing patients willingness, ability and readiness to take ART
- Don't let your patients run out of prescriptions

1.3. Doctors and publications, the keys to informed patients (aim 4)

The ten most frequently used sources of information used by PWHA in this study comprised of: doctor (73 of 79, 92%), "positive magazines" (56 of 79, 71%), drug advertising (41 of 79, 52%), Internet (36 of 79, 46%), HIV-positive friends (35 of 79, 44%), seminars, conferences, or symposia (35 of 79, 44%), expert literature (31 of 79, 39%), other medical experts (25 of 79, 32%), peer educators (22 of 79, 28%), and naturopaths/nutritionists (21 of 79, 27%).

The doctor is the most important and most frequently used source of information in PWHA. This study as well as other studies (Cunningham et al. 2000, Laws et al. 2000, Markson et al. 1999) showed that PWHA who decided to take ART rely heavily on their doctors' advice. However, PWHA often do not have a good understanding of information relevant to decision making, as this study and the data of Laws et al. (2000) indicate. To be more effective in providing information to their patients, doctors should use a simple and non-technical language, taking into account the educational level, cultural background, and language spoken by their patients (Stricker et al. 1998). Research in evidence based medicine suggests a redesign of patient oriented information (Holmes-Rovner et al. 2001):

- to offer a description of the treatment choices (including no treatment),
- a comparison of their consequences (benefits and harms),
- and an opportunity to consider these consequences in relation to life circumstances and patient preferences.

The most effective method of providing information to patients will likely vary depending on the individual, and there is unlikely to be a "one size fits all" approach, as particularly PWHA deciding not to take ART consider the information of their doctor as significantly less important than participants deciding to take ART.

However, PWHA make almost as much use of positive magazines (particularly the *Poz magazine*) as they made use of information from their doctor in acquiring information in decision-making about treatment. Further, publications were considered as important in making the decision about ART. This underlines that literature which is written particularly for PWHA is an important additional source of information to reduce the language barrier many PWHA experience in obtaining knowledge about HIV and may even protect their health. In this small study PWHA reading positive magazines had a lower incidence of doctor verified AIDS-defining events, even after controlling for CD4 cell nadir.

Comprehensive courses to improve knowledge about HIV/AIDS and the need for adherence may also be effective (Igboko et al. 1998). This study also confirms previous data that having

Internet access is important in reducing barriers to accessing HIV/AIDS information (Draper & Marks 1998). Drug advertising can also pursue more than commercial interests, as many participants of this study reported obtaining information relevant to decision making from drug advertising. Remarkably, more than one third of the participants reported reading expert literature, so that even expert literature, (provided it is written in a language that patients are able to understand) may be an important contribution to providing patients knowledge about HIV/AIDS. In this study participants using Internet or expert literature, but not drug advertising as sources of information, used more CAM. Knowledge of resistance was significantly positively associated with using the Internet, attending seminars, conferences or symposia, consulting peer educators and other HIV-patients, reading of positive magazines and consulting additional medical experts for information.

The integration of peer educators into medical decision-making may be another step toward gaining patients' confidence and allowing them a safe place to gather information and to express their fears and reluctance regarding medications. In this study information from HIV positive friends and peer educators, although frequently used, was a less important source of information in decision-making about ART, particularly for African American women. A New York peer educator project reported increasing treatment knowledge and adherence in women living with HIV (Jones et al. 2003), however experience shows that peer educator projects are sometimes also problematic (Maskovsky et al. 1998).

In summary there is no panacea to providing patients understanding about the goals of ART and the importance of adherence to ART, but doctors play a key role in assessing and responding to the information needs of PWHA. Further, publications such as literature written for PWHA and literature written for medical experts, drug-advertising, Internet (for those who have the privilege of access), and seminars can be used efficiently to disseminate information for PWHA which is both, frequently used as well as considered as important by PWHA. The participants of this study relied less on the information from other people living or not living with HIV in their decision about ART, although HIV-positive friends, peer educators, other medical experts and naturopaths/nutritionists were commonly used sources of information. Box 3 summarizes some practical suggestions for doctors to facilitate access to information in PWHA in their office.

Box 3: Suggestions for doctor's offices providing access to information in PWHA

- Provide positive magazines
- Provide Internet access (and a guide where to find useful information)

- Set up a patient library with information on HIV-treatment and complementary/ alternative medicine
- Advertise educational seminars for PWHA
- Facilitate contact with peer educators and HIV positive support groups

2. The quantitative part of the study –Decisional control, decisional conflict, adherence and quality of life

In main objectives of the quantitative part of the study were to assess decisional control preferences and perceptions (**aim 6**), decisional conflict (**aim 7**), self-reported adherence (**aim 8**) and HIV-related quality of life (**aim 9**). Six hypotheses were tested:

- **Hypothesis 1:** PWHA prefer shared decision-making rather than leaving the decision up to the doctor. Only a small minority prefers making the decision alone.
- **Hypothesis 2:** The preferences of PWHA are not reflected in the clinical encounter.
- **Hypothesis 3:** PWHA who perceive less control than preferred have more decisional conflict in the decision about ART.
- **Hypothesis 4:** PWHA perceiving less control than preferred and more decisional conflict in the decision to take ART are less adherent to ART.
- **Hypothesis 5:** If PWHA perceive less decisional control than preferred, they talk less to their doctors about their reasons for non-adherence.
- **Hypothesis 6:** If decisional control preferences are met in the clinical encounter, this is associated with less decisional conflict and a better quality of life in PLWH.

After discussing the quantitative results of this study, and the quantitative results of the LTS study on doctor-patient relationship, beliefs about medication, depression and perceived stress in the second section of the discussion, the focus in the third section is to discuss the models to improve the quality of decision-making and the quality of life in PWHA (**aim 10**), combining the results of the qualitative and quantitative part of this study.

2.1. Decisional role preferences and perceptions (aim 6)

2.1.1. How much do PWHA want to be involved in decision-making about ART?

Assessing decisional control preferences of PWHA with the CPS there was support for hypothesis 1: shared responsibility in decision-making was preferred by the majority (47 of 79, 59%) of the participants. This was followed by making the decision themselves, considering the doctors opinion (15 of 79, 19%), the doctor making the decision considering patients opinion (8 of 79, 10%) and making the decision themselves (7 of 79, 9%). Only 2 (3%) of the 79 patients (one Caucasian, one Hispanic) indicated as ideal that their doctor made the decision about ART. Using the Control Preferences Scale, the study of Laws et al. (2000) found that most PWHA reported that they prefer to share responsibility for treatment decision making with their doctors or to make the final decision themselves; but none of the 46 English speaking PWHA wanted to cede a larger share of the decision to their doctor, compared to 3 (20%) of 15 persons

interviewed in Spanish. Preference for active engagement in decision-making about ART may vary with patient's socio-cultural background and the sources of information used in decision-making. In this study and in the study of Laws et al. (2000) participants who preferred a collaborative or active role in decision-making about ART made more use of publications as a source of information than participants who preferred to leave the decision to their doctor. In this study PWHA not having a partner preferred a more active role in decision-making compared to PWHA having a partner who preferred a more collaborative role in decision-making about ART.

In general PWHA seem to have a higher preference for a collaborative or active role in decision-making about treatment in comparison to people suffering from cancer and other diseases. In a Canadian study on 1012 women with breast cancer assessments with the CPS revealed that 22% of the women wanted to select their own cancer treatment, 44% wanted to select their treatment collaboratively with their doctors, and 34% wanted to delegate this responsibility to their doctors (Degner et al. 1997 ii). In this study PWHA had a significantly higher preference for decisional control (mean 3.22, SD .84) compared to women with breast cancer (mean 2.79, SD 1.14) ($t=4.24^{***}$, $df 102$)¹. In the study of Degner et al (1997 ii) women who were younger than 50 years, had more than high school education, were married, and whose first language was English were more likely to prefer active or collaborative roles in treatment decision-making. Compared to the study above, other studies using the CPS found even lower patients preferences for active or collaborative involvement in decision-making about treatment. A Canadian study (Davison & Degner 1997) in 57 men (mean age of 71 years) showed that 58% of the men preferred a passive decision-making role. Two Canadian surveys (Degner & Sloan 1992) using the CPS in 436 newly diagnosed cancer patients and 482 members of the general public found that 59% of cancer patients wanted doctors to make treatment decisions on their behalf compared to only 9% of the public. A British study (Beaver et al. 1996) reported that the majority of 150 women newly diagnosed with breast cancer preferred leaving the decision-making responsibility to their doctor, whereas the control group of 200 women with benign breast disease preferred a collaborative role in which joint decisions. A literature review (Bernbassat et al. 1998) on patient's preferences for participation in decision-making reported preferences for a passive role in decision-making ranging from 9%-12% in non-patients, and 13% -59% in cancer patients. The severity of the patients' conditions, and their being older, less well educated, and male are predictors of a preference for the passive role in the patient-doctor relationship, but demographic and situational characteristics explain only 20% or less of the variability in preferences. An US survey (Strull et al. 1984) on 210 hypertensive outpatients and their 50 clinicians found that 53% of patients preferred to participate in making decisions, while clinicians

¹ Differences were calculated using the t-test to compare means (SISA 2004).

believed that their patients desired to participate in 78% of cases. The only way a doctor can gain insight into an individual patient's desire to participate in decision making is through direct inquiry and to determine the patients' desire to participate in medical decisions should be viewed as a basic clinical skill (Bernbassat et al. 1998).

2.1.2. Steps to meet patient's preferences for decisional control

In this study hypothesis 2 was partially supported: Most (46 of 79, 58%) did not perceive the decisional control they preferred, 29% (23 of 79) perceived more and 29% (23 of 79) less involvement than preferred. However 33 (42%) of the 79 participants perceived the decisional control they preferred. This exactly the same result as in the study in 1012 women with breast cancer (Degner et al. 1997 ii), in which only 42% of women achieved their preferred role in treatment decision making on the CPS.

Although 59% of the 79 participants preferred shared decision-making, only 32% reported that they perceived shared decision-making. As expected, some participants deciding to take ART tended to be less involved in decision-making than preferred. One striking finding of this study was that PWHA deciding to stop ART felt they had significantly more decisional control than they wanted. Although PWHA deciding to stop ART preferred shared responsibility in decision-making, they made their decision alone, anticipating that their doctor would not support their decision. It is very important for doctors to meet patient's preferences for shared decision-making in the decision to stop ART. The decision to stop ART in an advanced stage of HIV disease requires careful monitoring as a drop of CD4 cells below 200/ μ l and a viral load above 55,000 copies/ml (RT-PCR) have an 86% risk to progress to AIDS and a 70% risk to die of AIDS within 6 years (Mellors et al. 1991). For this reason it is important for doctors to meet patient's preferences for shared responsibility in the decision to stop ART.

Doctors can take active steps to share in the treatment decision-making process, like the following five steps suggested by Charles et al. (1997):

- Establish a conducive atmosphere so that patients feel that their views about various treatment options are valued and needed.
- Elicit patient's preferences, so that treatment options discussed are compatible with the patient's lifestyle and values.
- Transfer information to the patient on treatment options, risks and benefits in a way as unbiased, clear and simple as possible.
- Help the patient conceptualize the weighing process of risks versus benefits, and ask patients questions to ensure that the information underlying their treatment preferences are based on fact and not misconception.

- In sharing treatment recommendations with the patient, be careful not to impose your own values about the best treatment onto the patient.

Making a shared decision to interrupt treatment does not mean that both parties, patient and doctor, are convinced that this is the best possible option for this patient, but rather that both endorse the patients choice as a part of negotiated agreement in which the patients views count (Charles et al. 1997).

Most, but not all PWHA in this study wanted to participate in making choices about ART. The preferences of the 5 ART naïve patients for an autonomous decision to defer treatment were met in the clinical encounter. As the findings of this study indicate, the two PWHA who preferred the most passive role also perceived achieving their perceived role and also perceived least decisional conflict. Other PWHA who wanted relatively passive roles, felt pushed to assume more decisional responsibility than they wanted. Future research should determine whether patients who prefer a passive role should be encouraged to be active. In an US study of Barry et al. (1995) involving 421 men with benign prostate cancer in a program designed to facilitate patient participation in treatment decisions patients rated the Shared Decision-making Program very positively and made decisions consistent with their assessed preferences, suggesting that patients can be helped to participate in treatment decisions.

However for patients preferring a participatory decision-making style there is good evidence that doctors should take active steps to engage patients in decision-making. A representative US sample of 7730 patients from the practices of 300 doctors (Kaplan et al. 1996) found that higher scores in participatory decision-making styles were associated with greater patient satisfaction and loyalty to the doctor. Among patients of doctors who were rated in the least participatory decision-making style, one third changed doctors in the following year; whereas among patients of doctors who were rated in the highest quartile, only 15% changed doctors.

2.2. The era of ART – the era of decisional conflict? (aim 7)

Decisional Conflict was defined by the North American Nursing Diagnosis Association (1992) as the uncertainty about which course of action to take when choice among competing actions involves risk, loss, regret or challenge to personal life values (such as personal health, family relationships, career, finances, or other life events). Entering the era of antiretroviral combination therapies, we have entered the era of complex and uncertain treatment choices (Shernoff & Smith, 2000). The medical uncertainties regarding whether, when and which drugs to begin or stop or change were surprisingly not paralleled by a high state of uncertainty in decision-making about ART in the participants in this study. Remarkably about half (47%) of

participants had no decisional conflict, whereas 42 (53%) expressed decisional conflict (which was *high* to *very high* in only 4 (5%) participants). In a Canadian survey (O'Connor et al. 2003) using the GDCS in 635 adults, 59% expressed decisional conflict making 'complex' health decisions. In this study the prevalence of decisional conflict of PWHA in the decision about ART was not significantly different compared to common decisions about medical or surgical treatments or birth control (In this study the prevalence of decisional conflict of PWHA in the decision about ART was not significantly different compared to common decisions about medical or surgical treatments or birth control ($t=.17$, $p=.345$, $df 108$).¹

Decisional conflict arises from two sources. First the people are uncertain balancing the potential advantages but also potential disadvantages of the choice they face, which is the inherent difficulty of the choice (O'Connor & Jacobsen (2003). Nevertheless in the PWHA participating in this study there were no significant differences in decisional conflict between the decision to maintain, change, restart, stop or not to start ART. Even the decision not to take ART against treatment guidelines was not significantly correlated with decisional conflict.

The second source of decisional conflict includes modifiable factors that make an inherently difficult decision even more difficult, such as feeling uninformed, unclear about values and unsupported in decision-making (O'Connor 1995, 1999). The second source of decisional conflict was more relevant for the participants of this study. There was support for hypothesis 3: PWHA who perceived less decisional control than preferred had more decisional conflict in the decision about ART. This accounted particularly for PWHA deciding to take ART and participants preferring shared decision-making. A mismatch between preferred and actual role in decision making is a known factor contributing to decisional conflict reviewing the literature on evidence based medicine (O'Connor & Jakobsen 2003).

For PWHA surrogate markers and the use of CAM may also be related to the values in decision-making. The more CD4-cells increased over the past year, and the more participants used CAM the fewer participants felt unclear about values according to the GDCS in this study.

2.3. Adherence (aim 8)

2.3.1. The ACTG adherence questionnaire – A useful instrument in clinical practice?

In this study the 58 participants taking ART at the interview reported on average good adherence in the ACTG questionnaire (mean 99.97%, SD 11.10%) over the past 3 days. It has to be noted

¹ Differences were calculated using the t-test to compare means (SISA 2004).

that participants who decided not to take ART without telling their doctors were not labeled as being non-adherent in this statistics. However, only half 28 (49%) of the 58 participants taking ART achieved having an undetectable viral load. Incomplete virologic response, which refers to having a detectable viral load despite being treated with ART, occurs in as many as 63% of patients in population-based studies (Ledergerber et al. 1999).

The self-reported ACTG adherence questionnaire might be a useful instrument for clinical practice, as it is one of the simplest methods of assessing adherence to ART and it gives useful insights in patient's knowledge of their treatment instructions, their reasons for non-adherence and their symptoms of HIV or ART. In this study 9 (41%) of 22 PWHA did not recall that their medication had to be taken on an empty stomach. In another US study (Chesney et al. 2000) 22% of 74 patients did not know the special dietary guidelines for taking their protease inhibitors. Laws et al. (2000) found that many people who were taking protease inhibitors said they had been instructed to drink copious amounts of water to prevent kidney stones.

Although self-reported adherence is often overestimated (Haynes et al. 1980, Liu et al. 2001), doctors guessing patients adherence is no better than chance (Paterson et al. 2000). Asking patient's about their adherence is improving on a coin toss to predict adherence (Turner & Hecht 2001). A prospective US study in 140 PWHA (Golin et al. 2002) measured adherence to ART computing a composite score from electronic medication bottle caps, pill count and self-report. PWHA took 71% of prescribed doses with 96% of patients achieving suboptimal (<95%) adherence, demonstrating the critical need for programs to assist patients with medication taking. In this study the checklist of reasons for non-adherence was used in every participant, even if the initially reported that they never skipped doses. The checklist supported PWHA better in pinpointing problems with adherence. This study revealed six most common reasons for non-adherence: side-effects/toxicity of ART, being away from home, having a change in daily routine, sleeping through dose time, being busy with other things and simply forgetting. The most common reasons in this study have also predominated in previous reports (Chesney et al. 2000, Cheever 1999, Gallant & Block 1998, Golin et al. 2002, Walsh et al. 2001).

The symptom checklist of the ACTG adherence protocol was also useful in eliciting common symptoms in PWHA, although the instrument does not differentiate whether the symptoms are related to HIV or its treatment. Using the 12-item version of the ACTG adherence questionnaire (see appendix p. 10) five symptoms were present every day in more than 10% of the participants: signs of peripheral neuropathy, memory problems, sleeping problems, skin problems, and fatigue. The meanwhile up-dated 20-item checklist of the ACTG questionnaire

(ACTG 2001) is much more comprehensive, also including other important side effects of ART such as signs of lipodystrophy or lipoatrophy, loss of libido, and gastrointestinal discomfort. This instrument might assist doctors in assessing and addressing the side effects of ART in order to improve patient's adherence.

2.3.2. Are decisional control and decisional conflict related to adherence in PWHA?

Although 20 (34%) of 58 PWHA taking ART perceived less control than preferred, which was significantly associated with a higher decisional conflict, the following two hypotheses were rejected in this study:

- **Hypothesis 4:** PWHA perceiving less control than preferred and more decisional conflict in the decision to take ART are less adherent to ART.
- **Hypothesis 5:** If PWHA perceive less decisional control than preferred, they talk less to their doctors about their reasons for non-adherence.

However, these results need to be interpreted with caution as the majority of PWHA in this study did not perceive less decisional control than preferred and reported no or few decisional conflict, and adherence was measured by self-report only.

Reviews of the literature found evidence in other chronic diseases that decisional conflict (Towle & Godolphin 1999) and perceived omission for patient's participation in decision-making and can affect treatment adherence indirectly through an effect on patient satisfaction (Golin et al. 1996, Towle & Godolphin 1999). For this reason a study of Golin et al. (2000) prospectively hypothesized that increased patient participation in medical decision-making may improve adherence among patients with HIV. Nevertheless the longitudinal study (Golin et al. 2002) following 140 PWHA using an accurate, composite measure of adherence to ART could not support that PWHA's participation in decision-making, their satisfaction with the doctor and their self-efficacy to take ART were associated with adherence, though there was a trend toward greater adherence among patients with more trust in their doctor; and PWHA using adherence aids, such as pill boxes or memory aids, were significantly more adherent.

2.3.3. Doctor related strategies to improve adherence

Based on the current literature the DHSS Guidelines (2003) recommend the following strategies for doctors and the health team to improve adherence to ART in PWHA (see table 34).

Table 34: Strategies for doctors and health teams to improve adherence to ART in PWHA (DHSS Guidelines 2003).

<ul style="list-style-type: none">• Establish trust.
<ul style="list-style-type: none">• Serve as educator and information source with ongoing support and monitoring.
<ul style="list-style-type: none">• Provide access between visits for questions or problems (e.g., by providing a pager number), including during vacation or conferences.
<ul style="list-style-type: none">• Monitor ongoing adherence; intensify management during periods of suboptimal adherence (i.e., more frequent visits, recruitment of family or friends, deployment of other team members, and referral for mental health or chemical dependency services).
<ul style="list-style-type: none">• Use health team for all patients, including patients with special needs (e.g., use peer educators for adolescents or for injection drug users).
<ul style="list-style-type: none">• Consider impact of new diagnoses on adherence (e.g., depression, liver disease, wasting, or recurrent chemical dependency), and include adherence intervention in management.
<ul style="list-style-type: none">• Use nurses, pharmacists, peer educators, volunteers, case managers, drug counselors, clinician's assistants, nurse practitioners, and research nurses to reinforce adherence message.
<ul style="list-style-type: none">• Provide training to support team regarding antiretroviral therapy and adherence.
<ul style="list-style-type: none">• Add adherence interventions to job descriptions of support team members; add continuity-of-care role to improve patient access.

In a US survey of Golin et al. (2004) (n=190) doctors reported on average spending 13 minutes counseling patients when starting a new 3-drug ART regimen. The vast majority performed basic but not more extensive adherence counseling; half reported carrying out 7 or fewer of 16 adherence counseling behaviors "most" or "all of the time." Doctors who reported conducting more adherence counseling were more likely to be infectious disease specialists, care for more HIV-positive patients, have more time allocated for an HIV visit, and to perceive that they had enough time, reimbursement, skill, and office space to counsel.

2.4. Quality of life - Giving the life years or giving the years life? (aim 9)

Table 35 compares HAT-QoL dimension score distributions of this study to other studies. In this subset of the LTS-study the participants, who were living on average more than 11 years with the HIV-diagnosis, compared to 215 PWHA in the US who were diagnosed a mean of less than 5 years (Holmes & Shea 1999), participants rated a significantly better HIV mastery ($t = 3.17^{**}$, $df = 145$), less health worries ($t = 4.32^{***}$, $df = 165$) and less disclosure worries ($t = 7.20^{***}$, $df = 186$), whereas no significant differences were found on sexual function ($t = .62$, $p = .53$, $df = 138$), financial worries ($t = 1.58$, $p = .11$, $df = 140$) life-satisfaction ($t = -.26$, $p = .78$, $df = 138$), and overall function ($t = 1.15$, $p = .25$, $df = 148$).³ Also in comparison to the European Level Evaluation of Complementary Techniques in HIV (ELECTHIV), assessing quality of life with the HAT-QoL in 1066 PWHA (Nasta 2001), participants in this study rated a better quality of life, mainly less disclosure, health and financial worries, but equal overall and sexual function, life satisfaction and HIV mastery.⁴ ELECTHIV was a European case control study comparing 632 PWHA using complementary or alternative medicine (CAM) of which 81% took HAART vs. PWHA who did not use CAM of which 91% took HAART. Due to the large sample size distributing anonymous questionnaires among PWHA attending HIV/AIDS organizations in United Kingdom, Italy, Germany, Belgium, France, Greece and Spain the ELECTHIV2 project found that CAM users compared to non CAM users rated a significantly better quality of life on 3 subscales: life satisfaction, HIV mastery and disclosure worries. In the small subset of the LTS study these differences between CAM users and non CAM users were not found.

Table 35: HAT-QoL dimension score distributions (mean (SD): LTS-Study (subset of a paid volunteer sample), Holmes & Shea (1999) (convenience sample) and ELECTHIV (case control study comparing CAM users vs. non CAM users).

Study	Subset of LTS- study N=79	Holmes & Shea 1999 (USA) N =215	ELECTHIV 2001 (Europe) N= 632 CAM users vs. 434 non CAM users
Sexual function	57.17 (26.54)	55.0 (26.5)	58.9 vs. 57.2 (n.s.)
Financial worries	60.23 (32.60)	53.4 (32.9)	55.1 vs. 55.1 (n.s.)
Life satisfaction	64.24 (25.44)	65.1 (25.4)	66.3 vs. 62.8*
Overall function	70.10 (22.64)	66.6 (24.3)	71.4 vs. 68.5 (n.s.)
HIV mastery	72.94 (31.29)	59.7 (33.0)	74.3 vs. 67.7*
Health worries	77.29 (24.13)	62.8 (28.9)	68.4 vs. 65.2 (n.s.)
Disclosure worries	80.63 (21.25)	58.4 (28.6)	68.1 vs. 62.2*

³ Differences were calculated using the t-test to compare means (SISA2004).

⁴ The t-test to compare means (SISA 2004) between this study and ELECTHIV could not be calculated as the standard deviations of the mean dimension scores from the ELECTHIV study were not published.

However, in our study, which is using the HAT-QoL instrument for the first time in a sample with a larger proportion of African-American women, African-American women rated significantly less HIV mastery than men of Caucasian, Hispanic or other ethnic origin, even after controlling for time since diagnosis. The reasons for this finding remain to be established but it has to be pointed out that the subscale HIV mastery of the HAT-QoL is probably mislabeled. The two items of the subscale HIV-mastery

- *I've had regrets about the way I lived my life before knowing I had HIV*
- *I've been angry about my past HIV risk behavior*

rather seem to assess self-regrets/anger than HIV mastery.

The less often PWHA reported symptoms of HIV or ART in the checklist of the ACTG adherence questionnaire in this study the better they perceived their quality of life (particularly the dimensions overall function, life satisfaction, health worries, sexual function, and financial worries). In the ELECTHIV project the most commonly reported reason for using CAM was to improve the quality of life (74%) and among PWHA taking HAART 52% used CAM to prevent side effects. Reviewing the literature of factors affecting the quality of life in PWHA the presence of symptoms has had a strong impact on all measured dimensions of health related quality of life (Douaihy & Singh 2001). Successful management of side effects is important to improve quality of life, e.g. a 9 week dietary program to control ART related diarrhea resulted in enhanced quality of life as indicated by the HAT-QoL (Rachlis et al. 2003). Improvement of quality of life will be further addressed in the third section of the discussion, after discussing other results of the LTS-study related to long-term survival and quality of life.

2.5. Aspects of long-term survival with HIV

2.5.1. It takes two to Tango – The patient-doctor relationship

a) The styles of patient-doctor relationship

Despite the data of four clinical trials in chronically ill patients demonstrate that the patient-doctor relationship is consistently related to better health outcomes (Kaplan & Greenfield 1989) up to date little has been done to measure this relationship in HIV (Ironson et al. under review). Thus the work of Ironson et al. (under review) developing the DPR to measure the patient-doctor relationship from the view of PWHA was seminal. The DPR was given in the LTS study.

In this cross-sectional subset of the LTS study PWHA reported on average a highly collaborative and compliant but little defiant style of DPR. The PWHA perceiving shared responsibility in decision-making rated highest on the collaborative style of the DPR. PWHA taking ART rated a more compliant and collaborative style than PWHA not taking ART. Interestingly there was no significant difference on the defiant style of DPR between PWHA taking and not taking ART. The defiant relationship with the doctor is characterized by not wanting to discuss matters with the doctor, and not necessarily following what the doctor suggests (Ironson et al. under review).

According to a small pilot study (Solomon 2000) perceiving the treating doctor as a collaborator and not interacting in a passive compliant (or defiant) mode was one of the characteristics of long-term survivors with AIDS. It has to be noted that a compliant patient-doctor relationship does not describe the characteristics of a long-term survivor with HIV (Solomon 2000). A compliant style of DPR indicates a relationship where the patient follows doctor's orders and does not question his/her authority (Ironson et al. under review). Bader et al. (under review) defined this particular style as *traditional compliance*, which is opposed to *critical compliance*. Critical compliance describes the ability and the willingness of a patient to take a therapeutic regimen, based on an informed and autonomous choice, as determined by a process of shared decision-making between the patient and the doctor (Bader et al. under review). Critical compliance is similar to a collaborative style of DPR, which is characterized by mutuality and sharing in decision-making (Ironson et al. under review). In a German study in 43 PWHA (Bader et al. 2002) critical compliance was superior to traditional compliance with respect to adherence, coping, quality of life, physical symptoms, and psychosocial factors.

Further longitudinal research is essential to relate the styles of patient-doctor relationships to health outcomes such as long-term survival and quality of life in PWHA. Based upon the present findings it seems likely that collaboration rather than compliance is one of the psychosocial skills of long-term survivors with HIV.

b) The characteristics of a good patient-doctor relationship

The DPR includes four qualities characterizing a good patient-doctor relationship: patient asks, doctor informs, trust, and doctor's availability. The PWHA in this study reported a good patient-doctor relationship according to the DPR. The qualities patient asks, trust and doctor informs were rated on average very high and doctor availability was rated high. Doctor informs and doctor availability was explaining variation in quality of decision-making and quality of life, which will be discussed later in the third section of the discussion in the models to improve quality of decision-making and quality of life in PWHA.

However PWHA not taking ART rated significantly less trust and doctor availability than PWHA taking ART. Further, not trusting doctor's opinions as well as not having seen the doctor yet were related to not telling the doctor the reasons for the decision about ART. Improving these characteristics of the patient-doctor relationship might prevent treatment interruptions or at least facilitate patients sharing the decision not to take ART with their doctors. Another cross-sectional US study (Roberts 2002) interviewed 28 PWHA who were treated by HIV/AIDS experts. Most were extremely satisfied with the doctor, and trusting their doctor helped to believe in ART and to take ART, yet due to lack of trust and doctor availability some patients did not talk to the doctor about stopping ART or being non-adherent.

The DPR may be an important instrument to quantify characteristics of the patient-doctor relationship that relate to a patient's satisfaction with the quality of the relationship with their doctors. A longitudinal US study interviewed 146 PWHA (Sullivan et al. 2000) to assess the extent to which perceptions of specific aspects of the patient-doctor- relationship are related to overall satisfaction with the doctor. PWHA who were more comfortable discussing personal issues with their doctors ($p < .05$), who perceived their doctors as more empathetic ($p < .01$), and who perceived their doctors as more knowledgeable with respect to HIV ($P < .01$) were significantly more satisfied with their doctors, collectively explaining 56% of the variation in overall satisfaction with their doctor.

Due to the lack of instruments to measure the patient-doctor relationship there is little empirical evidence on the impact of the patient-doctor relationship on health outcomes. An Italian study (Martini et al. 2001) interviewing 214 PWHA examined different aspects of the doctor-patient relationship, including time dedicated to the visits and patients' subjective assessment of the quality of the relationship and information in relation to adherence to ART. There was a significant ($p < .05$) difference between patients followed by the same doctor (80% of the participants) and patients followed by different doctors (20%). Compared to PWHA followed by different doctors PWHA followed by the same doctor were more likely to be very much or adequately satisfied with the quality of the information provided by their doctors (86.5% vs. 57%) and satisfied with the relationship with the doctor. Satisfaction with the doctor-patient relationship, as defined by the patient, was associated with a high level of adherence, but the difference was not significant.

c) Establishing trust in the patient-doctor relationship

Trust is acknowledged as one of the central features of patient-doctor relationship. The Hippocratic Oath (Bauer 2004) originally outlined appropriate trust-building behavior for doctors 2300 years ago. Establishing trust in the patient-doctor relationship is at the top of the doctor related strategies to improve adherence in the DHSS Guidelines (2003). This reflects how profoundly important doctor behavior is for establishing trust in relationships with patients. But there is a lack of empirical evidence how doctors can foster trust in the relationship. Little data is published of a successful intervention that has measurably improved patients' trust in their doctor, as a literature review on patients trust in doctors concluded (Pearson & Raeke 2000). Rigorous efforts to conceptualize and measure trust have been relatively rare and for patient-doctor trust to be strengthened, our ability to measure the mediators and outcomes of trust must mature (Pearson & Raeke 2000). Trust is considered to be an important outcome in its own (Pearson & Raeke 2000). PWHA perceived trust in their doctor as a dimension of quality of life by PWHA (Holmes & Shea 1998).

The DPR conceptualizes trust as mutual linking and sense of trust between doctor and patient, and the doctor feeling concerned about the patient (Ironson et al. under review). As most participants rated a very high trust in DPR, there was little variability to examine whether decisional control and decisional conflict were related to trust in the patient-doctor relationship. In this study there was no support for hypothesis 6 (see below) for trust as a dimension of quality of life. However these results need to be interpreted with caution: While we attempted to examine this quantitatively, there was a ceiling effect on the trust dimension of the DPR. Whether meeting patients decisional control preferences and reducing decisional conflict is associated with more trust in the patient-doctor relationship (hypothesis 6) needs to be examined in PWHA who state a lack of trust in their doctors. The interviews in this study and other studies (Roberts et al. 2002, Golin et al. 2002) point towards the direction that a mismatch between perceived and perceived decisional role may cause dissatisfaction in doctor-patient relationship.

2.5.2. The beliefs about medication

Earlier attempts to understand patient's decision-making about treatment examined patient's beliefs about their illness but have ignored their beliefs about treatment (Horne 1999). A study in UK involving over 1200 participants living with a range of chronic illnesses showed that patient's beliefs about treatment could be grouped under two core themes: the beliefs about the necessity for the prescribed medication for maintaining health now and in the future, and concerns about the potential adverse effects of taking it (Horne et al. 1998). For this reason the questionnaire on

beliefs about medications (BMQ) was developed (Horne et al. 1999) and exists in a developing version specified to examine PWHAs beliefs about ART (Horne et al. 2001).

Using the HIV-specific version of the BMQ the participants in this study rated on average a high necessity for ART (mean 3.56) and moderate concerns about potential adverse effects of ART. Among PWHA taking ART more reasons for non-adherence were reported in PWHA who rated higher concerns about ART and lower necessity for ART, compared to those who rated lower concerns about ART and higher necessity for ART. PWHA deciding to take ART had significantly higher beliefs about the necessity for ART than PWHA deciding not to take ART. However PWHA taking and not taking ART reported equal concerns about ART.

A study in UK assessed 35 PWHA who were offered ART within the same frame of national guidelines compared to this study (CD4 cells below 350/ μ l, or a viral load above 55,000 copies/ml or symptoms of HIV/AIDS). Most (23 of 35, 66%) patients accepted ART, but 12 (34%) refused. PWHA declining ART were less likely to believe in their personal necessity for ART ($p < .01$) and had more concerns about ART ($p < .01$) than PWHA accepting ART. Patients with a higher CD4 count were more likely to doubt the personal necessity for ART ($p < 0.05$) and were more likely to decline it, whereas viral load was not related to beliefs about ART and decisions about ART. Individuals were significantly ($p < 0.001$) more likely to accept ART if their perceptions of personal necessity outweighed their concerns about adverse effects of ART, and if they had experienced more HIV-related symptoms ($p < 0.05$).

Horne (1999) considers patients beliefs about treatment, their perceived personal necessity and concerns about treatment as the hidden deterrent of quality of life. However, PWHA perceive concerns about ART as a dimension of quality of life (Holmes & Shea). According to hypothesis 6 meeting patients decisional control preferences and reducing decisional conflict is associated with less medication concerns. This hypothesis was rejected for decisional control, but it was supported for decisional conflict. The match between decisional control preferences and perceptions was not significantly associated with medication concerns, but there was a significant association between decisional conflict and medication concerns. The direction of the relationship will be further discussed in section three of the discussion in the model to improve the quality of decision-making about ART.

2.5.3. Depression in HIV - common, risky, but can be relieved

According to a report from the National Institutes of Mental Health (NIMH 2002) nearly 18.8 million (9.5 %) Americans over the age of 18 suffer from major depression in any one-year

period. Women experience depression about twice as often as men (Blehar & Oren 1995). Everyone at one time or another has felt depressed, sad, or blue; which is a normal reaction to stressful life events. A depressive disorder is not the same as a passing blue mood; a depressive disorder is an illness that affects the body, the mood, and the thoughts; lasting without treatment for weeks, months, or years (NIMH 2002). Although available therapies such as medication and psychosocial therapies (health education, counselling and/or cognitive-behavioral therapies) alleviate symptoms in over 80 percent of those treated, less than half of people with depression get the help they need (NIMH 2002).

A screening in a representative probability sample of 2864 adults receiving care for HIV in the US (Bing et al. 2001) showed that 36% had a major depressive disorder and also that African Americans were less likely to be diagnosed with depression than other ethnic groups. Thus PWHA are more at risk to suffer from depression compared to the general population. Depression is common and one of the strongest modifiable predictor of adherence to all medical therapy including ART and thus should be treated prior to starting (Bangsberg & Moss 1999). Depression is a major health risk for PWHA as it is associated with declines in immune function (Leserman et al. 1997), acceleration of the course of disease progression (Ironson et al. 2002 i, under review i, Leserman et al. 1999, Leserman et al. 2002, Zorilla et al. 1996), increased disability and lower quality of life (Holmes et al. 1997), shorter survival (Patterson et al. 1996), and greater probability of dying (Mayne et al. 1996). In the LTS study baseline depression predicted the change of CD4 cells and viral load log over 2 years (Ironson et al. under review i). The HIV Epidemiology Research Study (Ickovics et al. 2001) following a cohort of 765 HIV-positive women over a maximum of seven years since 1993 found that women with chronic depressive symptoms were 2 times more likely to die than women with limited or no depressive symptoms (RR 2.0, 95% CI 1.0-3.8).

However, data on treatment of depression among HIV-infected patients paint a distinctly hopeful picture (Sambamoorthi et al. 2000). Among 1010 PWHA diagnosed with depression, who were all Medicaid patients, 58% used antidepressant treatment, women (61%) and drug users in treatment (71%) were more likely to receive antidepressant treatment, and depressed patients treated with antidepressants were more likely to receive ART than those not treated with antidepressants. Also Sambamoorthi et al. (2000) reported that women were more likely to be diagnosed with depression than men and African Americans were less likely to be diagnosed with depression compared to other ethnic groups.

Similar results were found in this subset of the LTS study assessing depression with the BDI 25 (32%) of 79 participants suffered from mild to manifest clinical depression. The mean core of depression was 8.66 (SD 9.00), which lower compared the score of the 79 participants at baseline (mean 11.28, SD 8.78), however the difference between the score on the BDI at baseline and at the substudy was not significant ($t = -1.85, p = .07, df 155$)⁵. In addition, the subsample of the 79 participants did not differ from the 177 participants from the LTS study (Ironson et al. under review i) in their baseline BDI scores (mean 11.28, SD 8.78 vs. mean 11.13, SD 8.87; $t = -.13, p = .90, df 151$).

Of the 79 participants 21 (27%) reported taking central nervous medications such as anti-depressants and/or tranquilizers. It has to be pointed out that treatment with anti-depressants in PWHA taking ART requires careful monitoring due to possible interactions and side effects among some of the medications (NIMH 2002). There are many different treatments for depression and specific types of psychosocial therapy can also relieve depression. A literature review indicates that that psychosocial intervention, particularly cognitive-behavioral stress management (CBSM) can impact positively on quality of life and disease processes and possibly on morbidity and mortality in PWHA, however it was noted that most studies have been conducted upon men (Schneiderman et al. 2001). Currently a longitudinal study is testing the effect of a CBSM intervention in over 200 women with HIV/AIDS (Ironson 2004, LaPerriere under review). Apart from its potential to reduce depression CBSM is also of interest in addressing perceived stress.

⁵ Differences were calculated using the t-test to compare means (SISA 2004).

2.5.4. Coping with stress to stay healthy with HIV?

a) The role of perceived stress in remaining healthy with HIV

In this study, which is a cross-sectional subset of the LTS study followed up for up to six years, the mean score for perceived stress on the PSS was 16.35 (SD 7.36), which is significantly higher ($t = 1.96^*$, $df83$) than the norm in a US probability sample (Cohen & Williamson 1988) for HIV negative African-American individuals (mean 14.7, SD 7.2), but lower ($t = -4.93^{***}$, $df 82$) than the norm for a population who is disabled or too ill to work (mean 19.9, SD 6.8). There was no significant difference between the mean score for perceived stress in the sub-study at interview and at baseline (mean 16.36, SD 7.36 vs. mean 17.55, SD 6.67; $t = -1.07$, $p = .29$, $df 153$) and the baseline PSS score of 79 participants of the subsample and the 177 participants of the LTS study (mean 17.55, SD 6.67 vs. mean 17.67, SD 7.04; $t = .13$, $p = .90$, $df 154$).

A recent literature review (Leserman 2003) on longitudinal studies presented evidence that depression and stress may be predictive of HIV disease progression. Part of the evidence was provided by the LTS study (Balbin et al. 1999, Ironson et al. under review i). Cumulative perceived stress was related to the slope of CD4 decline and viral load log over 2 years (Ironson et al. under review i). After a 3 year follow-up (Balbin et al. 1999) the parent LTS study found protective effects on health of life involvement, collaborative relationship with doctor, emotional expression, depression (conversely), and perceived stress (conversely). The 60 HIV positive participants with CD4 cells below $50/\mu\text{l}$, who were asymptomatic and were not on protease inhibitors at that time, so called healthy low CD4 counts (HLC) participants rated significantly lower perceived stress on the PSS and depression on the BDI than the HIV-positive comparison group.

In a sub-study of the LTS-study (Ironson et al. 2001) a group of 30 HLC participants, were compared to 60 HIV positive participants with CD4 cells between 150-400 cells/ μl who never had AIDS category C symptoms and 33 healthy community controls. The HLC participants and were significantly higher than the comparison group of HIV positive individuals on cytotoxicity and number of natural killer (NK) cells, and there were no differences between NK cell cytotoxicity and number between the HLC group and the healthy community control group, suggesting that NK cells may be a factor protecting the health of PWHA (Ironson et al. 2001).

Further evidence that NK cells might have a role in suppressing HIV and thus have clinical significance is provided by Leserman et al. (2002) from the Coping in Health and Illness Project (CHIP), a study of 96 initially asymptomatic HIV-infected homosexual men followed-up every 6 months for up to 9 years. The CHIP found that higher average cumulative stressful events were

predictive of faster progression to AIDS. For every one severe stress per 6-month study interval, the risk of early disease stage change was doubled. The AIDS progression rate at the end of 8 years for those above the median in stress during the 9 years was 74%, compared with 40% for those below the median. An earlier analysis of the CHIP cohort showed that especially in the presence of severe stress (as indicated by cumulative stressful life-events), depressive symptoms (measured by a modified Hamilton Depression Rating Scale excluding potentially HIV-related symptoms) were related to declines in several lymphocyte subsets (e.g., CD16⁺ and CD56⁺, NK cells, and CD8⁺ cytotoxic-suppressor cells) over a 2-year period (Leserman et al. 1997).

b) Potential biological mediators between stress and HIV-disease progression

NK cells are one of the immune variables for which there is strong evidence for a connection with stress response (Herbert & Cohen 1993). The potential biological mechanisms mediating the relationship between stress and HIV disease progression are still unclear and most HIV literature to date has focused on the autonomic nervous system (ANS) and the neuroendocrine pathway (e.g., increases in adrenocorticotropin-releasing hormone and cortisol) as possible mediators (Leserman 2003). In response to stress or other stimuli there is an increased ANS activity, which in vitro has been demonstrated to enhance HIV viral replication and viral gene expression (Cole et al. 1998). A US study in 21 HIV-positive homosexual men (Cole et al. 2001) measured baseline ANS activity (e.g., systolic blood pressure, skin conductance, electrocardiogram interbeat interval) before initiating ART. Patients with higher baseline ANS activity experienced poorer suppression of plasma viral load and poorer CD4⁺ T cell recovery over 3-11 months of therapy. In another study Cole et al. (2003) assessed social inhibition and autonomic nervous system (ANS) activity in 54 homosexual men with asymptomatic HIV infection over 12–18 months. Socially inhibited individuals had elevated levels of ANS activity. Elevated ANS activity was also associated with an eight-fold heightened viral load set-point and impaired response to initiation of HAART. Individual differences in ANS activity accounted for 64%–92% of the association between social inhibition and HIV pathogenesis, consistent with a possible role in mediating inhibition-related health risks.

There are several pathways by which cortisol could mediate the stress immune response. In vitro studies suggest that cortisol stimulates HIV viral replication (Corley 1996). Summarizing the results of five retrospective and prospective clinical studies Christeff et al. (1977) reported that serum cortisol levels were significantly greater in HIV-positive than in HIV-negative men (especially during later stages) and CD4 cell counts were negatively associated with serum cortisol and positively related to serum dehydroepiandrosterone (DHEA). A study of Cruess et al.

(1999) examined the effects of a 10-week cognitive-behavioral stress management (CBSM) intervention on the ratio of cortisol to DHEA in a randomized controlled trial in HIV positive men. The 43 men in the intervention group had less increase in the cortisol/DHEA ratio compared with a wait-list group of 24 men. Changes in the cortisol/DHEA ratio were significantly positively related to changes in total mood disturbance and perceived stress over time. The findings of Cruess et al. (1999, 2002) suggest that CBSM intervention can buffer against decrements in the cortisol/DHEA ratio and that alterations in potential neuroendocrinological mediators of HIV disease progression move in concert with changes in mood and distress observed during CBSM. Interventions to reduce stress will be further discussed in the third section of the discussion in the models to improve quality of life in PWHA.

3. The qualitative and quantitative part of the study: Models of decision-making about treatment, quality of decision-making and quality of life

The third section of the discussion will be dedicated to three questions

- Which model of decision-making is best for PWHA? **(aim 5, aim 10)**
- What can doctors do to improve the quality of decision-making in PWHA? (aim 10)
- What can doctors do to improve the quality of life in PWHA? **(aim 10)**

3.1. Which model of decision-making about treatment is best? (aim 5, aim 10)

First of all it has to be noted that the models of decision making about treatment as introduced by Charles et al. (1999) include two different dimensions: levels of patient's participation and patient's level of information. In reality these are two different things that should rather be separated (Degner et al. 1997 i). However the concept of the models of decision-making about treatment has been widely accepted in the literature on medical decision-making (Büchi et al. 2000, Charles et al. 1997, 1999, Frosch & Kaplan 1999, Towle & Godolphin 1999, Coulter 2002).

a) The paternalistic models of decision-making about ART

Figure 118 (p. 324) summarizes the advantages and disadvantages of the paternalistic models vs. shared decision-making/informed choice models from the qualitative and quantitative parts of this study.

Although the participants in the paternalistic models reported fewer symptoms of HIV/AIDS in the interview, this has to be questioned. There were no significant differences in category B or C symptoms on the Physical Symptoms Checklist and no significant differences in symptoms of HIV/ART on the checklist of the ACTG adherence questionnaire comparing the paternalistic models vs. shared decision-making/informed choice models. Rating the interviews it appeared that participants in the paternalistic model did not have much knowledge about the symptoms of HIV and the side effects of ART. As symptoms of HIV/AIDS were underreported in the interviews compared to the checklists, it may be that participants in the paternalistic models lacked knowledge of symptoms of HIV/AIDS but being asked specifically with a checklist assisted them in reporting their symptoms. In other words, perhaps participants in the paternalistic models did not have less symptoms, but less knowledge of symptoms and were less likely to report symptoms if they were asked with an interview.

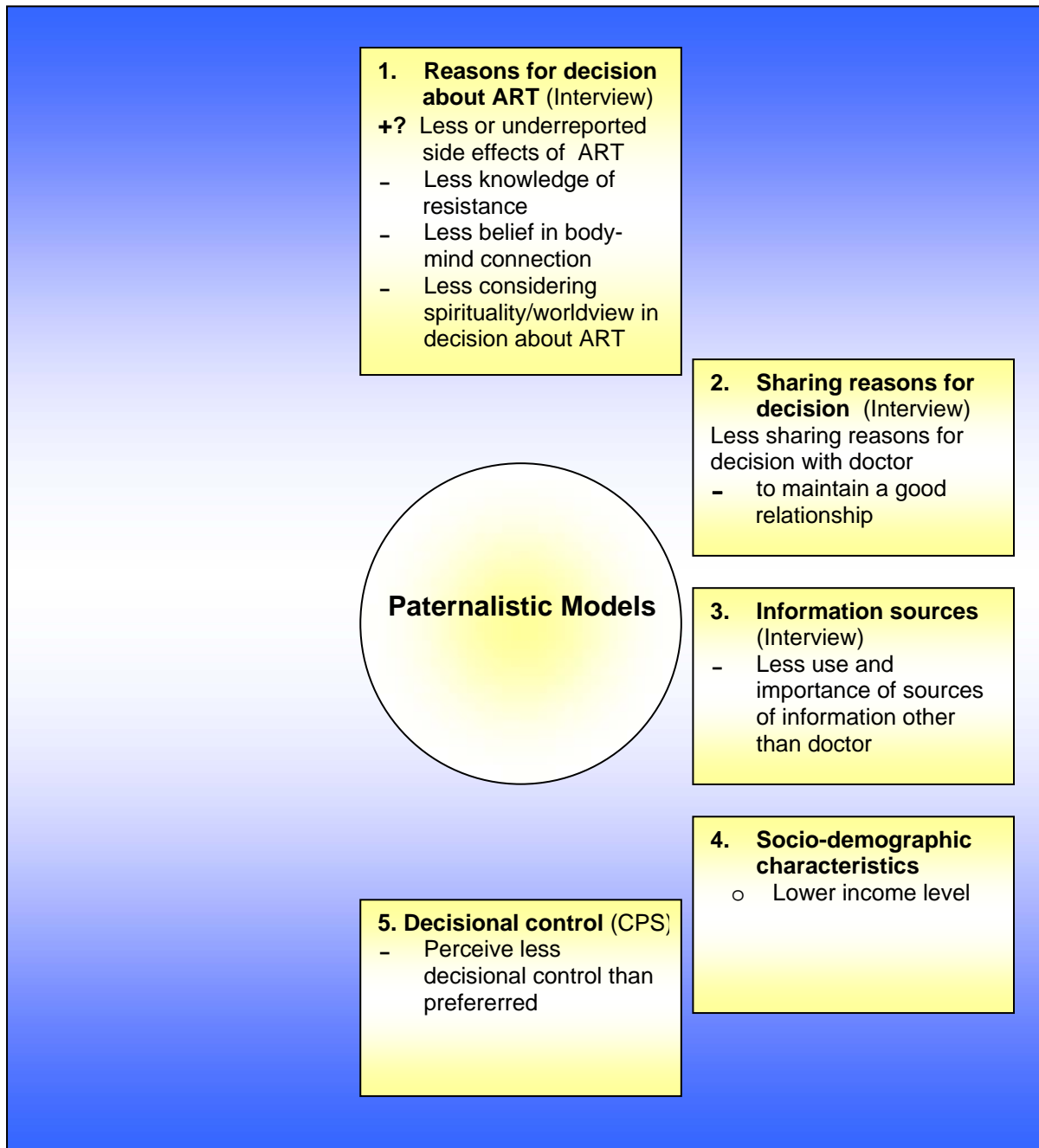


Figure 118: Paternalistic models (pure/intermediate): Overview of all significant differences comparing the paternalistic models (n=23) vs. shared decision-making/informed choice models (n=56) from the qualitative and quantitative parts of this study: Advantages (+), disadvantages (-), and neutral characteristics (o) of the paternalistic models.

In comparison to the other models participants in the paternalistic models had less knowledge about resistance, demonstrating patients' needs for treatment information were not met in the paternalistic models compared to the other models. Additionally patients knew less about body-mind connection, and considered their spirituality or worldview less in the decision about ART. The pure paternalistic but not the intermediate paternalistic model was also associated with more and more frequent treatment interruptions without informing the doctor (so-called drug holidays). The paternalistic model, particularly in its pure form, is definitely not the best model of decision-making about treatment, as participants often do not tell their doctors that they stopped taking ART, as they feel it is not that important for them to keep up a good relationship. Participants lacked knowledge about treatment and did not seek information outside the doctor's office. Neither patient's needs for information nor patient's needs for participation in decision-making were met in the paternalistic model.

Long ago research in other chronic diseases pinpointed the disadvantages of the paternalistic models of decision-making about treatment: the seminal work of Kaplan et al. (1987) documented improved clinical parameters in diabetes and hypertension as a result of informing patients and involving them actively in decision-making.

In summary, doctors should take active steps to meet patient's needs for information and try to encourage patients involvement in decision-making about treatment, respecting if they want to play a more passive role. Box 4 includes suggestions for doctors practicing a paternalistic model of to better meet patients' needs for information and involvement in decision-making about ART.

Box 4: Avoiding the disadvantages of a paternalistic model of decision-making:

Practical suggestions for doctors

- Explain symptoms of HIV and side effects of ART in a language that is easy to understand.
- Use checklists to examine symptoms of HIV and side effects of ART.
- Explain the reason for adherence in a language the patient understands and check if the patient has an understanding of the consequences of drug-holidays and resistance.
- Ask patients during every visit how they feel about their decision about ART and schedule regular visits to emphasize that you want to maintain a good relationship.
- Provide patients information with on HIV-treatment and mind-body medicine.
- Offer access to Internet, seminars and literature to patients with a low income level.
- Foster patients contact with peer educators and/or HIV-support groups.
- Assess and meet patient's preferences for participation in decision-making and empower patients to play a more active role in decision-making about treatment.

b) The model of shared decision-making about ART

Figure 119 (p. 327) summarizes the advantages and disadvantages of the shared decision-making model vs. the paternalistic/informed choice models from the qualitative and quantitative parts of this study.

There are many aspects suggesting that the shared decision-making model is best. The only disadvantage was the higher incidence of symptoms of peripheral neuropathy that might be explained by the fact that patients in the shared decision-making model were more likely to take ART continuously over the past year and thus were more likely to develop this common side effect of ART. There was no difference in the incidence of other side effects related to ART reported in the interviews and in the symptom checklist of the ACTG adherence questionnaire between participants in the shared decision-making model and the other models. However, in the shared decision-making model participants tolerated side effects better than in the other models. The results of this study are supported by other studies which found evidence that balanced information about risks and benefits in shared-decision-making about treatment is useful in making a treatment decision which is consistent with patient's preferences about risks and benefits of treatment (Barry et al. 1995, Coulter 2002).

The fact that participants in the shared decision-making model were more likely to take ART and to stick to their decision over the past year gives evidence that the decision to take ART was sounder in the shared decision-making model compared to the other models. Analyzing interviews in 50 PWHA Bader et al. (2002, under review) reported similar findings that a decision to take ART based on a shared decision-making model was more stable during critical life events, whereas treatment interruptions during critical life events were exclusively found in participants who decided to take ART based on a paternalistic model of decision-making.

In contrast to other models the standard of care regarding resistance testing was best met in the shared decision-making model. Against expectation participants in the shared decision-making model rated best on knowledge of resistance, demonstrating that patient's needs for information about resistance were best met in the shared decision-making model compared to other models. The doctor was the most important source of information in the shared decision-making model, but participants also were seeking more information from other people not living with HIV (including other medical expert's opinion) compared to participants in other models. This data gives evidence that the information provided by the doctor is a key to the informed patient.

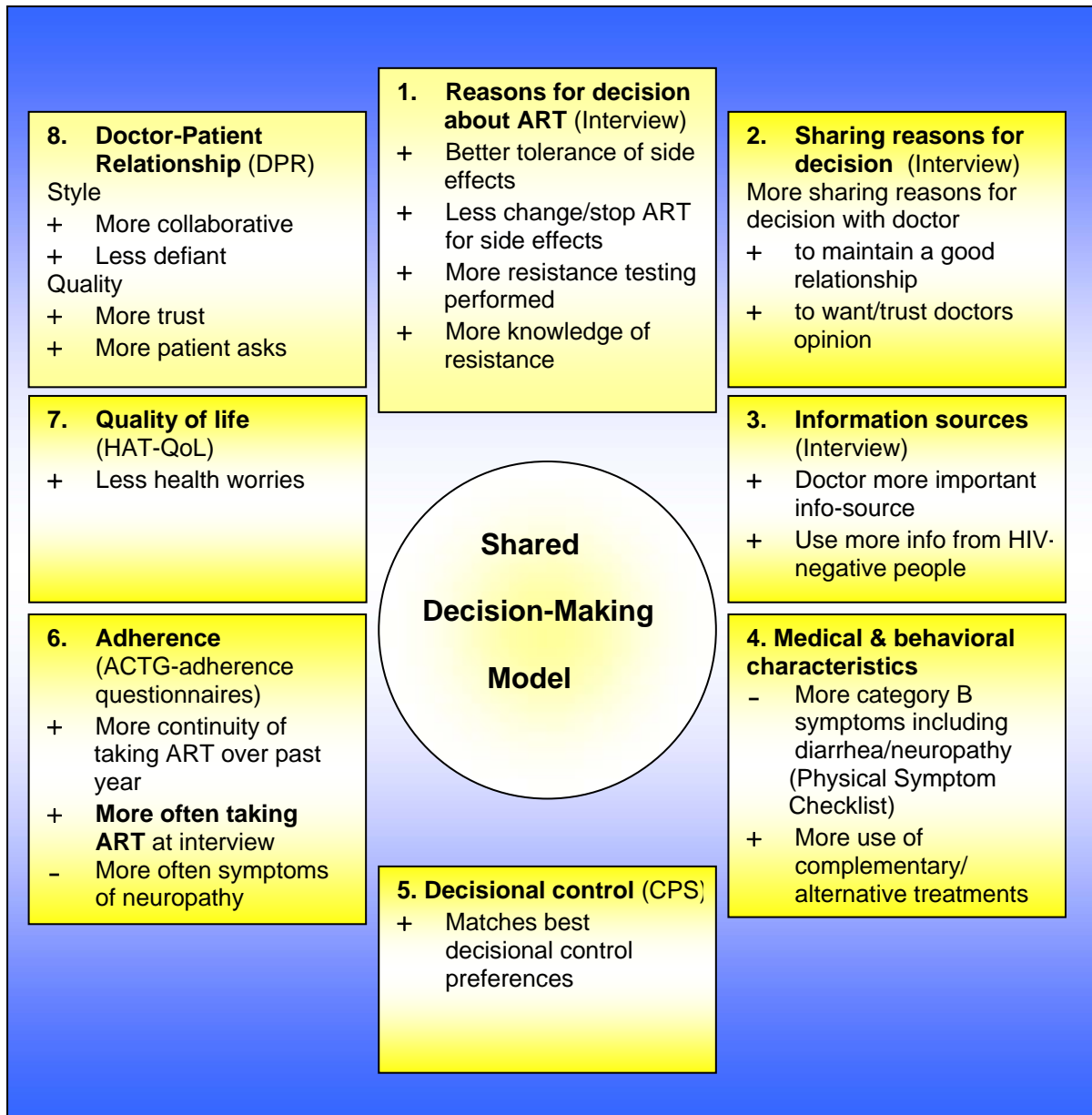


Figure 119: Shared decision-making model: Overview of all significant characteristics comparing the shared decision-making model (n=28) vs. paternalistic/informed choice models (n=51) from the qualitative and quantitative parts of this study: Advantages (+), and disadvantages (-) of the shared decision-making model.

There were several indicators that patient-doctor relationship was best in the shared decision-making model in contrast to the other models. They had a more collaborative and less defiant style of DPR, which was one characteristic of long-term survivors in the parent LTS study (Ironson et al. under review). The qualities patient ask and trust were more predominant in the shared decision-making model compared to the other models. Sharing the reasons for the decision about ART because of trust in doctor's opinion and maintaining a good relationship was another indicator of patients trusting their doctors more in the shared decision-making model than in the other models. Thus promoting shared decision-making might have the potential to establish trust in the patient-doctor relationship, which is one dimension of quality of life that PWhA consider as important (Holmes & Shea 1998).

Although overall shared decision-making was not associated with a better quality of life in this study it also has to be noted that participants in the shared decision-making model reported significantly less health worries. This is consistent with other small studies in Germany in 50 PWhA (Bader et al. 2002, under review) and a Canadian randomized controlled trial of a shared decision-making program in 240 ambulatory patients with ischemic heart disease (Morgan et al. 2000) who could not find a significant relationship between shared decision-making and quality of life. However, better tolerance of side effects of ART and better persistence with the choice to take ART, better collaboration and trust doctor-patient-relationship in conjunction with fewer health worries as a dimension of quality of life in the shared decision-making model compared to the other models suggest that in the long-term shared decision-making may be associated with a better quality of life. Further longitudinal studies are required to examine the relationship between shared decision-making about treatment and quality of life. This study provides evidence that shared decision-making is the model of decision-making about ART that meets best patients preferred role in decision-making as well as patients needs for information. Box 5 summarizes suggestions for doctors to take advantage of the benefits of shared decision-making about ART.

Box 5: Using the advantages of shared decision-making about ART:**Practical suggestions for doctors**

- Discuss patient's view of potential side effects of ART and patients tolerance of the side effects.
- Set up common goals when treatment should be changed or stopped for side effects.
- Explain the purpose of resistance testing to all patients and offer resistance testing to all patients who need a resistance test (according to DHSS Guidelines (2003) patients with a viral load > 1000 copies/ μ l after 16-24 weeks of ART).
- Establish a trustful collaborative relationship, so that patients feel free to ask and share their health and treatment worries and their values about treatment options.
- Provide information about treatment options, including the option not to take ART, in an unbiased way (also supporting patients seeking other medical expert's opinion).
- Discuss complementary and alternative treatment options with your patients.
- Assess patients preferred role in decision-making and meet patients preferences for an active role in decision-making.

c) The informed choice models of decision-making about ART

Figure 120 (p. 331) summarizes advantages and disadvantages of the informed choice models vs. the paternalistic/ shared decision-making models from the qualitative and quantitative parts of this study.

The informed choice model is based on a division of labor: The decision-making step is the sole prerogative of the patient; information transfer is seen as the key responsibility and only legitimate contribution of the doctor to the decision-making process (Charles et al. 1999). Assuming patients are accurately informed, they should not be persuaded to change their mind (Charles et al. 1999). The informed choice model is based on the assumption that information empowers the patient to become an autonomous decision-maker (Charles et al. 1997). If the paternalistic model leaves the patient outside the decision-making process, the informed choice model leaves the doctor outside by limiting the role of the doctor to being an agent of information transfer (Charles et al. 1997). However, in this study the idea of the doctor providing patients the information they need to make an autonomous decision did not translate into patient's information seeking behavior. In the informed choice model patients considered the information of the doctor as less important and made less use of it compared to the other models, indicating that the doctor was not the person meeting the information needs of participants in the informed choice model. Participants in informed choice model were also less knowledgeable about resistance compared to participants in the shared-decision-making model, but more knowledgeable compared to participants in the paternalistic models.

It is important to note that in this study the perception for making an autonomous choice about ART was not associated with increased knowledge of resistance but with increased anticipation of side effects and the decision not to take ART. The participants stopping ART felt forced to make their decision alone, anticipating the doctor would not support their decision, whereas the ART naïve patients preferred and perceived an informed choice model. Whereas patient's preferences for autonomy in decision-making were met in ART naïve participants, participants interrupting treatment had less desire for autonomy but did not have the relationship with their doctors enabling them to make a shared decision.

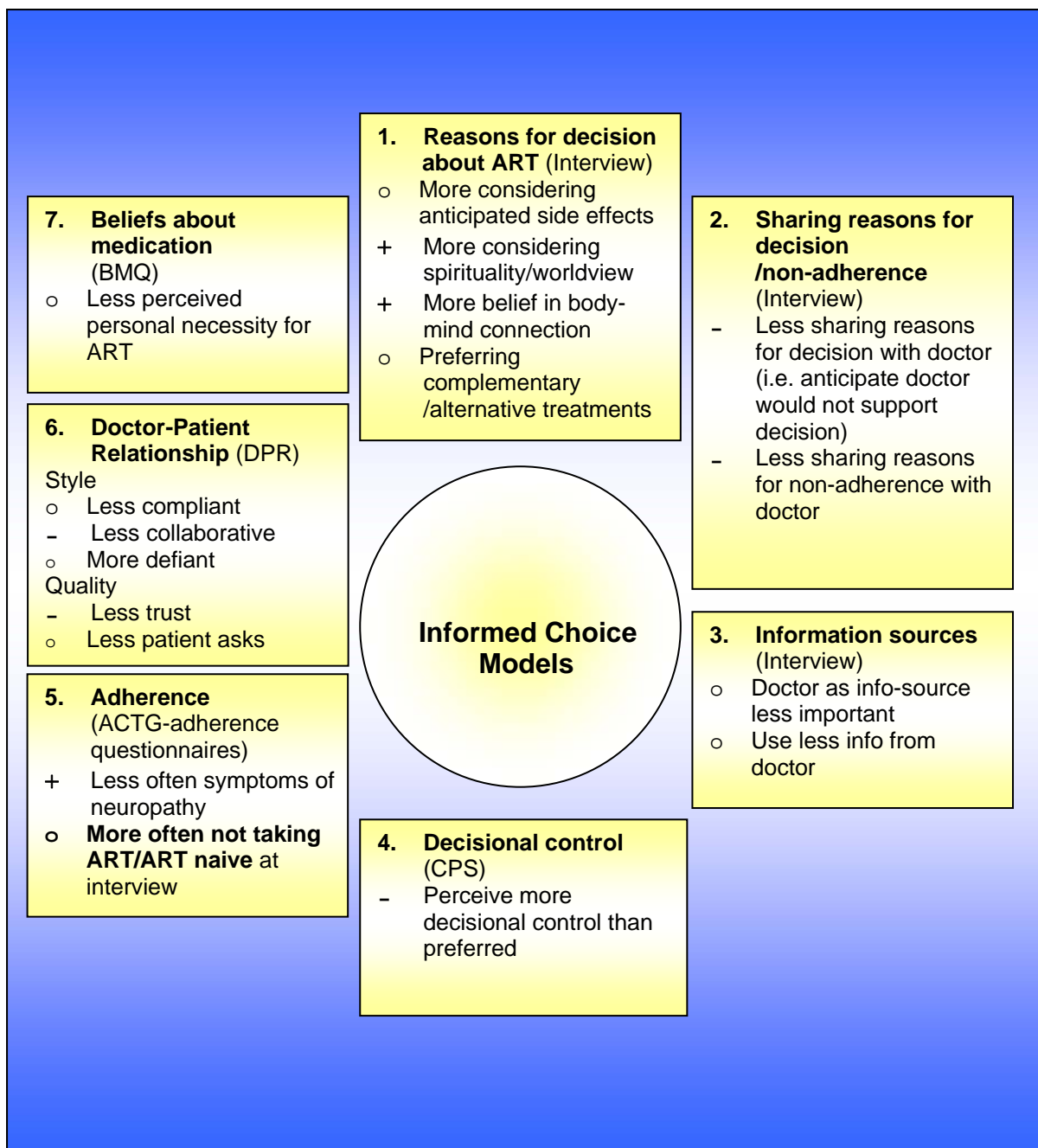


Figure 120: Informed choice models (pure/intermediate): Overview of all significant characteristics comparing the informed choice models (n=28) vs. paternalistic/shared decision-making models (n=51) from the qualitative and quantitative parts of this study: Advantages (+), disadvantages (-), and neutral characteristics (○) of the informed choice models.

The main disadvantages of the informed choice models were anchored in the patient-doctor relationship, characterized by less trust, less collaboration, and poor communication, including patient's not sharing the reasons for not taking or not adhering to ART. The quality *patient asks* in the DPR, which was less prominent in the informed choice models compared to other models, refers to the patients asking questions of and expressing concerns and problems that are obstacles to adherence with the doctor (Ironson et al. under review). The defiant patients making an autonomous choice not to take ART not wanting to discuss the decision with their doctor seem to challenge the patient doctor relationship. This accounts particularly for the informed choice in its pure form, which was significantly associated with treatment interruptions without telling the doctor, potentially jeopardizing future treatment options.

A German study (Kremer et al. 2004) examined the interaction between 8 physicians and 11 patients making an autonomous choice to forgo ART. Three doctors reported that they tried to put pressure on their patients to take ART. The 6 patients who felt that their doctor was trying to coerce them to take ART were unsatisfied with the interaction with their doctor, whereas the 5 patients who did not perceive their doctors as coercive were satisfied with the interaction with their doctors. Poor communication with the doctor is the single most important predictor of patient dissatisfaction with the doctor (Roter 1983)

In the decision to decline ART it appears that patients preferring shared decision-making perceive assuming more decisional autonomy than preferred due to a poor patient-doctor relationship. In this study results indicated that for some participants the lack of a good relationship with their doctors, rather than a lot of knowledge about treatment and a preference for autonomy were the reasons why they perceived an informed choice model.

The concept of the informed choice assumes a knowledgeable patient who prefers to make an autonomous choice about treatment (Charles et al. 1999). Overall in this study 22 (28%) of 79 participants (51 men and 28 women) wanted to make a decision about ART themselves. There is evidence from a US survey of Kaplan et al. (2002) in 131 ambulatory care patients (91 women and 40 men) that increased level of autonomy (Individuation-Attachment Questionnaire) and increased knowledge of an imagined disease (prostate cancer for men and breast cancer for women) was associated with a preference for an informed choice model in women but not in men. Kaplan et al. (2002) indicated that for women, autonomy was most important in predicting preference for an informed choice model when knowledge of the disease is low or moderate. Likewise, knowledge of the disease was most important for predicting preference for an informed choice model when autonomy was

low. These results and evidence reviewing the literature (Degner et al. 1997 i) suggest that meeting patient's desires for information and desires for involvement in decision-making are separate goals which should not be confounded in the models of medical decision-making about treatment. It is important to acknowledge, that most, but not all patients prefer shared decision-making and that patient's desire for active involvement in decision-making may be distinct from patients needs for information (Degner et al. 1997i, 1997 ii). Kravitz & Melnikow (2001) point out that the desire for information is nearly universal; most patients want to see the road map, including alternative routes, even if they want to take over the wheel. However, in other cultures (e.g. eastern civilization) this is not universally true.

There were several advantageous differences between patients perceiving the informed choice model vs. other models. The patients in the informed choice model were characterized as individuals with a strong belief that his or her mind can control the course of the HIV infection. Patients feel that they play a powerful role in the process of healing. Weighing benefits against the potential side effects of ART they perceived less necessity to take ART. Preferring complementary/alternative medicine, they made a decision not to take ART, which was more in line with their body-mind belief, spirituality or worldview. The informed choice model compared to the other models did not translate into a better quality of life but at least less symptoms of peripheral neuropathy compared to other models.

In the informed choice model a good patient-doctor relationship is a possibility, which is often missed. Ideally the doctor will support patient's belief in body-mind connection, and address his worldview and spiritual beliefs about HIV and its treatment options. Considering patients role as an active participant in the healing process doctors should provide the patient with the environment and guidance for greater empowerment, authenticity, and transformation. Ideally the doctor will understand and address the cause of illness with the apperception that illness is not random and plays a powerful role as a teaching agent (Faraclas 2003). Acting in cooperation with patient's body-mind belief doctor's relationship with the patient begins with a reverence for life, the purpose of life and what it means to be human (Faraclas 2003). Finding a new meaning as a result of the disease was one of the characteristics of long-term survivors with HIV (Solomon 2000). The patient in the informed choice model, the autonomous and knowledgeable patient using one's belief in body-mind connection and spirituality as a tool in healing might be the ideal candidate for healthy long-term survival with HIV. Again longitudinal research is required to assess the dynamics of quantity and quality of life in PWHA and matching models of decision-making about treatment to PWHAs preferences for information and participation in decision-making.

However, patients preferring a shared decision-making model should not perceive an informed choice model due to a poor doctor-patient relationship. Rather the informed choice model requires a knowledgeable and autonomous patient. Box 6 includes practical suggestions for doctors to foster patients' autonomy and knowledge making an informed choice about ART.

Box 6: Fostering patients informed choice about ART:

Practical suggestions for doctors

- Use patient's belief in body-mind connection, spirituality and worldview as a tool in the healing process.
- Explain potential risks and benefits for the patients and respect patient's treatment preferences; but refrain from being judgmental if a patient rejects ART.
- Respect patient's decision not to take ART so that patients feel comfortable to share the personal reasons for the decision not to take or not to adhere to ART.
- Strive to establish a trusting and collaborative relationship with the patient.
- Assess which information patients consider useful in decision-making about ART and provide information about treatment options, including the option not to take ART, in an unbiased way.
- Assess patient's preferred decisional role and meet patient's preferred level of autonomy.

3.2. How can doctors improve the quality of decision-making in PWHA? (aim 10)

As the constant revisions in treatment guidelines point out, the decision about ART is a difficult and complicated choice. Treatment choices are value-laden and therefore cannot be judged as “right” or “wrong” (O'Connor 1995). In situations where there is no “right” decision and where the long-term consequences are uncertain, to measure the quality of a decision it seems necessary to focus on the quality of the procedures within the process itself of making the decision, rather than only its outcome (Janis & Mann 1977). Observing the lack of instruments to evaluate the quality of decision-making O'Connor (1995) developed the GDSCS to measure decisional conflict. The decisional conflict construct contains three underlying dimensions:

- Uncertainty,
- three factors contributing to uncertainty (i.e., feeling uninformed, unclear about values, unsupported),
- and the perception of the quality of decision-making (O'Connor 1995).

This instrument has been widely used to evaluate the needs and the effectiveness of decisional support tools (O'Connor et al. 2003). So far little is known about the needs for decisional support in PWHA and this study was the first study applying the GDSCS in PWHA. A new clinical decision support tool for HIV is in process at the Johns Hopkins University (under development).

The model to improve the quality of decision-making in PWHA was built out of the variables examined in this study. In this study six variables were significantly associated with decisional conflict:

- Symptoms of HIV/ART
- Concerns about ART
- Depression
- Perceived Stress
- Doctor informs (inversely)
- Meeting patients preferences for shared decision-making

3.2.1. Improving the quality of decision-making by reducing symptoms of HIV/ART, depression, concerns about ART and perceived stress

The results were that the relationship between decisional conflict and symptoms of HIV/ART and depression was mediated by perceived stress and concerns about ART. Thus strategies to manage stress such as cognitive behavioral stress management (CBSM) are not only important reducing perceived stress and depression to improve long-term survival (Leserman 2003), but also in view of enhancing the quality of decision-making and reducing decisional

conflict. Addressing concerns about ART (Walsh et al. 2001) and managing symptoms of ART is not solely salient to improve adherence to ART, but also plays a pertinent role in the quality of the decision-making process.

3.2.2. Improving the quality of decision-making by providing information and reducing stress

In the patient-doctor relationship the quality doctor informs, as indicated by the DPR, may have the potential to buffer perceived stress, which in turn was related to the quality of decision-making. This quality of the DPR includes the doctors clear communication and explanations to the patient, implying a respectful way of explaining (i.e., rather discussing with the patient rather than telling the patient about side effects) (Ironson et al. under review). It appears that the way doctors provide information to patients is a useful tool to improve the quality of decision-making and to reduce decisional conflict.

3.2.3. Improving the quality of decision-making by meeting patients preferences for shared decision-making

Also, a relationship was found between patients perceiving less involvement than preferred in decision-making and increased decisional conflict, particularly if patients decided to take ART or if patients preferred shared decision-making. Thus it is important to meet patient's preferences for shared decision-making to improve the quality of decision-making. Asking patients how much they want to be engaged in decision-making about treatment is a foundation to meet patients preferred level of active involvement. Box 7 summarizes suggestions for doctors to improve the quality of decision-making and reducing decisional conflict in PWHA.

Box 7: Improving quality of decision-making and reducing decisional conflict:

Practical suggestions for doctors

- Assess, address and manage symptoms related to HIV and its treatment.
- Ask patients about their personal concerns about ART and discuss options to reduce the concerns.
- Recognize depression and offer comprehensive treatment for depression.
- Ask patients if they are able to relax, offering access to psychosocial therapies if needed.
- Communicate clearly with patients, assess patients understanding of what has transpired, discussing rather than telling patients about their treatment options.
- Ask patients how much they want to be engaged in decision-making about treatment and strive to formulate a negotiated treatment plan involving patients' active participation.

3.3. How can doctors improve the quality of life in PWHA? (aim 10)

The availability and efficacy of ART has prolonged the quantity of life and consequently, the impact of HIV on the quality of life has emerged as a key issue for PWHA. The ultimate goal for treatment is not merely to promote longevity but also to enhance the quality of life (Douaihy & Singh 2001). Although quality of life assessment is relevant to the measurement of treatment outcomes, assessment of quality of life is currently not included in the treatment guidelines in the US (DHSS Guidelines 2003) or Europe (Euroguidelines 2003) or of the International AIDS Society (Yeni et al. 2002). Quality of life in a clinical setting includes those dimensions of life directly affected by the overall state of health and is often referred to as health-related quality of life (Douaihy & Singh 2001). In the development of the HAT-QoL Holmes & Shea (1998) pointed out that existing instruments to measure quality of life have tended to be insufficiently comprehensive for PWHA driven mostly by researchers beliefs about the quality of life in HIV infection than from provided by PWHA themselves. Reviewing prior quality of life assessments in HIV/AIDS Berzon & Lenderking (1998) pointed out that some important areas of content were still not being addressed, such as sexual functioning, life satisfaction, mastery of control over life, illness satisfaction, disclosure worries, financial concerns, which have been included in the HAT-QoL (Holmes & Shea 1998). From their work Cohen et al. (1996) have added spirituality to the list and the importance of spirituality in decision-making about ART in this study supports this suggestion. However, it is challenging to measure the impact of HIV on quality of life as scales mainly have been developed with white middle- or upper-class male homosexuals in mind and the development of instruments that are sensitive to gender, ethnicity and socio-economic status should be considered (Douaihy & Singh 2001, Skevington & O'Connell 2003),

In this study quality of life was assessed with the HAT-QoL supplemented with scales with better psychometric properties for trust in patient-doctor relationship (DPR) and personal concerns about ART (BMQ). Six variables were found to be significantly associated with a negative impact on quality of life as indicated by the HAT-QoL:

- Symptoms of HIV/ART
- Depression
- Perceived stress
- Doctor availability (inversely)
- Decisional conflict
- More reasons for non-adherence in PWHA taking ART

3.3.1. Treating depression and symptoms of HIV/ART to improve quality of life

The results of this study indicated that there was a strong overlap between the constructs of the instruments measuring quality of life, depression and symptoms of HIV/ART, which was previously pointed out by Katz et al. (1996). This finding is supported by a literature review on factors affecting quality of life in PWHA (Douaihy & Singh 2001) highlighted that presence of symptoms (physical manifestations of HIV/AIDS and side effects of antiretroviral therapy) and depression had a strong impact on all measured dimensions of quality of life. Improving quality of life in PWHA through symptom control and treatment of depression therefore, represents an important area of therapeutic intervention. EUROVIHTA (Bock et al. 1998, pp. 177-181, Hautzinger et al. 1999), a European project carried out at the University of Tuebingen, is one of the few studies that intervened on both, depression and quality of life. EUROVIHTA is a group program to enhance the quality of life in 200 PWHA assessing the efficacy of a 16 week cognitive-behavioral group psychotherapy on changes in depression (BDI), anxiety (State/Trait Anxiety Inventory) coping strategies ('Trierer Skalen zur Krankheitsbewältigung' [Trier Scales on Coping with Physical Illness]), health locus of control ('Fragebogen zur Erhebung von Kontrollüberzeugungen zu Krankheit und Gesundheit' [questionnaire about locus of control in health and illness Questionnaire]), psychological symptoms (Symptom Checklist-90-R), physical health (checklist of physical symptoms according to the CDC-criteria for HIV/AIDS, surrogate markers) and quality of life (MOS-HIV QoL). Measurements were taken at four times before, during and after the intervention. The intervention demonstrated in 39 participants an improvement in depression and anxiety, which persisted after the 3-month follow-up period, suggesting long-lasting efficacy of structured cognitive-behavioral group psychotherapy (Blanch et al. 2002). In 78 PWHA the intervention demonstrated statistically significant intervention effects for quality of life, coping and depression scores in the directions desired against baseline scores (Escobar-Prinzón et al. 2000, Escobar-Prinzón 2000).

3.3.2. Reducing decisional conflict and being available for patients buffers stress and improves quality of life

The relationship between a better quality of life and doctor availability and reduced decisional conflict was mediated by a reduction of perceived stress. Thus the quality of the process of decision-making (reduction of decisional conflict) and the quality doctor availability (which also includes spending time with patients and listening to their concerns (Ironson et al. under review)) are indirectly related to a better treatment outcome in terms of quality of life. Perceived stress is a mediator variable enhancing quality of life. A good doctor patient relationship (Ironson et al. under review) and quality of decision-making (O'Connor & Jacobsen 2003) may buffer stress.

3.3.3. Psychosocial interventions, social support, spirituality, effective coping patterns and physical exercise reduce stress and improve quality of life

There is evidence for efficacy of cognitive stress management in reducing depression and perceived stress, and enhancing immune function (Antoni et al. 2002, Cruess et al. 1999, 2000, 2002). Reviewing the literature on the relationship between perceived stress and quality of life, Douaihy & Singh (2001) point out the important contributions of social support, spirituality and effective coping patterns in reducing stress and improving quality of life.

In the CHIP study Leserman et al. (1999) demonstrated that more stressful life events and less social support may accelerate the development of AIDS symptoms. At 5.5 years, the probability of developing symptoms of AIDS was about two to three times as high among those above the median on stress or below the median on social support compared with those below the median on stress or above the median on support. In another US study Swindells et al. (1999) followed 138 PWHA longitudinally and found that satisfaction with social support, regardless with the source of that support and problem-focused coping were significantly with a better quality of life ($p < .05$), whereas hopelessness measured with the Beck Hopelessness Scale was correlated with a decline in quality of life over time ($r = .64$ $p < .0001$).

Further, spirituality among PWHA was perceived as a bridge between hopelessness and meaningfulness in life (Ironson & Schneiderman 2002, pp 139-159, Eller 1999, Guillory et al. 1998, Hall 1998). Several studies found a relationship between spirituality and lower reported levels of distress in PWHA (Ironson et al. 2002, Woods et al. 1999 i, 1999 ii). Creating meaning and purpose in life more than religious experiences was found to correlate with psychological well-being in a sample of 117 African American men and women with HIV/AIDS (Coleman & Holzemer 1999). Patients with HIV infection have reported a strong will to live and believed that their quality of life with HIV infection was better than it was before the diagnosis (Tsevat et al. 1999, Williams et al. 1991). In this study 32 (40%) of the 79 participants had a depression score which was lower than usual, indicating either a potential denial of depression (Groth-Marnath 1990, pp. 102-104) or being less depressed than the usual HIV negative population.

Woods & Ironson (1999) found that PWHA appear to use spirituality in coping with their illness through increasing self-efficacy in giving them courage or knowledge of how to heal, giving them optimism, helping them cope and relax. Ironson et al. (2002) examined 279 PWHA, Woods et al. examined 106 HIV positive homosexual men (1999 i) and 33 HIV positive African American women (1999 ii), and both found that religious coping (e.g., placing trust in God, seeking comfort in religion) was significantly associated with lower scores for depression on the BDI.

Most studies investigating the relationship between copings with stress in PWHA found that active coping (i.e., taking constructive steps to deal with one's problems may slow HIV disease progression (Ironson & Schneiderman 2002, pp 139-159). PWHA who confronted stress with problem-solving and behavior-modifying approaches had a significantly better quality of life than those using emotion focused or avoidant coping (Swindells et al. 1999). Further, a cognitive-behavioral intervention program in the European multicenter intervention study EUROVIHTA has proven efficiency to enhance psychological and physical wellbeing and to support participants' coping with HIV in 117 PWHA (Bock et al. 2003).

LaPerriere et al. (1997) proposed a heuristic immunomodulatory-effects model showing how moderate physical exercise could attenuate the immunosuppressive effects of psychological stress. A German study of Royas et al. (2003) compared an exercise training group of 19 PWHA (2 women, 17 men) with a control group of 14 PWHA (8 women, 6 men) prior to and following the intervention on several outcome variables, including health related quality of life, psychological well-being (depression, anxiety, global symptoms), immune parameters, and cardiopulmonary parameters. The exercise group experienced a significant improvement in cardiopulmonary fitness, and health related quality of life improved significantly in that group relative to the control group.

In summary, reducing stress, facilitating access to psychosocial interventions and spiritual support enhancing the patient's effectiveness in coping with stress, such as developing strategies to reduce decisional conflict, fostering communication with the doctor and with a social support system, and increasing self-efficacy may potentially result in higher quality of life outcomes.

3.3.4. Improving adherence to ART improves quality of life

In this study, for those PWHA taking ART, better adherence was significantly related to better quality of life (i.e., life satisfaction, health worries, overall functioning) and fewer concerns about ART and higher perceived necessity for ART in the BMQ. Another cross-sectional study in Miami also found a correlation between self-reported adherence measured with the ACTG questionnaire and two dimensions of the HAT-QoL: overall functioning and medication worries ($p < .01$) (Penedo et al. 2003). The Swiss HIV Cohort Study (Zinkernagel et al. 1999) describes that adherence to ART affects quality of life: initially, after starting ART, there is a short-term decline in quality of life, which was reversed with the discontinuation of the medication responsible for the changes, followed by long-term improved quality of life. Thus intervention to improve adherence in PWHA taking ART may relate in higher quality of life outcomes.

Box 8 summarizes suggestions for doctors improving the quality of life in PWHA.

Box 8: Improving quality of life in PWHA:

Practical suggestions for doctors

- Assess, address and manage symptoms related to HIV and its treatment.
- Recognize depression and offer comprehensive treatment for depression.
- Offer patients access to psychosocial interventions, spiritual and social support, and physical exercise training to enhance their effectiveness in coping with stress.
- Assess decisional conflict and develop strategies to reduce decisional conflict.
- Be available for your patients and spend time listening to their concerns.
- Assess, address and manage reasons for non-adherence to ART.

4. Limitations of this study

Because this was a cross-sectional study, the associations which were found between variables have to be considered as correlations and may not be causal. Due to the combined qualitative and quantitative nature of the study the sample size was relatively small, but it is a relatively large sample size for a qualitative study. Particularly there was not enough statistical power to examine medical decision-making in participants who do not prefer shared decision-making about treatment.

This data may not be representative for PWHA in the US and there may be several biases. Initially, active drug-users, people with other life-threatening diseases or active psychosis were excluded from entry into the LTS study in 1997. It has to be noted that the incidence of hepatitis B and C is lower than expected in the HIV positive population, as participants were excluded from entry into the parent LTS study if they had taken street drugs during the last month. Further, all participants who were not physically well enough to visit the location of our research center were excluded from this sub-study so that we do not learn about the reasoning in decision-making in this population. Phone interviews revealed that some people in advanced disease stages discontinued ART and often had difficulties in decision-making about ART because they no longer had the desire to continue living under their condition. Thus there may be a bias in the results towards better health, a better quality of life, lower decisional conflict and less depression in this study population.

Interpreting the data for the reasons for decision-making, it is important to consider the possible effects of cognitive dissonance and self-perception (Albarracín & Wyer 2000), since the interviews were conducted after the participants had made their decision to maintain, change, restart, and stop or not to start treatment. Also, patients who have already implemented a choice usually have low decisional conflict (O'Connor & Jacobsen 2003), which might be another reason explaining the low decisional conflict in this study.

All participants were recruited within the Miami area, which means that most of them were seen by HIV-specialists. This may be a possible explanation why most patients reported a good patient-doctor relationship, because they knew, they were being treated by experts. In rural areas with lack of HIV specialized doctors there might be a different picture. It might also be that the new instrument measuring patient-doctor relationship needs to be refined to discriminate between different levels of trust and communication, as almost all patients rated high on the qualities trust, doctor informs and patient asks on the DPR.

The study is based on self-reports of adherence with the known unreliability of self-reports of adherence and the bias towards better adherence (Golin et al. 2002). There might be different correlations between the variables of this study using a composite measurement of adherence.

The participants volunteering to participate in the parent LTS study may have had a special interest in learning about the psychosocial factors for long-term survival with HIV and thus there also may be a bias in favor of body-mind belief.

5. Implications of this study for future research, treatment guidelines, and clinical practice

5.1. Directions for future research

While the findings of the present study are correlational, longitudinal research in representative populations is needed to establish the generalizability and causality of findings of this study. It might be of interest to develop a questionnaire to measure the criteria relevant in decision-making about ART for PWHA in larger studies. There is need for an instrument assessing patient's treatment knowledge. The psychometric properties of the new instrument measuring doctor-patient relationship may need to be refined to discriminate better between different qualities of trust and communication between patients and doctors. The HAT-QoL may need to be improved on the scales trust, medication concerns and sexual function and adapted for the use in women, and people with various cultural and socioeconomic backgrounds. Adherence should be assessed using a composite measurement, rather than self-reports.

Instruments measuring PWHA's criteria for decision, treatment knowledge, decisional role preferences and perceptions, decisional conflict, adherence, patient-doctor relationship, depression, perceived stress, coping with stress, spirituality and quality of life should be included in longitudinal studies. Further, intervention studies are needed that could test the effect of interventions such as decisional support tools, peer education, HIV support groups, psychosocial therapies, spiritual support, mind-body medicine, and strategies to improve adherence on longevity and quality of life of PWHA. The multicentric European Research Project EUROVIHTA of Hautzinger et al. (1999) and the work of Ironson et al. (2000, 2001, 2002, 2002i, 2004) are important steps in this direction.

5.2. Implications of the study for treatment guidelines

Although a small number of representatives of the community of PWHA in the revisions of the DHSS Guidelines, the guidelines still do not reflect the criteria which are important in view of PWHA in decision-making about ART. Fostering increased participation of PWHA (including women and African Americans living with HIV) in the panel of treatment guidelines, may ensure that future treatment guidelines incorporate the views of PWHA. Compared to the decision-making rationale of current treatment guidelines the decision-making rationale of PWHA is far more complex, including body-mind belief, spirituality/worldview, preference and use of CAM beyond the medical aspects of the decision such as surrogate markers, quality of life, side effects of ART, adherence and resistance. The main overall implication for treatment guidelines is that in decision-making about ART, PWHA do not want to be reduced to their HIV-disease, they want to be seen as whole persons, which includes their individual beliefs about health, medicine, spirituality, and the world.

5.3. Implications of this study for clinical practice

This study pursued ten aims resulting in practical suggestions for doctors, which are summarized in box 1-8. Regarding the decision about ART (**aim 1**) and the reasons for the decision (**aim 2**), doctors should not treat a patient as a disease, but treat them as a whole person, using the individual beliefs about health, medicine, spirituality, and the world as a tool in the healing process. In communication with patients about their reasons for the decision about ART and their reasons for non-adherence (**aim 3**), doctors can contribute by respecting patients choice to refuse ART and creating a non-judgmental, respectful atmosphere where the patients feel comfortable sharing their personal view. The important message for clinical practice is that doctors and publications (particularly positive magazines) are the main and most important source of information for PHWA (**aim 4**). Although this study did not investigate what was actually transpired between patients and doctors, patient's deficits in information were obvious, suggesting that doctors need to take active steps improving information transfer to their patients. The models of medical decision-making (**aim 5, aim 10**) confound patients need for information with their need for involvement in decision-making. Patients need for information is universal; however most, but not all patients want to play an active role in decision-making. Doctors need to meet both patients' needs for information and active involvement in decision-making. Asking patients about their preferred role in decision-making (**aim 6**) is the foundation to meet and foster their desire for active involvement, hopefully negotiating a treatment plan both agree upon and act on. The doctor also plays a key role in resolving decisional conflict and improving the quality of decision-making (**aim 7, aim 10**) by addressing patient's symptoms of HIV/ART, concerns about ART, depression and perceived stress. However patient's involvement in decision-making and

satisfaction with the process of decision-making does not relate necessarily to better adherence. As adherence to ART (**aim 8**) is a key to longevity and quality of life in PWHA, doctors should apply health team strategies to improve adherence and assess, address and manage patient's reasons for non-adherence. The doctor matters in improving the quantity and quality of life (**aim 9, aim 10**) in people living with HIV by being available, establishing a trustful collaborative relationship, reducing uncertainty in decision-making (providing information, clarifying patients values, supporting patients in their decision), and alleviating perceived stress, depression and symptoms of HIV and ART. Thus supporting the individual's ability to take an active role in the process of health, offering a way to learn how to better assist the body in healing, to perceive a sense of power and control over living with HIV is important in the treatment of PWHA. In conclusion, this study implicates for clinical practice that PWHA should not just be offered ART; they should also be offered support to play an active part in contributing to their health.

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VI. Acknowledgements

First, I wanted to thank all the PWHA for their faithful participation in the LTS-Study. I wanted to thank the pharmaceutical companies Glaxo-Smith-Kline and Gilead for funding this sub-study and the National Institute of Health for financially supporting the LTS-study. My further thanks go to my Professors Gail Ironson M.D., Ph.D. and Martin Hautzinger Ph.D. for their continuous advice, inspirations and patience in accompanying me through this project. I want to thank Annie George M.A. for performing interviews during my absence, Andreina Sala and Anna Schnuerer for assisting with transcriptions of the interviews, Emily Stieren, who assisted in making the dataset compatible with the longitudinal parent-study for future research, Karim Alarakhia, Tariq Seyed, Nick Brimo and Kelly Detz for double data entry, and Anna Schnuerer, Professor Gail Ironson, Annie George, Nick Brimo, Tariq Seyed and Haydee Pereda for all the sessions they spend coding the interviews with me. Last not least my thanks go to my husband Gholamali Gholamnejad and my children for all their sacrifices during my involvement in this project. This thesis is in memory to all my friends who died from AIDS inspiring me to learn how to live with HIV and AIDS.

VII. Appendix

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Kremer & Ironson Medical Decision-Making Sub-Study Interview

- 1.) Over the last year you have decided to
- maintain your HIV-therapy, taking _____
 - change your HIV-therapy, taking _____
 ___ months before you were taking _____
 - restart your HIV-therapy, taking _____
 ___ months you did not take HIV-therapy.
 - initiate your first HIV-therapy ___ months ago, taking _____
 - not to start HIV-therapy

a) Why did you make this decision? (Probe for CD4-cells, viral load, adherence, resistance, quality of life, side effects, symptoms of HIV-disease, did your spiritual beliefs play a role, do you pray for not to have side effects of the medication?)

b) Did you share this information with your doctor? **Yes** **No** (Why/Why not?)

c) Which sources of information did you use to make your present treatment decision? (Probe for the following categories and ask to rate on 5-point scale).

	very little				very much
	1	2	3	4	5
Doctor	1	2	3	4	5
Other PLWH (which?)	1	2	3	4	5
<input type="checkbox"/> HIV-positive friends					
<input type="checkbox"/> peer educator					
<input type="checkbox"/> HIV-positive partner					
<input type="checkbox"/> Other _____					
Other people (which?)	1	2	3	4	5
<input type="checkbox"/> Other medical expert					
<input type="checkbox"/> Naturopath, nutritionist, acupuncturist					
<input type="checkbox"/> HIV-negative friend					
<input type="checkbox"/> HIV-negative partner					
<input type="checkbox"/> HIV-negative family member					
Other information sources (which?)	1	2	3	4	5
<input type="checkbox"/> Positive magazines					
<input type="checkbox"/> Expert magazines					
<input type="checkbox"/> Drug advertising (pamphlets)					
<input type="checkbox"/> Internet					
<input type="checkbox"/> Conferences, seminars, symposia etc.					

d.) **How important was the decision for you?**

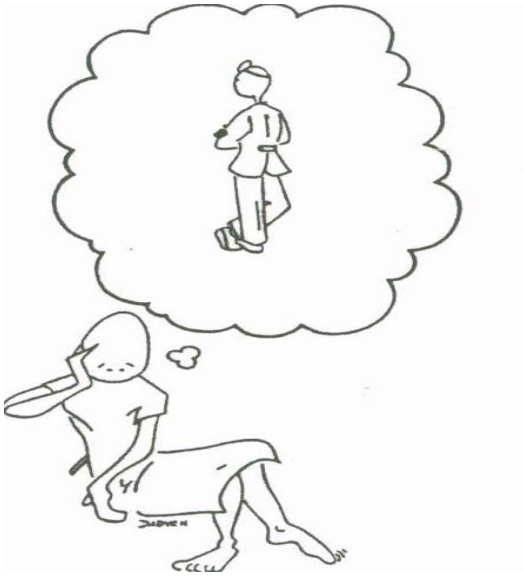
	very little				very much
	1	2	3	4	5

2.) You have told me, that you missed your medication ...(refer to the ACTG--adherence questionnaire, if applicable).

a) Are there other reasons for not taking your medication? **Yes** **No** If yes, which:

b) Did you share this information with your doctor? **Yes** **No** (Why/Why not?)

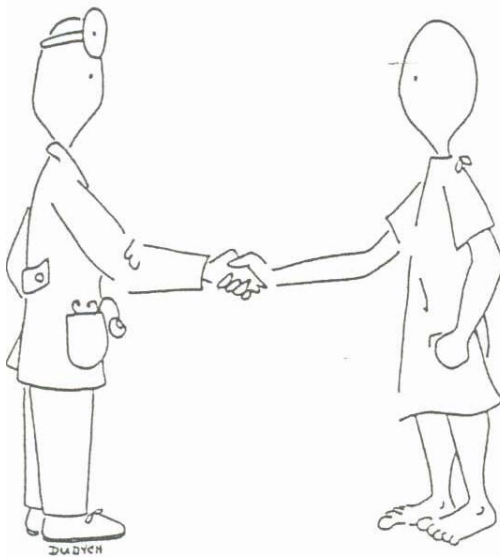
The Control Preferences Card Set ¹



Active Role:

- A. I prefer to make the decision about which treatment I will receive.

- B. I prefer to make the final decision about my treatment after seriously considering my doctors opinion.



Collaborative Role:

- C. I prefer that my doctor and I share responsibility for deciding which treatment is best for me.



Passive Role:

- D. I prefer that my doctor makes the final decision about which treatment will be used, but seriously considers my opinion.

- E. I prefer to leave all decisions regarding treatment to my doctor.

¹ The cartoons are 3 of the 5 that represent different roles in decision making (card A-E), depicting the cards **A**, **C**, and **E** (© Degner).

Kremer & Ironson Medical Decision-Making Sub-Study

Subject No: _____

Time point: _____

Generic Decisional Conflict Scale

My difficulty making this choice about HIV treatment

Now, thinking about the choice you just made about HIV treatment, please look at the following comments made by people when making decisions.

Please show how strongly you agree or disagree with these statements by circling the number from 1 (strongly agree) to 5 (strongly disagree), which best shows how you feel about the choice you just made.

1. This decision is easy for me to make	1 Strongly Agree	2 Agree	3 Neither Agree Nor Disagree	4 Disagree	5 Strongly Disagree
2. I'm sure what to do in this decision	1 Strongly Agree	2 Agree	3 Neither Agree Nor Disagree	4 Disagree	5 Strongly Disagree
3. It's clear what choice is best for me	1 Strongly Agree	2 Agree	3 Neither Agree Nor Disagree	4 Disagree	5 Strongly Disagree
4. I'm aware of the options I have in this decision	1 Strongly Agree	2 Agree	3 Neither Agree Nor Disagree	4 Disagree	5 Strongly Disagree
5. I feel I know pros of each option	1 Strongly Agree	2 Agree	3 Neither Agree Nor Disagree	4 Disagree	5 Strongly Disagree
6. I feel I know the cons of each option	1 Strongly Agree	2 Agree	3 Neither Agree Nor Disagree	4 Disagree	5 Strongly Disagree
7. I know <u>how important</u> the pros are to me in this decision	1 Strongly Agree	2 Agree	3 Neither Agree Nor Disagree	4 Disagree	5 Strongly Disagree

8. I know <u>how important</u> the cons are to me in this decision	1 Strongly Agree	2 Agree	3 Neither Agree Nor Disagree	4 Disagree	5 Strongly Disagree
9. I know which is more important to me (the pros or the cons)	1 Strongly Agree	2 Agree	3 Neither Agree Nor Disagree	4 Disagree	5 Strongly Disagree
10. I am making this choice without any pressure from others	1 Strongly Agree	2 Agree	3 Neither Agree Nor Disagree	4 Disagree	5 Strongly Disagree
11. I have the right amount of support from others in making this choice	1 Strongly Agree	2 Agree	3 Neither Agree Nor Disagree	4 Disagree	5 Strongly Disagree
12. I have <u>enough</u> advice about the options	1 Strongly Agree	2 Agree	3 Neither Agree Nor Disagree	4 Disagree	5 Strongly Disagree
13. I feel I have made an informed choice	1 Strongly Agree	2 Agree	3 Neither Agree Nor Disagree	4 Disagree	5 Strongly Disagree
14. My decision shows what is important to me	1 Strongly Agree	2 Agree	3 Neither Agree Nor Disagree	4 Disagree	5 Strongly Disagree
15. I expect to stick with my decision	1 Strongly Agree	2 Agree	3 Neither Agree Nor Disagree	4 Disagree	5 Strongly Disagree
16. I am satisfied with my decision	1 Strongly Agree	2 Agree	3 Neither Agree Nor Disagree	4 Disagree	5 Strongly Disagree

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University of Ottawa

ACTG Questionnaire for Adherence to Anti-HIV Medications (3 days)

Interviewer ___ ___

A. Are you currently taking any anti-HIV medications such as AZT or protease inhibitors?

No (if no: please skip to section G) Yes

If yes: Most people with HIV have many pills to take at different times during the day. Many people find it hard to always remember their pills:

- Some people get busy and forget to carry their pills with them
- Some people find it hard to take their pills according to the instructions, such as 'with food', 'on an empty stomach', 'every 8 hours'

Some people decide to skip pills to avoid side effects or to just not be taking pills that day. We need to understand how people with HIV are really doing with their pills. Please tell us what you are actually doing. Don't worry about telling us that you don't take your pills. We need to know what is really happening, not what you think 'we want to hear'.

B. Please complete step 1 - step 4

Step 1 Write in the names of your anti-HIV drugs on the lines below	Step 2 How many times per day are you supposed to take each drug?	Step 3 How many pills are you supposed to take each time you take this drug?	Step 4 Do you have any special instructions of the following to take this drug? Check all that apply
			<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
			<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
			<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
			<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
			<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
			<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions

C. The next section of the questionnaire asks about the anti HIV medications that you took over the last 3 days. Now, one day at a time, starting with **yesterday**, please fill in the boxes below.

Step 1 Write in the names of your anti-HIV drugs on the lines below	Step 2 How many pills did you skip taking yesterday?	Step 3 Where you off schedule - that is, late by one hour or more - in taking the drug? Check one	Step 4 Do you have any special instructions of the following to take this drug? Check all that apply
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions

Now, thinking about the **day before yesterday** (two days ago), please fill in the boxes below for each of your anti-HIV medications.

Step 1 Write in the names of your anti-HIV drugs on the lines below	Step 2 How many pills did you skip taking the day before yesterday?	Step 3 Where you off schedule - that is, late by one hour or more - in taking the drug? Check one	Step 4 Do you have any special instructions of the following to take this drug? Check all that apply
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions

Now, thinking about the **day before that** (three days ago), please fill in the boxes below for each of your anti-HIV medications.

Step 1 Write in the names of your anti-HIV drugs on the lines below	Step 2 How many pills did you skip taking the day before that (3 days ago)?	Step 3 Where you off schedule - that is, late by one hour or more - in taking the drug? Check one	Step 4 Do you have any special instructions of the following to take this drug? Check all that apply
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions
		<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable/ no strict schedule	<input type="checkbox"/> with food <input type="checkbox"/> empty stomach <input type="checkbox"/> drink plenty of fluids <input type="checkbox"/> no special instructions

D. Sometimes people with HIV have symptoms. Thinking about the last two weeks, how often did you have each of the following symptoms?

	Never	Rarely	Sometimes	Everyday
1. Fatigue, or loss of energy, that keeps you from doing the things you need or want to do.	0	1	2	3
2. Fever or high temperature	0	1	2	3
3. Loss of balance in walking or getting up from a chair or bed	0	1	2	3
4. Pain, numbness or tingling in the hands or feet	0	1	2	3
5. Trouble remembering so that you had to keep lists	0	1	2	3
6. Upset stomach or the feeling that you will vomit	0	1	2	3
7. Three or more runny bowel movements or episodes of diarrhea per day	0	1	2	3
8. Felt sad, down or depressed	0	1	2	3
9. Difficulty falling or staying asleep, or unusual daytime sleepiness	0	1	2	3
10. Skin problems, such as a rash, sores or dryness	0	1	2	3
11. Cough of any type or severity	0	1	2	3
12. Headache of any type or severity	0	1	2	3

E. Some people find that they forget to take their pills on the weekend days. Did you miss any of your anti-HIV medications last weekend—last Saturday or Sunday?

1 Yes 2 No

F. When was the last time you missed any of your medications? Check one.

- 5 Within the past week
- 4 1-2 weeks ago
- 3 2-4 weeks ago
- 2 1-3 months ago
- 1 More than 3 months ago
- 0 **Never skip medications or not applicable**

*If you **Never skip medications**, please go to **Section H** on page 5. Otherwise, please continue by answering the next set of questions.*

G. People may miss taking their medications for various reasons. Here is a list of possible reasons you may miss taking your medications. How often have you missed taking your medications because you: (Circle one response for each question.)

	Never	Rarely	Sometimes	Often
1. Were away from home?	0	1	2	3
2. Were busy with other things?	0	1	2	3
3. Simply forgot?	0	1	2	3
4. Had too many pills to take?	0	1	2	3
5. Wanted to avoid side effects?	0	1	2	3
6. Did not want others to notice you taking medication?	0	1	2	3
7. Had a change in daily routine?	0	1	2	3
8. Felt like the drug was toxic/harmful?	0	1	2	3
9. Fell asleep/slept through dose time?	0	1	2	3
10. Felt sick or ill?	0	1	2	3
11. Felt depressed/overwhelmed?	0	1	2	3
12. Had problems taking pills at specified times (with meals, on empty stomach, etc.)?	0	1	2	3
13. Ran out of pills?	0	1	2	3
14. Felt good?	0	1	2	3

HIV/AIDS-targeted QoL (HAT-QoL) Questionnaire

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Important Instructions:

The questions in this questionnaire ask how things are going in different areas of your life. Please answer all questions, even if you do not think they are relevant to you. Before starting to answer the question, however, there are two types of questions you need to know more about.

A. You will find some questions that ask about your job/routine daily activities. If you have a job, answer these questions thinking about your job. If you do not have a job, answer these questions thinking about the activities you usually do during most days of the week. Examples include housework, other sorts of chores, going to school or volunteering in an organization.

B. You will find some questions that ask about your doctor. If you usually see a nurse, a nurse practitioner or a physician's assistant, answer these questions thinking of this person rather than your doctor.

1. The following questions ask about your overall function in the past four weeks.

	All of the time	A lot of the time	Some of the time	A little of the time	None of the time
a. In the past 4 weeks, I have been satisfied with my physical activity.....	1	2	3	4	5
b. In the past 4 weeks, I have been physically limited in my ability to do routine household chores.....	1	2	3	4	5
c. In the past 4 weeks, pain has limited my ability to be physically active.....	1	2	3	4	5
d. In the past 4 weeks, I have been worried about not being able to do my job/routine daily activities as I have in the past.....	1	2	3	4	5
e. In the past 4 weeks, I have felt that having HIV has limited the amount of work I can do at my job/routine daily activities.....	1	2	3	4	5
f. In the past 4 weeks, I have been too tired to be socially active.....	1	2	3	4	5

2. The following questions ask about your life satisfaction in the past 4 weeks.

	All of the time	A lot of the time	Some of the time	A little of the time	None of the time
a. In the past 4 weeks, I have enjoyed living.....	1	2	3	4	5
b. In the past 4 weeks, I have felt in control of my life.....	1	2	3	4	5
c. In the past 4 weeks, I have been satisfied with how socially active I am.....	1	2	3	4	5
d. In the past 4 weeks, I have been pleased with how healthy I have been.....	1	2	3	4	5

3. The following questions ask about your health worries in the past 4 weeks.

	All of the time	A lot of the time	Some of the time	A little of the time	None of the time
a. In the past 4 weeks, I haven't been able to live the way I'd like to because I'm so worried about my health.....	1	2	3	4	5
b. In the past 4 weeks, I've been worried about my CD4 count.....	1	2	3	4	5
c. In the past 4 weeks, I've been worried about my viral load.....	1	2	3	4	5
d. In the past 4 weeks, I've been worried about when I'm going to die.....	1	2	3	4	5

4. The following questions ask about your financial worries in the past 4 weeks.

	All of the time	A lot of the time	Some of the time	A little of the time	None of the time
a. In the past 4 weeks, I have been worried about having to live on a fixed income.....	1	2	3	4	5
b. In the past 4 weeks, I have been worried about how to pay my bills.....	1	2	3	4	5
c. In the past 4 weeks, money has been too tight for me to care for myself the way I think I should.....	1	2	3	4	5

5. The following questions ask how you have felt about your HIV medications in the past 4 weeks.

Have you taken HIV medications in the past 4 weeks?

NO.....Go to section 6

YES.....Continue with question 5a

	All of the time	A lot of the time	Some of the time	A little of the time	None of the time
a. In the past 4 weeks, taking my medicine has been a burden.....	1	2	3	4	5
b. In the past 4 weeks, taking my medicine has made it hard to live a normal life.....	1	2	3	4	5
c. In the past 4 weeks, taking my medicine has caused unpleasant side effects.....	1	2	3	4	5
d. In the past 4 weeks, I've been worried about the effects my medicine may have on my body...	1	2	3	4	5
e. In the past 4 weeks, I've been unsure about why I'm taking medicine.....	1	2	3	4	5

6. The following questions ask how you have felt about being HIV positive in the past 4 weeks.

	All of the time	A lot of the time	Some of the time	A little of the time	None of the time
a. In the past 4 weeks, I have had regrets about the way I lived my life before knowing I had HIV.....	1	2	3	4	5
b. In the past 4 weeks, I have been angry about my past HIV risk behavior.....	1	2	3	4	5

7. The following questions ask about your disclosure worries in the past 4 weeks.

	All of the time	A lot of the time	Some of the time	A little of the time	None of the time
a. In the past 4 weeks, I've limited what I tell others about myself.....	1	2	3	4	5
b. In the past 4 weeks, I've been afraid to tell other people that I have HIV.....	1	2	3	4	5
c. In the past 4 weeks, I've been worried about my family members finding out that I have HIV.....	1	2	3	4	5
d. In the past 4 weeks, I've been worried about people at my job/routine daily activities finding out that I have HIV.....	1	2	3	4	5
e. In the past 4 weeks, I've been worried that I'll lose my source of income if other people find out that I have HIV.....	1	2	3	4	5

8. The following questions ask how you've felt about your doctor in the past 4 weeks.

	All Of the time	A lot of the time	Some of the time	A little of the time	None of the time
a. In the past 4 weeks, I've felt that I could my doctor whenever I needed to.....	1	2	3	4	5
b. In the past 4 weeks, I've felt that my doctor involves me in decision-making.....	1	2	3	4	5
c. In the past 4 weeks, I've felt that my doctor cares about me.....	1	2	3	4	5

9. The following questions ask about your sexual function in the past 4 weeks.

	All of the time	A lot of the time	Some of the time	A little of the time	None of the time
a. In the past 4 weeks, it's been difficult to get sexually aroused.....	1	2	3	4	5
b. In the past 4 weeks, I've had difficulty with orgasm.....	1	2	3	4	5

Supplemental question:

c. In the past 4 weeks, I have been interested in sex	1	2	3	4	5
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Doctor-Patient Relationship Questionnaire

For information on the questionnaire please contact the author

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YOUR VIEWS ABOUT ANTI-HIV MEDICATION

- We would like to ask you about your personal views about anti-HIV medication
- These are statements other people have made about their anti-HIV medication.
- Please show how much you agree or disagree with them by ticking the appropriate box.

**There are no right or wrong answers.
We are interested in your personal views**

	Views about ANTI HIV MEDICATION:	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
N1	My health, at present, depends on these medicines					
C1	Having to take these medicines worries me					
N2	My life would be impossible without these medicines					
C2	I sometimes worry about long-term effects of these medicines					
N3	Without these medicines I would be very ill					
C3	These medicines are a mystery to me					
N4	My health in the future will depend on these medicines					
C4	These medicines disrupt my life					
C5	I sometimes worry about becoming too dependent on these medicines					
N5	These medicines keep my HIV under control					
C6	These medicines give me unpleasant side effects					
C7	Using these medicines is embarrassing					
N6R	Missing this medication for a day won't matter in the long run					
N7	These medicines are my best hope for the future					
C8R	I am unlikely to get a bad side effect from this medication in the next month					
C9	Taking this medication has been much worse than expected					
C10R	I have received enough information about Anti HIV therapy					
N8	These medicines keep me alive					
C11R	The taste of this medication makes me feel unwell					

Perceived Stress Scale- 10 Item

Instructions: The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please indicate with a check how often you felt or thought a certain way.

1. In the last month, how often have you been upset because of something that happened unexpectedly?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

2. In the last month, how often have you felt that you were unable to control the important things in your life?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

3. In the last month, how often have you felt nervous and "stressed"?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

4. In the last month, how often have you felt confident about your ability to handle your personal problems?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

5. In the last month, how often have you felt that things were going your way?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

6. In the last month, how often have you found that you could not cope with all the things that you had to do?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

7. In the last month, how often have you been able to control irritations in your life?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

8. In the last month, how often have you felt that you were on top of things?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

9. In the last month, how often have you been angered because of things that were outside of your control?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

___0=never ___1=almost never ___2=sometimes ___3=fairly often ___4=very often

Subject No:

Beck Depression Inventory

In this questionnaire are groups of statements. Please read each group of statements carefully.

Then pick out the one statement in each group which best describes the way you have been feeling the past week including today! Circle the number beside the statement you picked. If several statements in the group seem to apply equally well, circle each one. Be sure to read all the statements in each group before making your choice

1. 0 I do not feel sad.
1 I feel sad.
2 I am sad all the time and can't snap out of it.
3 I am so sad or unhappy that I can't stand it.
2. 0 I am not particularly discouraged about the future.
1 I feel discouraged about the future.
2 I feel I have nothing to look forward to.
3 I feel that the future is hopeless and that things cannot improve.
3. 0 I do not feel like a failure.
1 I feel I have failed more than the average person.
2 As I look back on my life, all I can see is a lot of failures.
3 I feel I am a complete failure as a person.
4. 0 I get as much satisfaction out of things as I used to.
1 I don't enjoy things the way I used to.
2 I don't get real satisfaction out of anything anymore.
3 I am dissatisfied or bored with everything.
5. 0 I don't feel particularly guilty.
1 I feel guilty a good part of the time.
2 I feel quite guilty most of the time.
3 I feel guilty all of the time.
6. 0 I don't feel I am being punished.
1 I feel I may be punished.
2 I expect to be punished.
3 I feel I am being punished.
7. 0 I don't feel disappointed in myself.
1 I am disappointed in myself.
2 I am disgusted with myself.
3 I hate myself.
8. 0 I don't feel I am worse than anybody else.
1 I am critical of myself for my weaknesses or mistakes.
2 I blame myself all the time for my faults.
3 I blame myself for everything bad that happens.

9. 0 I don't have any thoughts of killing myself.
 1 I have thoughts of killing myself, but I would not carry them out.
 2 I would like to kill myself.
 3 I would kill myself if I had the chance.
10. 0 I don't cry any more than usual.
 1 I cry more now than I used to.
 2 I cry all the time now.
 3 I used to be able to cry, but now I can't even cry even though I want to.
11. 0 I am no more irritated by things than I ever am.
 1 I am slightly more irritated now than usual.
 2 I am quite annoyed or irritated a good deal of the time.
 3 I feel irritated all the time now.
12. 0 I have not lost interest in other people.
 1 I am less interested in other people than I used to be.
 2 I have lost most of my interest in other people.
 3 I have lost all of my interest in other people.
13. 0 I make decisions about as well as I ever could.
 1 I put off making decisions more than I used to.
 2 I have greater difficulty in making decisions than before.
 3 I can't make decisions at all anymore.
14. 0 I don't feel that I look any worse than I used to.
 1 I am worried that I am looking old or unattractive.
 2 I feel that there are permanent changes in my appearance that make me look unattractive.
 3 I believe that I look ugly.
15. 0 I can work about as well as before.
 1 It takes an extra effort to get started at doing something.
 2 I have to push myself very hard to do anything.
 3 I can't do any work at all.
16. 0 I can sleep as well as usual.
 1 I don't sleep as well as I used to.
 2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
 3 I wake up several hours earlier than I used to and cannot get back to sleep.
17. 0 I don't get tired more than usual.
 1 I get tired more easily than I used to.
 2 I get tired from doing almost anything.
 3 I am too tired to do anything.
18. 0 My appetite is no worse than usual.
 1 My appetite is not as good as it used to be.
 2 My appetite is much worse now.
 3 I have no appetite at all anymore.
19. 0 I haven't lost much weight, if any, lately.
 1 I have lost more than five pounds.
 2 I have lost more than ten pounds.
 3 I have lost more than fifteen pounds.

- 20 0 I am no more worried about my health than usual.
1 I am worried about physical problems such as aches or pains, or upset stomach, or constipation.
2 I am very worried about physical problems and it's hard to think of much else.
3 I am so worried about my physical problems that I cannot think about anything else.
21. 0 I have not noticed any recent change in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost interest in sex completely.

Classification of antiretroviral substances: Substance classes (bold), registered trademarks[®] and substance names (licensed/experimental) including substances prescribed to the study participants

Registered trademark [®] (alphabetical)	Substance name	Substances prescribed in study (alphabetical)	Registered trademarks [®] (Combination tablets containing substance)
Nucleoside/Nucleotide Analoge Reverse-Transkriptase-Inhibitoren (NRTIs)			
Combivir [®]	AZT+3TC	3TC	Epivir [®] (Combivir [®] /Trizivir [®])
Epivir [®]	3TC, Lamivudin		
HIVID [®]	DDC, Zalcitabin	Abacavir	Ziagen [®] (Trizivir [®])
Retrovir [®]	AZT, Zidovudin	AZT	Retrovir [®] (Combivir [®] /Trizivir [®])
Trizivir [®]	AZT+3TC+Abacavir		
Videx [®]	DDI, Didanosin	DDI	Videx [®]
Viread [®]	Tenofovir	D4T	Zerit [®]
Zerit [®]	D4T, Stavudin	Tenofovir	Viread [®]
Ziagen [®]	Abacavir		
Non-Nucleoside Analoge Reverse-Transkriptase-Inhibitoren (NNRTIs)			
Rescriptor [®]	Delavirdin	Delavirdin	Rescriptor [®]
Sustiva [®]	Efavirenz	Efavirenz	Sustiva [®]
Viramune [®]	Nevirapin	Nevirapin	Viramune [®]
Protease Inhibitoren (PIs)			
Agenerase [®]	Amprenavir	Amprenavir	Agenerase [®]
Crixivan [®]	Indinavir	Indinavir	Crixivan [®]
Fortovase [®]	Saquinavir-Softgel	Lopinavir	(Kaletra [®])
Invirase [®]	Saquinavir-Hardgel	Nelfinavir	Viracept [®]
Kaletra [®]	Lopinavir/Ritonavir	Ritonavir	Norvir [®] (Kaletra [®])
Norvir [®]	Ritonavir	Saquinavir	Invirase [®] /Fortovase [®]
Viracept [®]	Nelfinavir		
Experimental Treatments			
Substance class	Substance names (alphabetical)		Prescribed in study
NRTIs	DAPD, Emtricitabin,		
NNRTIs	Capravirin, DPC 083, Emivirin, GW420867X, TMC 125,		
PIs	Atazanavir, Fos-Amprenavir, GW433908, Mozenavir, Tipranavir		Atazanavir, GW433908,
Entry Inhibitors	AMD-3100, BMS-806, Integrase Inhibitoren, Pro-140, Pro-542, SCH-C, T-20, T-1249		T-20
Immune Therapies	Cyclosporin, G-CSF, GM-CSF, Hydroxyurea, Interferon, Interleukin-2, Interleukin-12, Mycophenol, Remune		Hydroxyurea