

The Quality of Life of HIV+ and HIV- people living in Elandsdoorn, South Africa

And the role of physical health, mental health
and coping strategies



Universiteit Utrecht



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Abstract

HIV/AIDS is a huge problem in South Africa; the country has the highest rate of HIV infected people in the world. With the introduction of *Highly Active Antiretroviral Therapy* (HAART), the life expectancy of people living with HIV/AIDS has been increased. As the survival of people living with HIV/AIDS has been increased and people living with HIV/AIDS do not die as a direct consequence of the disease, HIV/AIDS is now seen as a chronic disease. This change cases that the quality of life (QOL) of people living with HIV/AIDS has become an important focus for researchers and health care providers. Different concepts and findings explain the influence and impact of being HIV infected on the physical health and mental health, which influences the health related QOL. The current quantitative research explores the QOL of people living in Elandsdoorn, South Africa. The study takes into account the mental health, physical health and coping strategies (task-oriented coping, emotion-oriented coping and avoidance-oriented coping) and explores their relation with the QOL. Also explores the difference in QOL between HIV+ and HIV- people. Questionnaires were used to explore this at a group of 202 adults in the age group of 19 to 65 years (M=40), of which 198 participants (54 HIV+) joined the final sample. Based on the results, the conclusion can be made that, controlling for gender and age, both physical health and mental health are predictors of the QOL. The better the physical health and/or the mental health, the higher the QOL will be. Results show that coping strategies are mediating the influence of physical health and mental health on the QOL. When comparing the results of the HIV+ and HIV- population, it is seen that for the HIV- people, physical health, mental health and avoidance-oriented coping are influence the QOL. The more use of avoidance-oriented coping the higher the QOL will be. However, for the HIV+ people it is seen that the mental health of people with HIV+ does not influence the QOL. Also the QOL of the HIV+ population is mediated by almost all coping strategies. The more use of task-oriented coping strategy and the less use of emotion-oriented coping, the higher the QOL will be. Practically this means that new intervention programs should focus more on physical health and coping strategies to avoid a negative QOL outcome, and not so much on mental health. However, results of the study also show that not all theoretical distinctions described by previous research contribute to the explanation of whether the QOL of HIV- people does not differ much from the QOL of HIV+ people. Due to the limitations of the current study, future study can be focus on exploring additional aspects of the health related QOL that might be present in the current sample and theoretical distinctions that explain the relation between aspects of health and the difference in QOL between the HIV+ and HIV- population.

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The QOL of HIV+ and HIV- people living in Elandsdoorn, South Africa, and the role of physical health, mental health and coping strategies

The republic of South Africa struggles with a continuing HIV epidemic (Department of Health, 2012) as the country has the highest rate of HIV infected people in the world. HIV, The *Human Immunodeficiency Virus*, is a sexually transmitted infection, which can result in *acquired immunodeficiency syndrome* (AIDS) and eventually death. The late stages of the HIV infection are often referred to as HIV/AIDS. The estimate of HIV infected people in South Africa lies between the 6 million and 6,5 million (UNAIDS, 2013). This means that out of the 54 million people living in South Africa (Stats SA, 2014), circa 12% is infected with the HIV virus. Even though an increased number of people survive their illness and are able to live with their illness (Maurice, 2014), the HSRC Executive Director and Head of Biostatistics, Dr Khangelani Zuma, said in April 2014 that while the tide is turning against the disease, there is a concern over people who are still getting infected with the virus (Department of Health, 2014). This is because South Africa still has also the highest rate of new HIV-infections (Maurice, 2014). Before, in the early 1980s, the life expectancy of people infected with the virus was not long. However, with the introduction of Highly Active Antiretroviral Therapy (HAART) the life expectancy of people living with HIV/AIDS is increased. (Clayson, Wild, Quarterman, Duprat-Lomon, Kubin & Coons, 2006). HAART does not cure HIV and AIDS but it is a form of medication that aims to slow down the HIV virus and avoids it from growing. As the survival of patients with HIV/AIDS has been increased, the QOL has become an important focus for researchers and health care providers (Clayson, et al., 2006). An important question in all current HIV/AIDS evaluations is how the virus and related disease, medications and other treatment regimens affect QOL. Being HIV+ has an impact on the physical health, but has also an impact on the psychological well-being of the HIV+ population (Mak, Cheung, Law, Woo, Li & Chung, 2007). In order to assess the impact of being HIV+ on peoples' lives, the health-related QOL is a good indicator. The health-related QOL includes at least a person's physical, social, and cognitive (mental) functioning, and subjective sense of well-being (WHOQOL, 1995). In studying the effect of the physical health and mental health on the QOL, coping strategies are of importance. The reason for this is that according to several studies AIDS is increasingly considered a chronic disease. HIV/AIDS is now seen as a chronic disease as people living with HIV/AIDS are living longer and do not die as a direct consequence of the disease (Basavaraj, Navya & Rashmi, 2010; Clayson et al., 2006). This means that HIV+ people have to cope during a longer part of their life with a range of HIV-related symptoms and syndromes and possibly

other chronic diseases (Basavaraj et al., 2010; Halloran, 2006; Kassutto, Maghsoudi, Johnson, Robbins, Burgett, Sax, et al., 2006).

This study is performed at the Ndlovu Care Group (NCG), a not for profit organization operating in the Moutse area in Limpopo and Lillydale in Mpumalanga, in South Africa. The mission of NCG concerns improving the QOL of people living in the rural areas where Ndlovu Care Group is active. This implies all kinds of changes at the individual, family and community level by means of well-designed interventions. To establish the effect of these interventions, intervention research has to be carried out (Tempelman, H., Slabbert, M., Gosling, A., Vermeer, A., 2010). This research investigates among others the effect of physical health and mental health on the QOL of HIV+ and HIV- people, as well as whether coping strategies mediating the association between physical health and mental health and QOL. The study aims at understanding what coping strategies positively support dealing with physical and mental health in order to improve QOL of HIV infected people.

Theoretical framework

In this section the background and context of the research will be explained. A summary of the literature that will be used for the research, as well as the relevance of the literature will be discussed, concept-by-concept. The main concepts that are used in this research are QOL physical health, mental health and coping strategies. These concepts will be used to discuss possible explanations how physical health, mental health, and coping strategies may affect the QOL.

Quality of life

QOL is a broad concept that can be affected by many factors like political, medical or employment. For this research mainly the health related aspects of QOL will be taken into account, as the research will be done among people with and without HIV/AIDS, and how they perceive and experience their wellbeing. The definition of QOL that is used throughout this research is the definition according to the World Health Organization, which is: “Individuals’ perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, standards, expectations and concerns” (WHOQOL Group, 1995, 1405). “A number of factors interplay to influence QOL” (Bajunirwe, 2013, p. 55). The WHO divided the QOL into six different health-related domains: physical health, psychological, level of independence, social relationships, environment and spirituality/religion/personal beliefs (WHOQOL, 2002). QOL is seen as the development of well-being, and the way a person rates his or her wellbeing in society. According to the WHO, health is the condition when a person is in a complete social, physical and mental well-being (<http://who.int>). The physical well-being, which in this research will be called ‘physical health’, and the emotional wellbeing, which in this research will be called ‘mental health’, will affect the QOL.

An important question in all HIV/AIDS evaluations is how the virus and related disease affect the QOL (WHOQOL, 1995). When comparing the QOL of HIV+ and HIV- people it is seen that HIV+ people have lower QOL than HIV- people (WHOQOL-HIV Group, 2003). According to a literature review of determinants of QOL among HIV+ people in developed countries, factors such as gender, age, education, employment, income, depression and anxiety, social support, health care, stigma, smoking, alcohol use, drug use and life style can be associated with QOL (Degroote, Vogelaers & Vandijck, 2014). In the study of Sigstad, Stray-Pedersen & Froland (2005) a low QOL of adults with HIV+ is linked to unemployment and disease-related strains. The differences in QOL between the two groups

are the greatest relating to the physical health and the level of independence (Charles, Jeyaseelan, Pandian, Sam, Thenmozhi & Jayaseelan, 2012; O'Connell, K., Skevington, S., 2003; WHOQOL-HIV Group, 2003). According to Bajunirwe (2013), HIV+ people in the absence of treatment experience, besides physical and mental aspects, also deterioration in their general wellbeing and in all aspects of QOL. The QOL measures are increasingly being recognized as important when comparing the efficacy of AIDS therapies and assessing the impact of HIV/AIDS on peoples' lives (Bajunirwe, 2013; Charles, et al., 2012; WHOQOL, 1995). The reason for this is that through the introduction of HAART, the QOL of people with HIV+ has impressively improved (Bajunirwe, 2013). Scholars Mutabazi-Mwesigire, Katamba, Martin, Seeley & Wu (2015) state that the QOL of HIV+ people will improve over the time that they will be on treatment. However, according to Basavaraj, et al. (2010) people on treatment might still face problems that may affect the QOL. The problems that HIV+ people might still experience are often related to, for example, stigmas, poverty, depression and risky behavior. These problems have a negative effect on the QOL of HIV+ people, as it limits the capabilities to participate in daily life (Basavaraj, et al., 2010).

In conclusion, the QOL of HIV+ people and HIV- people can be affected by many factors. Overall, research shows that HIV+ people have poorer QOL compared to HIV- people (Bajunirwe, 2013; Basavaraj, et al., 2010; Charles, et al., 2012; O'Connell, et al., 2003; Sigstad, et al., 2005; WHOQOL-HIV Group, 2003).

Physical health

According to the Aids Clinical Trials Group (ACTG; 1999) aspects of physical health can be found in physical functioning, role functioning, pain and energy. Physical functioning refers to physical activities that can be performed without limitation due to good health. Role functioning refers to experienced health-related problems with work or other daily activities (ACTG, 1999). Pain refers to the experienced bodily pain and the degree of interference with normal activities due to pain (Ware, 1993). Energy refers to the feeling of being full energy or at the other hand, worn out all of the time (ACTG, 1999).

These physical health aspects can be measured between HIV+ and HIV- people, as both may experience the same physical problems, for example like feeling fatigued. However, fatigue is a non-specific symptom that has many possible causes. According to Grandy, Anderson & Chase (1998) it is an almost universal clinical complaint of HIV+ people. It is therefore important to investigate and know HIV-specific symptoms. Scholars Justice, Holmes, Gifford, Rabeneck, Zackin, Sinclair, et al. (2001) have identified symptoms that are common and/or bothersome in HIV infection across different studies. They report fatigue,

sadness, headache, runny nose, and difficulty sleeping as the five most common symptoms, reported in prior studies. Symptoms in general play a central role in peoples experiences of disease (Grandy, et al., 1998). Besides that, Kroenke & Price (1993) state that symptoms are the initial reason a patient presents for care. Above all, symptoms are a deterrent of the HIV+ people perceived health-related QOL (Cunningham, Shapiro, Hays, Dixon, Visscher, et al., 1998; Kroenke et al., 1993). Gas/bloating, hair loss and ‘changes in the way my body looks’ are found as symptoms that are experienced most by HIV+ people on treatment. Due to the increased use of multidrug therapies, it is important to determine whether the drug treatment or other medical therapies affects a person’s physical health (Justice, et al., 2001). The treatment can cause side effects that may impact the QOL. This strong association between HIV-specific symptoms and the health-related QOL is also seen in the study of Cleary, Fowler, Weissman, Massagli, Wilson, Seage, et al. (1993), who state that the more common the symptoms are getting experienced by HIV+ people, the lower the health-related QOL. Following Peltzer & Phaswana-Mafuya (2008), physical problems can influence daily life of HIV infected individuals. Scholars (Breitbart, McDonald, Rosenfeld, Monkman, Passik, 1998; Zinkernagel, Ledergerber, Battegay, Cone, Vernazza, Hirschel, 1999; Ferrando, Evans, Goggin, Sewel, Fishman, Rabkin, 1998) explain that many people living with HIV find it challenging to participate in physical activities and do not have sufficient energy and vitality. Zinkernagel, et al. (1999) states that the low energy is associated with both physical morbidity and poor QOL.

Having said this, it can be stated that everyone, despite HIV status, can suffer from physical health symptoms as described above. However, research shows that health related symptoms, that are HIV-specific are linked to a lower QOL (Breitbart, et al., 1998; Cleary, et al., 1993; Cunningham, et al., 1998; Ferrando, et al., 1998; Grandy, et al., 1998; Justice, et al., 2001; Kroeke, et al., 1993; Pletzer, et al., 2008; Zinkernagel, et al., 1999).

Mental health

The World Health Organization (WHO) defines mental health as a state of wellbeing in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community (2001a).

The used concepts and findings in this section of the research are focused on depression. The reason for this is because on the one hand depression is one of the most prevalent and treatable mental disorders (Kroenke, Spitzer, 2002). On the other hand, the

reason for focusing on depression is found in the link between depression and the QOL. In studies of patient and general populations it is seen that mood disorders, and in particular depression, have an important negative impact on a person's health related QOL (Haus, Wells, Sherbourne, Rogers, Spritzer, 1995; Wells, Sturm, Sherbourne, Meredith, 1996; Wells, Stewart, Hays, Burnam, Rogers, Daniels, et al., 1989). Also scholars Jia, Uphold, Wu, Reid, Findley & Duncan (2004) state that there is a relationship between depression and a lower QOL. Kroenke et al. (2002) finds that the higher the score on depression, the lower the score on multiple domains of health-related QOL (Kroenke et al., 2002). Scholars (Sewyn, Arnold, 1998; Voelker, 1997) make the relationship between depression and the QOL even more specific as they associate the presence of a major psychiatric disorder, such as depression, with a negative impact on the mental dimension of the QOL. In fact, "for most domains of functioning and well-being, depression is more debilitating than most medical conditions" (Sherbourne, Hays, Fleishman, Vitiello, Magruder, Bing, et al., 2014, p. 248).

When looking at the differences in the mental health of HIV+ and HIV- people, it is seen that psychiatric illnesses, such as depression, are more common for HIV+ people than for HIV- people (Sherbourne, et al., 2014). Correspondingly, a study of Israelski et al. (2007), shows that out of their participants who receive public healthcare, those patients with HIV/AIDS are likely to have high rates of acute and posttraumatic stress disorders and depression. A reason for this is that HIV infection is seen as a stressful life event (Dalmida, 2006; Jia, et al., 2004). According to Jia et al. (2004) it is widely accepted that people living with HIV are highly vulnerable to stress. As living with HIV/AIDS is seen as stressful, the number of HIV infected adults who are depressed is increasing (Gore-Felton, et al., 2006). A reason for this is that living with HIV places heavy demands on psychological resources that may overwhelm the HIV+ people, resulting in depression (Orlando, Tucker, Sherbourne, Burnam, 2005). Additionally, researchers Moneyham, Sowell, Seals and Demi (2000) state that depressive symptoms are a common response to HIV disease. They analyzed the impact of mental factors experienced by HIV+ people and also included the various measures of QOL in their analysis. Their conclusion is that there is a significant correlation between depressive symptoms, HIV symptoms and QOL. They found that the more a HIV infected person has to deal with depressive symptoms, the lower the QOL would be. It is seen that depression associated with the infection and/or disease significantly impacts the QOL of the people living HIV/AIDS (Jia, et al., 2004). The impact is negative, as the depression is associated with a decreased health-related QOL (Dalmida, 2006; Sherbourne, et al., 2014). Mental health or depression is therefore a major concern within the HIV population.

Treatment of depression in patients who are HIV+ may not prolong life but might lower the risk of suicide and improve their QOL (Basavaraj, et al., 2010).

In conclusion, major stress and depression related to a lower QOL are the key findings when it comes to mental health (Haus et al., 1995; Jia, et al., 2004; Kroenke et al., 2002; Sewyn et al., 1998; Sherbourne et al., 2014; Voelker, 1997; Wells et al., 1996, 1989). Especially when it comes to the mental health of HIV+ people, who are more vulnerable to stress and experiencing depression than HIV- people (Dalmida, 2006; Gore- Felton, et al., 2006; Israelski, et al., 2007; Jia, et al., 2004; Moneyham, et al., 2000; Orlando, et al., 2005; Sherbourne, et al., 2014).

Coping strategies

The definition of coping that is used in this research is drawn on the work of Lazarus and Folkman (1984), who define coping as ‘constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person’ (1984, 141). Ridder & Heck (2004) have divided coping in three different types in the Coping Inventory for Stressful Situations (CISS); task-oriented coping, emotion-oriented coping and avoidance-oriented coping (Endler, Parker, 1990). Task-oriented coping describes the task-oriented attempts, aimed at solving the problem, cognitive restructuring the problem, or changing the situation. Emotional-oriented coping describes the emotional reactions that have the purpose to reduce stress. However those reactions are not necessarily always successful. Emotional-oriented reactions are for example making reproach, becoming angry, or fantasize how the situation could change. Avoidance-oriented coping describes activities aiming at avoiding the stressful situation by searching for distraction or companionship (Endler, et al., 1990).

Coping styles play an important role in physical and psychological well-being. Aldwin & Revenson (1987) argue that coping strategies play a mediating role in dealing with confrontations with stressful situations and can affect health and wellbeing. Regarding the emotion-focused coping style, there is a strong correlation between emotion-focused coping and well-being (Endler et al., 1990). The research shows that a low emotion-focused coping style determines a poorer QOL. This correlation is also argued by Jia et al. (2004) who found that emotion-focused coping is significantly related to the patient’s reduced QOL. Regarding the avoidance-focused coping, several studies show that high use of avoidance-focused coping is associated with a lower QOL (Fleishman, et al., 2002; Jia, et al., 2004).

When looking at the differences between HIV+ and HIV- people, it is seen that scholars argue that HIV/Aids is nowadays seen as a chronic disease, which influences coping

strategies (Kassutto, Maghsoudi, Johnston, Robbins, Burgett, Sax, et al., 2006; Halloran, 2006). The study of Moneyham, Hennessy, Sowell, Demi, Seals, Mizuno (1998) examines the effectiveness of active (task-oriented coping and emotional-oriented coping) and passive (avoidance-oriented coping) coping strategies among women infected with HIV. Avoidance-focused coping is used as an indicator of passive coping. Findings show that passive coping has a negative influence on physical health. However, the researchers argue that avoidance-focused coping will decrease and active coping will increase as physical symptoms increase. Besides that, the physical symptoms and emotional distress are positively and significantly related. Participants who report greater use of avoidance coping also report greater distress, more anxiety and depression. Scholars (Schmitz, Crystal, 2000; Fleishman, Sherbourne, Crystal, Collins, Marshall, Kelly, et al., 2000) state that a person infected with HIV who increases the use of avoidance-focused coping may have poorer physical functioning and a higher risk to experience stress. The relation between avoidance-focused coping and depression is not solitary seen in a HIV+ population. The study of Lesserman, Perkins, and Evans (1992) compares HIV+ and HIV- groups and found that participants in both groups who were using more passive coping strategies also reported more depressive symptoms. The relationship between mental health, QOL and copings abilities is also shown in the study of Gore-Felton et al. (2006). The study shows that the use of adaptive coping strategies used by persons living with HIV/AIDS were related to the psychological dimension of the QOL, as the use of adaptive coping strategies were an important predictor of depression. The research of Jia, H., et al. (2004) assesses the effects of coping, as well as the direct and indirect effects through depression, on health-related QOL among men infected with HIV. The scholars find that coping has total effect on the health-related QOL, mainly through the intermediate variable depression. They also find that passive coping, or avoidance coping are related to increased depressive mood. These depressive symptoms have a significant and negative direct effect on every aspect on the QOL.

In sum, coping strategies do play a mediating role in determine the QOL. This mediating role is seen for HIV+ people (Halloran, 2006; Kassutto, et al., 2006; Moneyham, et al., 1998) and also for HIV- people (Endler et al., 1990; Jia, et al., 2004; Lesserman, et al., 1992). A greater use of passive coping, like avoidance-focused coping, is associated with poorer physical function and more depressive symptoms (Schmitz, et al., 2000; Fleishman, et al, 2000). These depressive symptoms relate with a lower QOL (Fleishman, et al., 2002; Gore-Felton, et al., 2006; Jia, et al., 2004). Besides that, a greater use of active coping, like emotion-oriented coping and task-oriented coping, determines a higher QOL (Jia, et al., 2004).

Research question and relevance

The dependent variable in this research will be the 'Quality of life'. The independent variables are the mental health, physical health and health status. Also, social, economic and other demographic variables will be taken into account as control variables. The research will be two folded. The first aim is to determine the effect of physical health and mental health on the QOL of both HIV+ and HIV- people. The second aim is to determine if coping strategies are having a mediating effect on the association between physical health and mental health on the QOL. The main research question of this research will therefore be:

“To what extent does the physical and mental health influence Quality of life, is this mediating by coping strategies, and does it differ between HIV- and HIV+ people in Elandsdoorn, South Africa?”

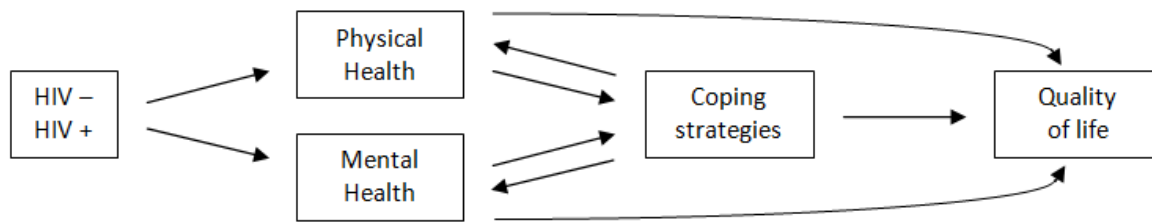
Hypotheses

Based on the above explained concepts and findings there are four different hypotheses that will be analyzed in this master thesis, which are:

1. Physical health and mental health will influence the quality of life of HIV- and HIV+ people;
2. There will be a difference in the quality of life between HIV- and HIV+ people, influenced by differences in physical health and mental health;
3. The association between both physical and mental health, and Quality of life is confounded/mediated by coping strategies;
4. There will be a difference in the quality of life between HIV- and HIV+ people, influenced by different coping strategies.

The first two hypotheses are about the correlation of physical health and mental health on the QOL. And the last two hypotheses are about the correlation of coping strategies on this relationship. Figure 1 schematically shows the research question and hypotheses described above.

Figure 1. Research scheme and hypotheses.



Interdisciplinary

The two principles of Interdisciplinary Social Science are an interdisciplinary approach and a problem oriented approach. First of all, this research is interdisciplinary as it uses insights from different social disciplines, such as: psychology, sociology and social medicine.

Literature used for this research originates from all these disciplines to get a comprehensive perspective on the interrelatedness of individual and social behavior. Aspects of psychology and sociology are used to describe the individual well-being and the individual mental and physical health. Also some aspects of social medicine are used to describe the physical health as well as the health related to the QOL. Secondly, this research uses a problem oriented approach, as the research focus on HIV/Aids, which is still a major social problem in South Africa. By taking the different aspects of disciplines together, a complete view on the social problem will be created.

Social Relevance

From a social perspective, this research is relevant because HIV is still a huge problem in South Africa. As HIV/Aids is seen as a stressful life event, the coping strategies of someone living with HIV/Aids might influence of his/her QOL. The outcome of this research is therefore contributive to the partly release of social problems, as the strengthening of someone's coping strategies might improve mental health and physical health, and a better QOL. Answers can lead to social programs to be implemented by the Ndlovu Care Group that are of greater practical utility as they could be designed more properly to fit the needs and improve the QOL of the members of the community in Elandsdoorn. However, the use of this research is not restricted to the study of Ndlovu Care Group, the research can also be relevant for other HIV+ target groups in South Africa.

Scientific Relevance

From a scientific perspective, this research is relevant as research comparing the QOL between the HIV+ and HIV- population is limited. A lot of research has been done to the health related QOL, coping strategies and mental and physical health outcomes. However, few HIV-related researchers have explicitly compared the HIV- and the HIV+ population. If the QOL turns out to differ between those two groups, and if it becomes clear which factors are contributing to that difference, it will contribute to social scientific knowledge.

Research design

Instruments

Applied research methodology is employed at Ndlovu Care Group under the supervision of the established Ndlovu Research Consortium. One of the studies is a multidisciplinary Cohort Study that compares HIV+ and HIV- subjects to investigate the epidemiology, pathogenesis and social factors. This research concentrates on the prevention, prognosis and management of HIV and the interaction with lifestyle related chronic diseases, such as diabetes and cardiovascular diseases (NRC, 2015). Part of the larger cohort study is the social science sub-study, from which data will be used for answer the research question and measure the different variables of this master thesis. The social science sub-study uses a quantitative research method. With the use of a questionnaire, that contains different scales from social scientific studies, questions will be asked about different aspects and domains of the QOL. Some items that are used in this master thesis are already asked in the baseline questionnaire from the main Ndlovu Cohort Study.

Data analysis of the dependent variable

The Quality of Life

In order to explore the QOL, items about the QOL from the validated scale of the World Health Organization (2003) are included in the questionnaire. For this research questions from the adapted version of this questionnaire, especially focusing on people dealing with HIV, are used. In this 13-items questionnaire, item scales have been added to question typically cultural aspects, such as spirituality, personal beliefs and religion (WHOQOL-HIV, 2003). The items ask how good or satisfied the participant is feeling about various aspects of five different health-related domains in his life. The five domains are: physical health (1 item), psychological (1 item), level of independence (3 items), social relationships (3 items) and environment (3 items). An example of a question from the physical health domain that is asked is: "Please indicate how satisfied you are with the your sleep?" The items are scored on a five-point answering Likert scale with indicators 1 (very dissatisfied), 3 (neither satisfied nor dissatisfied) and 5 (very satisfied). For the indication of the general QOL of the participants 2 items are used. The first question is: "Please indicate how satisfied you are with your health?" The possible answers are also on a five-point scale ranging between 'very dissatisfied' and 'very satisfied'. The second question is: "How would you rat your quality of life?" These items are scored on a five-point answering scale with indicators 1 (very poor), 3

(neither poor nor good) and 5 (very good).

After doing the reliability test for the WHOQOL-BREF scale the value of Cronbach's alpha is equal to .79, which indicates good reliability. All the items are included in the final analysis, as none of the items would increase the reliability if they were deleted because all individual values are less than the overall reliability of .79. This means that the WHOQOL-BREF items reflect consistently the construct that it is measuring.

Data analysis of the independent variables

The independent variables, physical health, mental health and coping strategies are operationalized in the following manner:

Physical health

In order to explore the physical health of the participants, questions about the physical health based on the ACTG (Aids Clinical Trials Group; 1999) item scale are added to the questionnaire. This used 20-item scale is the ACTG Adherence Follow Up Questionnaire, a questionnaire dealing with symptoms that probably HIV+ people on medication might have experienced, as the questionnaire from which the questions are taken is focusing on adherence. However, as most of the symptoms are general health symptoms, there can be a comparison made between HIV+ and HIV- people. The items ask about health symptoms that the participant might have had during the past four weeks. The participants have to indicate how much they have been bothered by each symptom. Symptoms such as: fatigue or loss of energy, fever, chills or sweats, diarrhea or loose bowel movements and changes in the way their body looks. For all these symptoms the participant has to choose one of the following possible answers: score 1 = 'I do not have the symptom at all', score 2 = 'I do have the symptom and it does not bother me', score 3 = 'I do have the symptom and it bothers me a little', score 4 = 'I do have the symptom and it bothers me a lot' and score 5 = 'I do have the symptom and it bothers me terrible'.

After doing the reliability test for the ACTG scale the value of Cronbach's alpha is equal to .88, which indicates good reliability. All of the 20 items are included in the final analysis, as none of the items would increase the reliability if they were deleted because all individual values are less than the overall reliability of .88. This means that the ACTG questions reflect consistently the construct that it is measuring.

Mental health

In order to explore the mental health of the participants questions that are asked in the baseline questionnaire of the main cohort study are used. The validated scale that is used is the PHQ-9, based on the Patient Health Questionnaire (PHQ; 1997). The PHQ-9 is a 9 item scale, focusing on depression. The items ask how often the participants have been bothered by problems like having little interest or pleasure in doing things, feeling down, tired, depressed or hopeless, poor appetite and trouble concentrating, over the last two weeks. All the nine questions have the same answers as possible options: score 0 = 'Not at all', score 1 = 'several days', score 2 = 'more than half the days', score 3 = 'nearly every day' and 'refuse'. After doing a reliability test for the PHQ-9 scale the value of Cronbach's alpha is equal to .86, which indicates good reliability. All of the items are included in the analysis, as the scoring of the PHQ-9 are nine items, each of which is scored 0 to 3 that provides a 0 to 27 severity score. Because of this, participants, who answer 'refuse' for one or more questions, were excluded from the study.

Coping strategies

The mediating effect of coping strategies is explored with the use of questions based on a short version of the Coping Inventory for Stressful Situations (CISS-21) developed by Endler and Parker (1999). The 21 items are divided in three different categories. Each category contains 7 items that concern ways people react to various difficult, stressful or upsetting situations. The participants have to indicate how much they engage in the type of activities during this specific situation. All the 21 items are scored on a five-point answering Likert scale with indicators 1 (not at all) and 5 (very much).

The first category is task-oriented coping. An example of a question that is being used to explore the task-oriented coping strategy is: "Indicate how much you engage in: 'focus on the problem and see how I can solve it' during this specific situation". After doing the reliability test for the task-oriented coping items of the CISS-21 scale the value of Cronbach's alpha is equal to .70, which indicates good reliability. All of the 7 items are included in the final analysis.

The second category is emotion-oriented coping. An example of a question that is being used to explore the emotion-oriented coping strategy is: "Indicate how much you engage in: 'blaming myself for having gotten into this situation', during this specific situation". After doing a reliability test for the emotion-oriented coping items of the CISS-21 scale the value of Cronbach's alpha is equal to .78, which indicates good reliability. All of the 7 items are included in the final analysis.

The third category is avoidance-oriented coping. An example of a question that is being used to explore the avoidance-oriented coping strategy is: “Indicate how much you engage in: ‘Blame myself for being too emotional on the situation.’ during this specific situation”. After doing a reliability test for the avoidance-oriented coping items of the CISS-21 scale the value of Cronbach’s alpha is equal to .66, which does not indicate good reliability. After deleting item ‘Take some time off and get away from the situation’ (which individual value is higher than the overall reliability of .66), the value of Cronbach’s alpha is equal to .72, which does indicate good reliability. Therefore, for the avoidance-oriented coping category, 6 of the 7 items are included in the final analysis.

Data analysis of the control variables

Other factors might also play a role in the relationship between the mental health, physical health, coping strategies and the QOL. In order to be sure that the results of the current research reflect the influence of only physical health and mental health, as well as the mediating effect of coping strategies on QOL, control variables are included. The control variables included in this research are gender, age, education, employment and partnership status. The control variables are operationalized in the following manner:

Gender

In order to explore the gender of the participant, in the baseline questionnaire is asked if the participant is a female or a male. The possible answer options are: score 1 = male, score 2 = female.

Age

The age of the participant is explored by asking the date of birth of the participant. This question is included in the baseline questionnaire. The age of the participant is then scored by subtracting the date on which the participant filled in the questionnaire from his/her date of birth.

Education

In order to determine the highest level of education completed by the participant, in the baseline questionnaire a question about education is included. The question has 6 different answers as possible option: score 1= ‘none’, score 2 = ‘Primary school completed’, score 3 = ‘Secondary school completed’, score 4 = ‘Matric’, score 5 = ‘Technicon’ / ‘College’ and score 6 = ‘University’.

Employment

The question, included in the baseline questionnaire, about employment that is used to explore the influence of employment on the QOL is: “Are you currently employed?” The question has 9 different answer possibilities which are: score 1 = ‘Yes, employed’, score 2 = ‘Yes, self-employed’, score 3 = ‘No, unemployed’, score 4 = ‘No, student’, score 5 = ‘No, retired’, score 6 = ‘No, disabled’, score 7 = ‘No, other’, score 8 = ‘Refused’ and score 9 = ‘Don’t know’. For score 7, the participants have to specify the answer.

Partnership status

In order to explore the partnership status of the participant, in the baseline questionnaire the participant is asked to select his/her current partnership status. The possible answers that are used for this question are: score 1 = ‘married’, score 2 = ‘life partner’, score 3 = ‘living together >50% of the time’, score 4 = ‘single’, score 5 = ‘divorced’, score 6 = ‘widowed’, score 7 = ‘multiple partners’ and score 8 = ‘other’. For score 1 till 8, participants have to write down since when they are in that partnership (score = year). For score 8, the participants have to specify the answer.

Procedures and participants

The study is executed at the Ndlovu Research center in Elandsdoorn, in South Africa. The people who participate in the study are living in Elandsdoorn, which is in the Moutse area in Limpopo and the Lillydale area in Mpumalanga in South Africa. The HIV infected participants within this study are mainly patients who are coming to the Ndlovu Care Group medical center in Elandsdoorn. After enrollment in the Ndlovu Cohort Study the participants are asked to participate in the social science sub-study. Before the start of the questionnaire the participants fill in a consent form to give their approval to participate and joining the study. The respondents whatever their HIV-status are asked to fill in the same questionnaires, as the study aims to compare questionnaires from HIV+ and HIV- people. The questionnaire consists of 110 questions that are in English. However, because most of the participants are not able to read and/or write, plus do not speak English fluently, four counselors who are working for Ndlovu Care Group are assisting in filling in the survey. The counselor reads the questions and answers out loud and explains the questions if needed. The questionnaire takes place in a private and quite environment, and during work hours in the morning on Monday until Friday. Filling in the questionnaire takes approximately 45 minutes. The participants participate on voluntary basis and receive a small compensation in return.

A total of 202 participants has joined the study, 4 participants are excluded from the study. Of these 198 participants 156 are female (78.8%) and 42 are male (21.2%). When looking at other descriptive statistics, 145 participants report that they are HIV- negative (73.3% of the population). Of these HIV- negative participants 117 are female (80.7%) and 28 are male (19.3%) 53 participants (26.8 % of the population) report that they are HIV-positive, this include participants who are on treatment as well those who are not on treatment. Of these HIV-positive participants 39 are female (73.6%) and 14 are male (26.4%). The age of the participants that are included in the study is between 19 and 65 years, with an average age of 40 years. The age of the participants is evenly distributed and does not differ between the HIV-negative and HIV-positive participants.

In order to explore whether physical health, mental health and coping strategies influence the QOL and the difference between the QOL of the HIV+ and HIV- population, a multiple regression is used.

Results

In the following section the results of the quantitative data analyses will be discussed. The results will be addressed according to the four hypotheses that include the determinants: mental health, physical health, coping strategies and the outcome: QOL. Information regarding the HIV status is also included in this section.

Descriptive statistics

Based on the descriptive statistics, it can be stated that the overall QOL of the population is very high (mean=3.96, SD=.53) where the maximum score is 4. As the QOL is normally distributed, the QOL outcomes are still enough scattered for including QOL in the analysis. The overall score on physical health is quite low, what means that overall the participants don't have to deal with a lot of health related symptoms (mean=1.54, SD=.54). The rates of the mental health of the participants were not high or low (mean=14.27, SD=5.46). When estimating the coping strategies, it can be seen that the participants score high on task-oriented coping (mean=3.62, SD=.67) followed by emotional-oriented coping (mean=2.97, SD=.90) and last avoidance-oriented coping (mean=2.36, SD=1.01).

When looking at the bivariate correlations between the QOL and the predictor variables it can be seen that that QOL and physical health are significantly correlating with each other, $r=-.478$ $p < .01$. The correlation is negative, which means that participants who have to deal with a lot of health related symptoms will be more likely to have a lower QOL outcome. The QOL and mental health also correlate with each other, $r=-.384$, $p < .01$. This correlation is negative, which means that participants that are bothered by mental problems will be more likely to have a lower QOL outcome. When looking at QOL and coping strategy it is seen that there is no significant correlation between QOL and emotional-oriented coping. However, task-oriented coping correlates with QOL, $r=.163$, $p < .01$. This correlation is positive, which means that participants that make use of the task-oriented coping strategy are more likely to have a higher QOL. There is also a correlation between avoidance-oriented coping and QOL, $r=.258$, $p < .05$. This correlation is also positive, which means that participants that make use of the avoidance-oriented coping strategy are more likely to have a higher QOL.

Influence of control variables

A multiple regression analysis is done and at first, the control variables of gender, age, education, partnership status and employment were included in the model (this model already included physical health and mental health). However, none of these control variables were of significant influence as there was no positive or negative correlation between one of the

control variables and QOL. Therefore, for the following analyses only the standard control variables of gender and age are included in the models, to control for the composition of the population.

Assumptions

To examine the linear relationship between the QOL and physical health, mental health and coping strategies and the difference between the HIV+ and HIV- population, two types of multiple regression analysis (MRA) are performed; the standard multiple regression and the hierarchical multiple regression. Prior to interpreting the results of the MRA, several assumptions have been evaluated and are the same for each of the four hypotheses:

- Normality: All variables, except mental health have a value between -1 and 1, and are therefore approximately normally distributed. It is of the greatest importance that the dependent variable, QOL, is normally distributed, this assumption is met. Therefore, the assumption of normality for all of the variables is met.
- Non-zero variance: in the descriptive analysis it is seen that all the variables have some variation in their values.
- Outliers: Multiple regression is sensitive to outliers and other influential cases. When looking at the scatterplot it can be seen that the model for the dependent variable QOL contains some outliers. However, as it is unknown why some of values are outliers, the outliers will not be removed.
- Multicollinearity: The correlations between the predictor variables are explored in order to check whether the predictors correlate too highly with each other. When looking at the correlation matrix of the predictor variables, none of the variables have a correlation coefficient $r > .80$, which indicates that although some variables do correlate, the predictors are still measuring different aspects (Field, 2009, p.224). Also, when detecting the multicollinearity with the variance inflation factor statistics (VIF) none of the predictors have a value of 10, this indicates that there is no perfect multicollinearity between the predicting variables.
- Normality, linearity and homoscedasticity of residuals in the regression analyses: When looking at the Normal Probability Plot for all the different variables it can be seen that the differences between the observed and the predicted values on residuals are normally distributed. Also, the relationship between the predicted values and the residuals is linear as the predictors lie along a straight line. Finally, the residuals at each level of the predictors have the same variance. This means that the assumption of homoscedasticity is true.

Hypotheses 1: “Physical health and mental health will influence the quality of life of people with HIV- and HIV+”

Interpretation of the model

To estimate the proportion of variance in the QOL that can be accounted for by physical health and mental health, a standard multiple regression analysis was performed. When looking at the predictive utility of the entire model it is seen that the ANOVA model is significant ($Sig < .05$), indicate that proportion of variance R^2 does depart significantly from zero. This means that mental health and physical health in combination do account for more of the variance in the QOL than we would expect by chance. In combination, physical health and mental health account for a significant 31.6% of the variability in the QOL, $R^2 = .316$, adjusted $R^2 = .302$, $F(2, 192) = 22.189$, $p = .000$.

Interpretation of the independent variables

Unstandardized (B) and standardized (β) regression coefficients, the t statistics and the corresponding significance for each predictor in the regression models are reported in Table 1.

		Coefficients ^a				
		Unstandardized		Standardized		
		Coefficients		Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.929	.159		24.770	.000
	Age	-.005	.003	-.133	-1.887	.061
	Gender	.201	.090	.157	2.228	.027
2	(Constant)	4.858	.171		28.395	.000
	Age	-.002	.002	-.038	-.616	.539
	Gender	.115	.077	.090	1.487	.139
	Physical Health	-.387	.060	-.397	-6.404	.000*
	Mental Health	-.027	.006	-.280	-4.504	.000*

a. Dependent Variable: Quality of Life

Table 1: Statistics of Multiple Regression on QOL.

Note. $N=197$. * $p < .05$.

When looking at the predictive utility of each predictor in the model, it is seen that physical health as well as mental health both account for a significant proportion of unique variance in the criterion. Physical health is a significant predictor, $t(192) = -6.40, p = .000$. Mental health is also a significant predictor, $t(192) = -4.50, p = .000$. Looking at the standardized regression coefficient it is seen that after controlling mental health, a 1 standard deviation (SD) increase in physical health will result in a -.397 decrease in QOL. After controlling for physical health, a 1 SD increase in mental health will result in a -.280 decrease in QOL. This means that there is a negative correlation between physical health and QOL, and mental health and QOL. The reason for this negative correlation on QOL is that the score on mental health and physical health are higher as the health is decreasing/worse. However, both predictor variables do account for more of the variance in the QOL than we would expect by chance as the better someone's physical and/or mental health (which means a lower score on physical health and/or mental health) the higher the QOL will be.

Hypotheses 2: "There will be a difference in the quality of life between HIV- people and HIV+ people, influenced by differences in physical health and mental health."

Interpretation of the model

To test the hypothesis that the HIV status accounts for a significant proportion of the variance in QOL, beyond that already accounted for by physical health and mental health, hierarchical multiple regression analysis (MRA) is employed. In step one of the hierarchical MRA, physical health and mental health account for a significant 31.6% of the variance in QOL, as described in the interpretation of the first hypotheses above. On step 2, HIV status is added to the regression equation, and accounted for an additional of 0.06% of the variance in QOL, $R^2 = .322$, adjusted $R^2 = .304$, $F(5,191) = 18.131, p = .000$.

Interpretation of the independent variables

Unstandardized (B) and standardized (β) regression coefficients, the t statistics and the corresponding significance for each predictor in the second regression model are reported in Table 2.

Coefficients^a

Model		Unstandardized		Standardized		
		Coefficients		Coefficients		
		B	Std. Error	Beta	t	Sig.
2	(Constant)	4.748	.191		24.797	.000
	Age	-.001	.002	-.033	-.548	.584
	Gender	.108	.078	.084	1.387	.167
	Physical Health	-.377	.061	-.387	-6.191	.000*
	Mental Health	-.028	.006	-.295	-4.668	.000*
	HIV status	.093	.073	.078	1.270	.206

a. Dependent Variable: Quality of Life

Table 2: Statistics of Multiple Regression on QOL.

*Note. N=197. *p <.05.*

As can be seen in table 2, the significant predictors of QOL in the second regression model are physical health ($t(191)=-6.191, p=.000$) and mental health ($t(191)=-4.668, p=.000$). As an individual predictor, the HIV status is non-significant.

Difference between HIV+ and HIV- population

Despite the non-significance of the HIV status, it will be interesting to study if the model differs between the HIV+ and the HIV- population. In order to compare the two different groups, the data file is split according the HIV status and a standard MRA is employed. The predictor variables of physical health and mental health are added in the regression equation. By interpreting the model it is seen that in combination these predictors explain a significant 38% of the variance in the QOL for the HIV- population, $R^2=.380$, adjusted $R^2=.363$, $F(4,140) = 21.477, p=.000$. The predictors in combination explain a significant 24.9% of the variance in the QOL for the HIV+ population, $R^2=.249$, adjusted $R^2=.185, F(4,47) = 3.893, p=.000$.

Interpretation of the independent variables

Unstandardized (B) and standardized (β) regression coefficients, the t statistics and the corresponding significance for each predictor in the regression model are reported in Table 3.

HIV status Model		Coefficients ^a					
		Unstandardized Coefficients		Standardized Coefficients		t	Sig.
		B	Std. Error	Beta			
1.00							
2	(Constant)	4.983	.200		24.864	.000	
	Age	.001	.003	.026	.387	.700	
	Gender	.102	.093	.073	1.096	.275	
	Physical Health	-.398	.069	-.402	-5.748	.000*	
	Mental Health	-.043	.008	-.355	-5.023	.000*	
2.00							
1	(Constant)	4.868	.337		14.437	.000	
2	Age	-.011	.006	-.254	-1.967	.055	
	Gender	.123	.131	.122	.942	.351	
	Physical Health	-.244	.122	-.266	-2.009	.050*	
	Mental Health	-.012	.008	-.202	-1.528	.133	

a. Dependent Variable: Quality of Life

Table 3: Statistics of Multiple Regression on QOL.

Note. $N_{HIV-} = 145$. $N_{HIV+} = 52$. * $p < .05$.

As can be seen in table 3, the significant predictors of the QOL of the HIV- population in the second regression model are physical health ($t(140) = -5.748$, $p = .000$) and mental health ($t(47) = -5.023$, $p = .000$). Looking at the standardized regression coefficient of physical health and mental health it is seen that after controlling mental health, a 1 standard deviation (SD) increase in physical health will result in a -.402 decrease in QOL of HIV- people. After controlling physical health, a 1 SD increase in mental health will result in a -.355 decrease in

QOL of HIV- people. This negative correlation means that for the HIV- population, the higher the score on physical health and/or mental health, the lower the QOL will be.

The significant predictor of the QOL of the HIV+ population in the second regression model is only physical health ($t(47)=-5.748, p=.000$). Mental health has become a non-significant predictor. Looking at the standardized regression coefficient of physical health it is seen that a 1 SD increase in physical health will result in a -.266 decrease in the QOL of HIV+ people. This negative correlation means that for the HIV+ population, the higher the score on physical health, the lower the QOL will be. However, there is no effect of mental health on the QOL. If mental health is not included in the model for the HIV+ population, the effect of physical health on QOL is significant, $R^2=.196$, adjusted $R^2=.146$, $F(3,49) = 3.974, p=.000$ (not shown in the table). A 1 SD increase in the significant predictor physical health ($t(49)=-6.796, p=.000$), will result in a -.494 decrease in QOL, what means that without the inclusion of mental health, physical health has a much greater (addition of .228) effect on the QOL.

Hypotheses 3: “ The association between both physical and mental health, and Quality of life is mediated by coping strategies”

Interpretation of the model

To test the hypotheses that coping strategies can account for a significant proportion of the variance in the QOL, beyond that already accounted for by physical health and mental health hierarchical MRA is also employed. On step 1 of the hierarchical MRA, coping strategies (which include task-oriented coping, emotional-oriented coping and avoidance-oriented coping) accounted for a significant 13.1% of the variance in QOL, $R^2=.131$, adjusted $R^2 = .109$, $F(5,191) = 5.779, p= .000$. On step 2, physical health and mental health are added to the regression equation, and accounted for an additional of 25.5% of the variance in QOL. In combination, the predictor variables physical health, mental health and coping strategies explain 38.6% of the variance in QOL, $R^2=.386$, adjusted $R^2 = .363$, $F(7,189) = 16.987, p=.000$

Interpretation of the independent variables

Unstandardized (B) and standardized (β) regression coefficients, the t statistics and the corresponding significance for each predictor in the regression models are reported in Table 4.

		Coefficients^a				
		Unstandardized		Standardized		
		Coefficients		Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.680	.243		15.145	.000
	Age	-.003	.003	-.070	-1.008	.315
	Gender	.091	.090	.071	1.012	.313
	Coping T	.116	.062	.149	1.861	.064
	Coping E	-.135	.043	-.232	-3.112	.002*
	Coping A	.112	.040	.215	2.784	.006*
2	(Constant)	4.276	.220		19.399	.000
	Age	.001	.002	.013	.211	.833
	Gender	.027	.077	.021	.357	.722
	Coping T	.121	.053	.156	2.302	.022*
	Coping E	-.010	.041	-.017	-.235	.815
	Coping A	.096	.034	.185	2.817	.005*
	Physical Health	-.438	.066	-.450	-6.583	.000*
	Mental Health	-.023	.006	-.244	-4.062	.000*

a. Dependent Variable: Quality of Life

Table 4: Statistics of Multiple Regression on QOL.

*Note. N=197. *p < .05. Coping T= task-oriented, coping E= emotional-oriented, coping A=avoidance-oriented.*

As can be seen in table 4, the significant predictors of QOL in the first regression model are emotional-oriented coping ($t(191)=-3.112, p=.002$) and avoidance-oriented coping ($t(191)=2.784, p=.006$), while task-oriented coping is almost significant, ($t(191)=1.861, p=.064$). However, by looking at the coping strategies in the second regression model, it is seen that avoidance-oriented coping is still a significant predictor ($t(189)=2,817, p=.005$) of

QOL and task-oriented coping also becomes now a significant predictor of QOL ($t(189)=2.302, p=.022$). However, emotion-oriented coping becomes a non-significant predictor of QOL. The reason for this is that physical health and emotional-oriented coping significantly correlate with each other, $r=.478, p<.01$ (not shown in table) but mental health and emotional-oriented coping do not significantly correlate with each other. Besides this, physical health remains a significant predictor of QOL ($t(189)=-6.583, p=.000$) as well as mental health ($t(189)=-4.062, p=.000$). This means that coping strategies in general do account for more of the variance in the QOL than we would expect by chance, but the type of coping strategy that does account for more of the variance in the QOL differs when looking at the entire model or at each individual coping predictors only.

Looking at the standardized regression coefficient, for each of the significant coping strategies it is seen that after controlling the other predictor variables, a 1 standard deviation (SD) increase in task-oriented coping will result in a .156 increase in QOL, and after controlling the other predictor variables, a 1 SD increase in avoidance-oriented coping will result in a .185 increase in QOL. The standardized regression coefficient for physical health, after controlling all the other variables, explains that a 1 SD increase in physical health will result in a -.450 decrease in QOL. This means that still the higher the score on physical health the lower the QOL will be, however, in combination with coping strategies the QOL will be less low (positive difference of .153 per 1 SD increase in physical health). After controlling all the variables except mental health, it is seen that a 1 SD increase in mental health will result in a -.244 decrease in QOL. This means that still the higher the score on mental health, the lower the QOL will be, but in combination with coping strategies the QOL will be even lower (negative difference of .040 per 1SD increase in mental health). If emotional-oriented coping is not included in the model, the combination of physical health, mental health, task-oriented coping and avoidance-oriented coping account for a significant 38.6% of the variability in the QOL, $R^2=.386$, adjusted $R^2=.367$, $F(6,190)=19.908, p=.000$ (not shown in the table as all individual indicators of QOL are significant and do not differ much in the standardized regression coefficient compared to the model where emotional-oriented coping is included). The effect on the QOL correlated by physical health and mental health is only mediated by task-oriented coping and avoidance-oriented coping as there is a positive correlation between task-oriented coping and QOL and avoidance-oriented coping and QOL. The association between both physical health and mental health, and QOL is therefore mediated by task-oriented coping and avoidance-oriented coping, as the higher the score on task-oriented coping and avoidance-oriented coping, the higher the QOL will be, independently of the status of physical health and mental health.

Hypotheses 4 “There will be a difference in the quality of life between HIV- people and HIV+ people, influenced by different coping strategies”

Interpretation of the model

To test the hypothesis that coping strategies can account for a significant proportion of the variance in QOL, beyond the proportion already accounted for by physical health and mental health, and that this will differ between HIV- and HIV+ people, hierarchical multiple regression analysis (MRA) is employed. Step 1 of the hierarchical MRA is model 2 of the third hypothesis, described above. Physical health, mental health and coping strategies account for a significant 38.6% of the variance in QOL. On step 2, the HIV status is added to the regression equation, and accounted for an additional 0.06% of the variance in QOL. In combination, the predictor variables physical health, mental health, coping strategies and HIV status explain 39.2% of the variance in the QOL, $R^2=.392$, adjusted $R^2=.366$, $F(8,188) = 15.169$, $p=.000$.

Interpretation of the independent variables

Unstandardized (B) and standardized (β) regression coefficients, the t statistics and the corresponding significance for each predictor in the second regression model are reported in Table 5.

		Coefficients^a				
		Unstandardized		Standardized		
		Coefficients		Coefficients		
Model		B	Std. Error	Beta	t	Sig.
2	(Constant)	4.169	.233		17.880	.000
	Age	.001	.002	.018	.299	.765
	Gender	.019	.077	.015	.246	.806
	Physical Health	-.425	.067	-.437	-6.348	.000*
	Mental Health	-.025	.006	-.260	-4.256	.000*
	Coping T	.118	.053	.152	2.243	.026*
	Coping E	-.012	.041	-.020	-.285	.776
	Coping A	.099	.034	.190	2.905	.004*
	HIV status	.096	.070	.080	1.374	.171

a. Dependent Variable: Quality of Life

Table 5: Statistics of Multiple Regression on QOL.

*Note. N=197. *p <.05. Coping T= task-oriented, coping E= emotional-oriented, coping A=avoidance-oriented.*

As can be seen in table 5, the significant predictors of QOL in the second regression model are physical health ($t(188)=-6.348, p=.000$), mental health ($t(188)=-4.256, p=.000$), coping T ($t(188) = 2.243, p=.026$) and coping A ($t(188)=2.905, p=.004$). As an individual predictor, the HIV status is non-significant.

Difference between HIV+ and HIV- population

Despite the non-significance of the HIV status, it will still be interesting to see if the same model stays for the HIV+ population as well as for the HIV- population. In order to compare the two different groups, the data file is split according the HIV status and a standard MRA is employed. Like in the second model of the third hypotheses, the predictor variables of physical health, mental health and the three coping strategies are added in the regression equation. By interpreting the model it is seen that in combination these predictors explain 43% of the variance in the QOL for the HIV- population, $R^2=.430$, adjusted $R^2=.401$, $F(7,137) = 14.762, p=.000$. And the predictors in combination explain 47.7% of the variance in the QOL for the HIV+ population, $R^2=.477$, adjusted $R^2=.394$, $F(7,44) = 5.743, p=.000$.

Interpretation of the independent variables

Unstandardized (B) and standardized (β) regression coefficients, the t statistics and the corresponding significance for each predictor in the regression model are reported in Table 6.

		Coefficients^a					
HIV status	Model	Unstandardized		Standardized		t	Sig.
		Coefficients		Coefficients			
		B	Std. Error	Beta			
1.00							
	2	(Constant)	4.488	.252		17.779	.000
		Age	.003	.003	.067	.988	.325
		Gender	.004	.096	.003	.046	.963
		Physical Health	-.462	.078	-.467	-5.911	.000*
		Mental Health	-.040	.008	-.331	-4.764	.000*
		Coping T	.090	.061	.113	1.480	.141
		Coping E	.026	.048	.043	.531	.596
		Coping A	.085	.041	.154	2.059	.041*
2.00							
	2	(Constant)	3.874	.421		9.205	.000
		Age	-.007	.005	-.160	-1.398	.169
		Gender	.079	.114	.078	.692	.493
		Physical Health	-.275	.118	-.299	-2.328	.025*
		Mental Health	-.007	.007	-.111	-.935	.355
		Coping T	.283	.099	.406	2.858	.006*
		Coping E	-.144	.069	-.281	-2.087	.043*
		Coping A	.102		.243	1.949	.058
				.052			

a. Dependent Variable: Quality of Life

Table 6: Statistics of Multiple Regression on QOL.

*Note. N HIV- = 145. N HIV+ = 52. *p < .05. Coping T= task-oriented, coping E= emotional-oriented, coping A=avoidance-oriented.*

As can be seen in table 6, the significant predictors of the QOL of the HIV- population in the second regression model is besides physical health ($t(137)=-5.911, p=.000$) and mental health ($t(137)=-4.764, p=.000$) also avoidance-oriented coping ($t(137)=2.059, p=.041$). Task-oriented coping and emotional-oriented coping are both non-significant predictors of the QOL of the HIV- population. These predictors are not the same for the HIV+ population. Physical health is still a significant predictor of the QOL ($t(44)=-2.328, p=.025$) but mental health has become a non-significance predictor. Other significant predictors of the QOL of the HIV+ population in the second regression model are task-oriented coping ($t(44)=2.858, p=.006$) and emotional-oriented coping ($t(44)=-2.087, p=.043$). Here avoidance-oriented coping is almost significant ($t(44)=1.949, p=.058$).

Considering each individual predictor, for the HIV- population it means that besides the physical health and mental health, only avoidance-oriented coping accounts for more of the variance in the QOL than we would expect by chance. The standardized regression coefficient of avoidance-oriented coping shows that when controlling for physical health and mental health, a 1 SD increase in avoidance-oriented coping will result in a .154 increase in QOL. This positive correlation means that for the HIV- population the association between both physical health and mental health, and QOL is mediated by avoidance-oriented coping. The higher the score on avoidance-oriented coping, the higher the QOL will be, independently of the effect of physical health and mental health. If task-oriented coping and emotional-oriented coping are not included in the model for the HIV- population, avoidance-oriented coping is still a significant predictor of QOL ($t(139)=19.869, p=.004$) (not shown in table). When controlling for physical health and mental health, the standardized regression coefficient of avoidance-oriented coping shows that a 1 SD increase in avoidance-oriented coping will result in a .205 increase in QOL, what means that without the inclusion of task-oriented coping and emotional-oriented coping, avoidance-oriented coping has an even greater mediated effect on the QOL of the HIV- population.

When looking at each individual predictor, for the HIV+ population it is seen that physical health accounts for more of the variance in the QOL than we would expect by chance. Mental health does not longer account for more of the variance in the QOL, like it is seen in table 3. However, the coping strategies (mostly task-oriented coping and emotional-oriented coping) do correlate as they now account for more of the variance in QOL of the HIV+ population than we would expect by chance. The standardized regression coefficient explains the direction of the correlation. After controlling task-oriented coping and emotional-oriented

coping, a 1 SD increase in physical health will result in a -.299 decrease in QOL. After controlling physical health and emotional-oriented coping, a 1 SD increase in task-oriented coping will result in a .406 increase in the QOL. After controlling physical health and task-oriented coping, a 1 SD increase in emotional-oriented coping will result in a -.281 decrease in QOL. This means that only the association between physical health and QOL of the HIV+ population is mediated by coping strategies. There is no association between mental health and QOL of the HIV+ population, mediated by coping strategies. The higher the score on task-oriented coping strategy and the lower the score on emotion-oriented coping, the higher the QOL of HIV+ people will be. If mental health is not included in the model for the HIV+ population, only task-oriented coping is a significant predictor of QOL ($t(46)=6.314, p=.002$) (not shown in table). When controlling physical health, the standardized regression coefficient of task-oriented coping shows that a 1 SD increase in task-oriented coping will result in a .445 increase in QOL. This means that without inclusion of mental health, only task-oriented coping has a mediated effect on QOL and this effect is slightly greater than when mental health is included in the model.

Conclusion and discussion

The aim of this study was to gain insight in the predictors that affect the QOL of HIV+ and HIV- people in Elandsdoorn, South Africa. The research question of the study was: *“To what extent does the physical and mental health influence Quality of life, is this mediating by coping strategies, and does it differ between HIV- and HIV+ people in Elandsdoorn, South Africa?”* The following hypotheses were formulated about the influence of physical health, mental health and coping strategies on the QOL:

1. Physical health and mental health will influence the quality of life of HIV- and HIV+ people;
2. There will be a difference in the quality of life between HIV- and HIV+ people, influenced by differences in physical health and mental health;
3. The association between both physical and mental health, and Quality of life is confounded/mediated by coping strategies;
4. There will be a difference in the quality of life between HIV- and HIV+ people, influenced by different coping strategies.

Influence of physical health and mental health on QOL

As a result of the multiple regression analysis, it can be concluded that physical health and/or mental health influences the QOL of HIV- and HIV+ people living in Elandsdoorn, South Africa. It is seen that the better someone's physical health and/or mental health, the higher the QOL of HIV+ and HIV- people in Elandsdoorn, South Africa will be. Looking back at the presented concepts and findings it is also seen that the physical and/or mental health influences the QOL and a high physical and/or mental health predicts a higher QOL.

Influence of coping strategies on QOL

As a result of the multiple regression analysis, it can be concluded that the use of coping strategies in general influence the QOL of HIV+ and HIV- people. Looking at the influence of coping strategies in combination with physical health and mental health, only avoidance-oriented coping and task-oriented coping influences the QOL. The more use of avoidance-oriented coping, the higher the QOL will be. This is not in line with previous research and earlier presented findings, where the more use of avoidance-oriented coping explained a lower QOL (Schmitz, et al., 2000; Fleishman, et al, 2000), and the more use of active coping strategies (task-oriented coping and emotional-oriented coping) explained a higher QOL (Jia, et al., 2004). However, despite the HIV status, for the people living in Elandsdoorn, South Africa, only the use of task-oriented coping and avoidance coping will have a positive effect

on the QOL.

Difference between HIV+ and HIV- people

As a result of the multiple regression analysis, it can be concluded that the HIV status does not influence the QOL. For the HIV+ people as well as the HIV- people, the combination of physical health and mental health influences the QOL. This is not in line with previous research, in which is stated that the HIV status does influence the QOL, where the QOL of HIV+ is assumed to be lower than the QOL of HIV- people. However, there are some differences in the QOL of HIV+ and HIV- people when looking at the single predictors, physical health and mental health. For the HIV- people, both single predictors will influence the QOL. But, for the HIV+ people, only physical health influences the QOL. There is no effect of mental health on the QOL of HIV+ people. Looking back at the presented concepts and findings, it was stated that the differences in QOL between the two groups are the greatest relating to the physical health (Charles, et al, 2012; O'Connell, 2003; WHOQOL-HIV Group, 2003). This is also the case for HIV+ people living in Elandsdoorn, South Africa. When looking at the difference HIV+ and HIV- people it can be concluded that the HIV status, in combination with the use of coping strategies does not influence the QOL. However, when looking at the single predictors it can be concluded that for the HIV- people only physical health, mental health and avoidance-coping strategies influence the QOL. The better the physical and/or mental and, and the more use of avoidance-coping strategies, the higher the QOL. For the HIV+ people it can be concluded that, in combination with coping strategies only physical health and not mental health influence the QOL. When looking at the coping strategies it can be concluded that only task-oriented coping strategies and emotional oriented coping strategies influence the QOL. This is interesting, because for the HIV+ people now emotional-oriented coping strategies does influences the QOL. The more use of emotional-oriented coping strategies, the higher the QOL will be. This is in line with previous research and presented findings, where the use of active coping strategies positively influences the QOL (Jia, et al., 2014).

Overall QOL

The overall QOL of the HIV+ and HIV- people living in Elandsdoorn, South Africa is very high. Also, there is not a big difference in QOL between the HIV+ and HIV- people. According to the results, this is because the mental health of HIV+ people does not influence the QOL. The physical health of HIV+ people does influence the QOL, but the people do not have to deal a lot with physical health related symptoms. Also, the people living in

Elandsdoorn, South Africa, make mostly use of task-oriented coping. Looking back at the presented concepts and findings, using these active coping strategies explain the high score on the QOL. Another possible explanation for the relative high QOL of HIV+ and HIV- people living in Elandsdoorn, South Africa, could be the positive impact of the interventions and programs that are already implemented by Ndlovu Care Group.

Practical implications

Results of the current study have shown the influences of physical health, mental health and coping strategies on the QOL of HIV+ and HIV- people living in Elandsdoorn, South Africa. It therefore can be said that it is important for the interventions of Ndlovu Care Group to take the predictors of a high(er) QOL into account. Practically, for the HIV- people, this could mean that interventions should focus on good physical health and good mental health only, as this will improve the QOL. For the HIV+ people, this could practically mean that since only physical health influence the QOL, interventions and health programs in Elandsdoorn, South Africa should focus more on the physical health related symptoms instead of the mental health. Another practical implication can be that interventions should merely focus on using active coping strategies to avoid a lower QOL and improve the QOL.

Limitations

A major limitation of the current study is that the participants who participated in the study are not representing the population of Elandsdoorn in general. This is due to the fact that a greater amount of women compared to men are included in the study and the uneven distribution between people who are HIV+ and HIV-. Another limitation is the making of mistakes by filling in the questionnaire. Possible reasons for this are the length of the questionnaire, the language of the questionnaire in combination with the presence of a counselor when filling in the questionnaire (as the questionnaire was in English and the first language of the participants is Zulu, Zutu or Sepedi, a counselor translated the questions and this creates room for interpretation). An additional important limitation of the current research is that the score on physical health for HIV+ people has nothing to do solely for having HIV/AIDS. As age, illnesses or other diseases could also explain someone's physical health condition. A final limitation to the current research is the limited amount of. As this research has been the start of a longitudinal study, not enough participants are included in the current study yet, to make conclusions that are accountable for the whole population (which are HIV+ and HIV- people living in Elandsdoorn, South Africa). An example of this limitation is seen

in the results section, where some of the correlations of coping strategies are not significant (but almost significant) due to the limited amount of participants.

Despite the mentioned limitation, this study does provide useful information for the Ndlovu Care group in Elandsdoorn, South Africa.

Recommendations for future research

The current research forms a foundation for future research about the QOL of HIV+ and HIV- people in Elandsdoorn, South Africa. The current research only uses quantitative data.

Therefore, future research could intensify the research with the use of qualitative data. This will integrate with the quantitative data and support the findings. Also, this combination causes a gain in more in-depth knowledge about the relationship between physical health, mental health, coping strategies and QOL. Also, future research can better explore and investigate the influences of QOL domains that are still low (compared to for example the QOL domain mental health), as interventions should focus on improving the QOL in general. Besides that, participants for this study should be recruited by visiting the people at home, instead of reaching those who are mobile and able to leave their house and come to the research centre to participate the study. By doing this, the population of Elandsdoorn will be presented very well and conclusions about the whole population in general can be made. Finally, as in future research perhaps more (newly) HIV diagnosed people will enter the sample, it is a point of attention to include the HIV stadia and the use of medication in the research. This influences the way someone is coping with HIV/AIDS, the experienced HIV-related symptoms that influence the physical health and mental health, as well as the influence of the use of medication.

Conclusion

Based on concepts and findings it can be stated that physical health and mental health do influence the QOL of HIV+ and HIV- people. Also, this influence is for both groups mediated by the use of coping strategies. The QOL of life between HIV+ and HIV- people living in Elandsdoorn, South Africa does not differ much from each other. However, the research results show that only physical health and mental health influences the QOL of HIV- people. It can be concluded that interventions that are aimed at improving physical health and improving mental health, will be most effective for a high QOL of HIV- people. Research results show that the QOL of HIV+ people will be mostly influenced by physical health and (active) coping strategies. It can be concluded that interventions that are aimed at improving

physical health and increasing the use of active coping strategies, will be most effective for a high QOL of HIV+ people.

Bibliography

- AIDS Clinical Trial Group (1999), ACTGQOL 601-602, *Health Survey Manual*. AVERT.
Retrieved on March 11, 2015, from <http://www.avert.org/>
- Aldwin, C.M. & Revenson, T.A. (1987) Does coping help? A reexamination of the relation between coping and mental health. *Journal of personality and social psychology*, 53, 37-348.
- Bajunirwe, F. (2013). Quality of Life among Patients Living with HIV AIDS in Sub-Saharan Africa. *Antiretroviral Treatment in Sub-Saharan Africa. Challenges and Prospects*, 39.
- Basavaraj, K.H., Navya, M.A., & Rashmi, R. (2010). Quality of life in HIV/AIDS. *Indian Journal of Sexually Transmitted Diseases*, 31(2), 75—80.
- Clayson, D.J., Wild, D.J., Quarterman, P., Duprat-Lomon, I., Kubin, M., Coons, S.J. (2006). A comparative review of health related quality of life measures for use in HIV/AIDS clinical trials. *Pharmacoeconomics*, 24, 751-65.
- Cleary, P. D., Fowler Jr, F. J., Weissman, J., Massagli, M. P., Wilson, I., Seage III, G. R., ... & Epstein, A. (1993). Health-related quality of life in persons with acquired immune deficiency syndrome. *Medical care*, 569-580.
- Charles, B., Jeyaseelan, L., Pandian, A. K., Sam, A. E., Thenmozhi, M., & Jayaseelan, V. (2012). Association between stigma, depression and quality of life of people living with HIV/AIDS (PLHA) in South India—a community based cross sectional study. *BMC Public Health*, 12(1), 463.
- Cunningham WE, Shapiro MF, Hays RD, et al. Constitutional symptoms and health-related quality of life in patients with symptomatic HIV disease. *Am J Med*, 1998;104:129–136.
- Dalmida, S. G. 2006. Spirituality, mental health, physical health, and health-related quality of life among women with HIV/AIDS: Integrating spirituality into mental health care. *Issues in Mental Health Nursing*, 27: 185–98.
- Department Health Republic of South Africa (2014). Retrieved on 10 January, 2015, from: <http://www.health.gov.za/hiv.php#http://www.health.gov.za/hiv.php>
- Endler, N.S. & Parker, J.D.A. (1990) *Coping inventory for Stressful Situations Manual* Second edition. Toronto: Multi-health systems.
- Field, A. (2009) *Dicovering statistics using SPSS*. SAGE Publications, London, England.

- Fleishman, J.A., Sherbourne, C.D., Crystal, S., Collins, R.L., Marshall, G.N., Kelly, M., *et al.* (2000) Coping, conflictual social interactions, social support, and mood among HIV - infected persons. *American Journal of Community Psychology*, 28, 421-53.
- Gore-Felton, C., C. Koopman, D. Spiegel, M. Vosvick, M. Brondino, A. Winningham (2006). Effects of quality of life and coping on depression among adults living with HIV/AIDS. *Health Psychology*, 11 (5), 711-29.
- Grady, C., Anderson, R., & Chase, G. A. (1998). Fatigue in HIV-infected men receiving investigational interleukin-2. *Nursing research*, 47(4), 227-234.
- Halloran, J. (2006) Increasing survival with HIV: Impact on nursing care. *AACN Clinic Issues*, 17, 8-17.
- Israelski, D. M., Prentiss, D. E., Lubega, S., Balmas, P., Garcia, M., Muhammad, Cummings, S., Koopman, C. (2007). Psychiatric co-morbidity in vulnerable populations receiving primary care for HIV/AIDS. *AIDS Care*, 19 (2), 220-5.
- Jia, H., Uphold, C.R., Wu, S., Reid, K., Findley, K., Duncan, P.W., (2004). Health-related quality of life among men with HIV infection: effects of social support, coping, and depression. *AIDS Patient Care STDS*, 18 (10), 594-603.
- Justice, A. C., Chang, C. H., Rabeneck, L., & Zackin, R. (2001). Clinical importance of provider-reported HIV symptoms compared with patient-report. *Medical care*, 39(4), 397-408.
- Kassutto, S., Maghsoudi, K., Johnston, M.N., Robbins, G.K., Burgett, N.C., Sax, P.E., *et al.* (2006). Longitudinal analysis of clinical markers following antiretroviral therapy initiated during acute or early HIV Type I infection. *Clinical Infection Disease*, 42, 1024-31.
- Kroenke, K., Spitzer, R. (2002). The PHQ-9: A new depression diagnostic and severity measure. *Psychiatric Annals*, 32 (9), 1-7.
- Kroenke, K., Price, R.K. (1993). Symptoms in the community. Prevalence, classification, and psychiatric comorbidity. *Arch Intern Med*, 153 (1993), pp. 2474–2480.
- Lazarus, R.S., Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer.
- Lesserman, J., Perkins, D., Evans, D.L. (1992). Coping with treat of AIDS; The role of social support. *American Journal of Psychology*. 149, 1514-1520.
- Logie, D.E., Harding, R. (2005), An evaluation of a morphine public health programme for cancer and AIDS pain relief in Sub-Saharan Africa. *BMC Public Health* 5, 82.
- Mak, W.W.S., Cheung, R.Y.M., Law, R.W., Woo, J., Li, P.C.K. & Chung, R.W.Y. (2007). Examining attribution model of self-stigma on social support and psychological

- well-being among people with HIV+/AIDS. *Social Science & Medicine*, 64, 1549-1559.
- Maurice, J. (2014). South Africa's battle against HIV/AIDS gains momentum. *The Lancet*, 383(9928), 1535-1536.
- Moneyham, L., Hennessy, M., Sowell, R., Demi, A., Seals, B., Mizuno, Y. (1998) The effectiveness of coping strategies used by HIV-seropositive women. *Research Nursing & Health*, 21, 351-62.
- Moneyham, L., Sowell, R., Seals, B., Demi, A. (2000) Depressive symptoms among African American women with HIV disease. *Research and Theory for Nursing Practice*, 14(1), 9-39.
- Mutabazi-Mwesigire, D., Katamba, A., Martin, F., Seeley, J., & Wu, A. W. (2015). Factors That Affect Quality of Life among People Living with HIV Attending an Urban Clinic in Uganda: A Cohort Study. *PloS one*, 10(6), e0126810.
- NRC (2015) A multidisciplinary cohort study comparing HIV-positive and HIV-negative subjects to investigate the epidemiology, pathogenesis and social factors determining the interaction between HIV and (lifestyle-related) chronic conditions, with a special focus on cardiovascular disease; Addendum 1, Social Science Sub-Study. Utrecht/Groblersdal: Nodlovu research Consortium.
- O'Connell, K., Skevington, S., WHOQOL HIV Group., (2003), Preliminary development of the World Health Organization's Quality of Life HIV instrument (WHOQOL-HIV): analysis of the pilot version. *Social Science & Medicine*, 57 (7), 1259-127.
- Ridder, D.T.D. de, Heck, G.L. van, (2004). *Coping Inventory for stressful situations*. CISS Handleiding.
- Schmitz, M.F., Crystal, S. (2000) Social relations, coping, and psychological distress among persons with HIV/AIDS. *Journal of Applied Social Psychology*, 30, 665-83.
- Sherbourne, C. D., Hays, R. D., Fleishman, J. A., Vitiello, B., Magruder, K. M., Bing, E. G. & Shapiro, M. F. (2014). Impact of psychiatric conditions on health-related quality of life in persons with HIV infection. *American Journal of Psychiatry*.
- Sigstad, H. M., Stray-Pedersen, A., & Froland, S. S. (2005). Coping, quality of life, and hope in adults with primary antibody deficiencies. *Health Qual Life Outcomes*, 3, 31.
- Stats SA. (2014) *Statistics*. Retrieved on 20 January, 2015, from <http://beta2.statssa.gov.za/>
- Tempelman, H., Slabbert, M., Gosling, A., Vermeer, A. (2010) A Model for Integrated Health, Child and Community Care in Rural South Africa. VU University Press, Amsterdam.
- The WHOQOL group. (1995). The World Health Organization Quality of Life assessment

- (WHOQOL): position paper from the World Health Organization. *Social Science & Medicine*, 41(10), 1403-1409.
- UNAIDS. (2013) *HIV and AIDS estimates (2013)*. Retrieved on 17 January, 2015, from <http://www.unaids.org/en/regionscountries/countries/southafrica>
- Ware JE. (1993). *SF-36 Health Survey: Manual and Interpretation Guide*. Boston: The Health Institute, New England Medical Center.
- Wells, K. B., Stewart, A., Hays, R. D., Burnam, M. A., Rogers, W., Daniels, M., Berry, S., Greenfield, S., Ware, J. (1989). The functioning and well-being of depressed patients: results from the Medical Outcomes Study. *JAMA*; 262:914–919.
- Wells, K. B., Sturm, R., Sherbourne, C. D., Meredith, L. S. (1996). *Caring For Depression*. Cambridge, Harvard University Press.
- World Health Organization, (1998). WHOQOL-BREF Quality of Life assessment. The WHOQOL Group. *Psychological Medicine*, 28, 551-8.
- WHO (2001a). Strengthening mental health promotion. Geneva, World Health Organization (Fact sheet, No. 220).
- World Health Organization (2006). HIV/AIDS Cancer Pain Release. The urgency of pain control in adults with HIV/AIDS. 19 (4). Retrieved on 20 January, 2015, from <http://www.whocancerpain.wisc.edu>
- World Health Organization, Mental health. Retrieved on 20 January, 2015, from http://www.who.int/features/factfiles/mental_health/en/
- World Health Organization, WHOQOL-HIV instrument. Retrieved on 20 January, 2015, from http://www.who.int/mental_health/media/en/557.pdf