FACTORS INFLUENCING ADHERENCE TO ANTIRETROVIRAL THERAPY AMONG YOUTH IN MERU COUNTY BASED ON CASE OF MERU TEACHING AND REFERRAL HOSPITAL

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ABSTRACT

The Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) have become one of the major health problems in many countries in the world. The disease is widely spread in low and middle income developing countries. The HIV pandemic is one of the most serious health crises the world faces today. Globally, there was an estimated 33 million people living with HIV by the end of 2007 and more than 25 million people since 1981 have died from AIDS. In 2007 there were 2.7 million new infections and 2 million HIV-related deaths. Non-adherence issues have been common especially in sub-Saharan African countries. It is not known why the clients find it hard to reach the recommended near perfect adherence levels of or above 95 per cent and therefore there is need to establish this. If the clients' issues are not extensively addressed, there might be a possibility of clients in developing viral resistance. The critical factors that influence adherence fall into four main categories: Clients factors such as active drug or alcohol use, age, sex, cultural beliefs and ethnicity; medication for regimen such as dosing complexity, side effects, number of pills, food restrictions; provider-client relationships such as attitudes, beliefs and system of care/service delivery such as long distance travel, inconvenient appointments. The purpose of this study was to establish the factors influencing adherence to antiretroviral therapy (ART) among youth in Meru county based on a case of Meru Teaching and Referral Hospital (METRH). The target population for this study composed the 12 doctors, 76 nurses and 206 patients living with HIV/AIDS in Meru County. A sample population of 167 was arrived at by calculating the target population of 294 with a 95% confidence level and an error of 0.05. Data was analyzed using Statistical Package for Social Sciences (SPSS Version 21.0). Multiple regression analysis was used to establish the relations between the independent and dependent variables. The study sought to establish the client factors influencing adherence to ART antiretroviral therapy) among youth in Meru County. Further the study sought to establish the medication factors influencing adherence to antiretroviral therapy (ART) among youth in Meru County. The study also sought to establish the provider-client factors influencing adherence to antiretroviral therapy (ART) among youth in Meru County. Again, the study sought to establish the stigma and discrimination factors influencing adherence to antiretroviral therapy (ART) among youth in Meru County. The study concluded that client factors had the greatest effect on the Adherence to ART, followed by provider-client factors, then medication factors while stigma and discrimination factors had the least effect to the Adherence to ART and that all the variables were significant. The study recommends that people living with HIV should be encouraged not to continuously use alcohol which disrupts antiretroviral therapy. The study recommends that the manufacturer should focus on the complexity of dosage such that one pill which contains all the requirements can be manufactured in order to reduce the dosing complexity which is highly believed

to have discouraged youth from antiretroviral therapy. The study finally recommends that the county government of Meru should organize for a road show to sensitize its residents on the effects and importance of adhering to ART.

Key Words: *antiretroviral therapy, youth, Meru County, Meru Teaching and Referral Hospital*

INTRODUCTION

The Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) have become one of the major health problems in many countries in the world. The disease is widely spread in low and middle income developing countries; such as South Africa, Botswana, and other Sub-Saharan African countries (Jointed United Nations programme on HIV / AIDS (UNAIDS), 2011). However, the introduction of Antiretroviral Therapy (ART) brought dramatic changes to the lives of people (UNAIDS, 2011). People living with HIV have started to live longer and AIDS related deaths have also been declining due to the availability of the ART programme. Since 1995, around 2.5 million deaths have been averted in low and middle income countries due to increased access to ART (UNAIDS, 2011).

ART requires a high level of adherence to minimize treatment failure and viral resistance (Mukui et al., 2016). There is a very strong relationship between adherence and virologic failure; an adherence level of more than 95% may lead to 22% virologic failure, an adherence level between 80% and 95% level may result in a 61% treatment failure and less than or equal to 80% adherence may have a treatment failure of 80% (UNAIDS, 2011). The shift to the use of antiretroviral therapy (ART) for treating HIV and AIDS has led to increasingly complex drug regimens (Su et al., 2016).) These drug regimens present significant challenges to both patients and health care providers with respect to adherence. Without adequate adherence, antiretroviral agents are not capable of suppressing HIV replication owing to insufficient concentrations of drugs in the blood, and may lead to difficulties suppressing plasma viral load (Phelps et al., 2010). In addition to being associated with poor short-term viral response, poor adherence to ART accelerates development of drug-resistant HIV. Therefore, identifying and mitigating the factors that reduce adherence to combination antiretroviral agents are important for prolonged viral load suppression (Phelps et al., 2010).

In the last couple of years, there has been rapid progress in scaling up Anti-Retroviral Therapy (ART) for People living with HIV/AIDS (PLWHIV) world-wide, Sub-Saharan African being no exception (WHO, 2009). It is estimated that 44% of the people with advanced HIV infection are currently receiving ART world-wide (WHO, 2010). However, the success should not only be measured through the number of people receiving ART at a given time, but also taking into account their clients successful adherence to the treatment. The virologic efficacy of ART or high adherence level is better achieved if the client sticks to the treatment regimen of more than 95% (WHO, 2009). However, in resource poor settings this is not easy to achieve as many clients fail to adhere in the long term duration the ART is required.

The widespread accessibility of the ART has changed the course of HIV infection in developed countries with comparable benefits being observed in resource limited settings. Recent studies have shown a sharp progress in ART access globally through combined efforts of affected countries and international partners. For example, two Countries in sub-Saharan Africa that is Botswana and Namibia have reached international treatment coverage of 80% or more (UNAIDS, 2010). Phillips et al. (2016) reported tremendous increase in supply of ART in resource limited settings. This dramatic availability of ART meant that more clients in need of ART were able to access them even in the low income countries.

Sub-Saharan Africa region is by far the worst affected in the world by the epidemic. The region has just over 10% of the world population but it is home to 67% of all people living with HIV and for 75% of AIDS deaths in 2007. HIV prevalence varies considerably across this region ranging from less than 1% in Madagascar to over 26% in Swaziland (WHO, 2009). Currently there are an estimated 940,000 people (adults and children) living with HIV in Uganda .HIV prevalence was estimated to be 5.4% among adults in 2007 showing a decline from an estimated adult prevalence of 7.9% in 2001 (WHO 2009a). Increases in treatment coverage have been extraordinary in many countries of the Sub-Saharan Africa. For example in Namibia where treatment coverage was less than 1% in 2003, 88% of individuals in need were on ART by the end of 2007. In Rwanda, ART coverage increased from 1% in 2003 to almost 71% in 2007 (Guira et al., 2016).

Access to antiretroviral therapy has increased tremendously in Sub-Saharan Africa with the World Health Organization (WHO) estimates pointing to an increase from 100,000 people receiving treatment at the end of 2003 to over two millions in December 2007 representing a 20-fold increase. This has changed the clinical course of Human Immunodeficiency Virus (HIV) with significant decline in morbidity and mortality. Now the challenge has shifted from access to adherence since with increased access to antiretroviral therapy (ART), HIV has become a chronic disease where patients have to take antiretroviral drugs for a long time with substantial side effects and sometimes with complex regimens (Today, South Africa has the largest antiretroviral therapy programme in the world with a 54% coverage and with 1.5 million people on ARVs (UNAIDS, 2010). In addition to this, the pressure on government is increasing to revise their ARV policy and to treat more people earlier since the publication and active media coverage of the "Treatment as Prevention" strategy in July this year by Montaner (2011). The "Treatment as Prevention" strategy is based on research findings which showed that by expanding ARV coverage (that is, putting more people on ARVs earlier) the communal viral load will be lowered and this in turn is associated with declining numbers of new HIV infections. The strategy is based on the widely accepted principle that the concentration of viruses in the blood is a key driver of HIV transmission.

In Kenya, ART is available in all public, private and even faith based organizations (FBO) at no cost. The Government of Kenya has also put strategic measures in place where CCCs have been

established all over country-wide including remote areas. This is to ensure that every client eligible for the therapy gets it. Currently more than 99% of those clients who require ART can access them in a resource limited settings. However, WHO believes that at least 3 million people needing care should be able to access ART (Montaner, 2011).

The regimen has been simplified to fewer doses, less food and fluid restrictions and is more tolerable but treatment still requires high adherence level of or more than 95%. Recent studies have shown reduced numbers of illnesses related to HIV infection worldwide from the peak of 2.1 to 1.8 million in 2009 and a slight increase in adherence rate in Sub Saharan African countries. (UNAIDS/WHO, 2011).

In Meru Teaching and Referral Hospital, the adherence rate is as low as 30.4% according to areport by NACC (2009) after studying the entire Meru County medical population. According to the latest released report of the Kenya Aids Indicator Survey, Kenya is among the six HIV burden countries in Africa where more than 1.6 million people are living with HIV. About 29,122 (3.3 percent) people in Meru are living with HIV/AIDS with children constituting 13 percent which translates to 3,720 of the victims living with the virus placing the county's burden to the nation at position 31. HIV accounts for an estimated 29 percent of annual adult deaths, 20 percent of maternal mortality and 15 percent of children under the age of five years according to the UNAIDS efficient and sustainable HIV responses report 2013. It is alarming the toll that has placed in the country's economy by lowering per capita output by 4.1 percent. This study will focus on Meru County seeking to investigate the factors influencing adherence to Antiretoviral therapy (ART) among the youth (Nachega, 2009).

STATEMENT OF THE PROBLEM

The antiretroviral regimen has also been associated with unbearable side effects such as neuropathy, diarrhea and headache. In addition to these, there are so many pills to be swallowed about 16-20 per day including the pills to prevent opportunistic infections. This becomes a major challenge for many HIV-positive clients. They, therefore, end- up taking few of the pills or discontinuing the whole regimen 5 in order to get relieved from the pill burden (Bhat et al., 2010). Food and fluid restrictions have also been associated with ART as compared to other medications. This makes the regimen a unique one. Clients may also find it difficult to fit the ART regimen in their life situations resulting to a lot of disruptions, stresses. Such inconveniences may make them skip some doses of the ART regimen. Various factors have been associated with poor adherence to antiretroviral therapy. These include negative attitudes towards ART, inaccessibility of the ARVs, inadequate knowledge about the therapy, poverty, cultural and religious beliefs, illiteracy and age. Therefore, such factors need to be addressed so that clients are empowered and enlightened more on the importance of maintaining high ART adherence levels and the implications of non-adherence. The problem of ART adherence has been there since its introduction in 1990s (Palitza, 2009).

Non-adherence issues have been common especially in sub-Saharan African countries. It is not known why the clients find it hard to reach the recommended near perfect adherence levels of or above 95 per cent and therefore there is need to establish this. If the clients' issues are not extensively addressed, there might be a possibility of clients in developing viral resistance (Tosolari, 2009).

Kenya has made strides in scaling up ART. The primary goal of ART as designed by the Ministry of Health is to minimize the viral load in HIV infected patients with the purpose of promoting quality of life, as well as reducing of HIV-related morbidity and mortality. However, anecdotal evidence suggests certain problems that contribute to the default rate, for insistence (Bhat et al., 2010) indicate that some men use their partners' ART irrespective of their status and further explore that the defaulter rate is high among the youth and children under the care of the elderly. There are no much studies about adherence levels in Kenya, specifically in Meru County.

About 29,122 (3.3 percent) people in Meru are living with HIV/AIDS with children constituting 13 percent which translates to 3,720 of the victims living with the virus placing the county's burden to the nation at position 31. According to NACC, Meru County in 2011 had 1,700 new infections and the remedy towards reducing the sexual transmission of HIV counselling, testing and linkage to care and treatment need to be emphasized and encouraged. NACC's report further discloses that that there is need to scale up HIV testing in the county to counsel and reduce the risk of those who test negative and to link those who test positive to care and treatment programmes as well as improve adherence to ART programs. One major challenge cited by NACC is the lack of information regarding the HIV/AIDS prevalence and control in Meru County. Due to the lack of information on many areas involving the spread and control of HIV/AIDS in the county, it has been difficult to make policies to address the situation. This is the gap that this study seeks to fill.

Montaner (2011) conducted a study in Kenya on patient satisfaction with integrated HIV and antenatal care services in rural while Ochieng et al. (2015) did a similar study in location but on implementation and operational research: correlates of adherence and treatment failure among Kenyan patients on long-term antiretroviral therapy. Mukui et al. (2016) studied the rates and predictors of non-adherence to antiretroviral therapy among HIV-positive individuals in Kenya focusing on the results from the second Kenya AIDS indicator survey. Also, another study by Muthiani (2010) focused on factors influencing adherence to antiretroviral therapy at Nyeri Provincial Hospital in Central Kenya. Clearly, studies focusing on the adherence challenge factors in Kenya, and more specifically in Meru County, are few. This is why this study seeks to fill this gap in literature by studying the factors that may lead to poor adherence to ART, specifically in Meru County.

GENERAL OBJECTIVE

The purpose of this study was to establish the factors influencing adherence to ART antiretroviral therapy) among youth in Meru county based on a case of Meru Teaching and Referral Hospital (METRH).

SPECIFIC OBJECTIVES

1. To establish the client factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru county
2. To establish the medication factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru county
3. To establish the provider-client factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru county
4. To establish the stigma and discrimination factors influencing adherence to Antiretoviral therapy (ART)among youth in Meru county

THEORETICAL ORIENTATION

The purpose of theoretical framework is to make scientific findings more meaningful and generalizable. Thus, this section discusses the theoretical foundation on which the study is anchored. The study will be grounded on the Health Belief Model framework (HBM) which is supported by the social- psychological model.

Health Belief Model (HBM)

With reference to this study, the health belief model framework (HBM) was used. HBM is a social- psychological model that attempts to explain and predict individual health behavior by focusing on the attitude and beliefs of individuals. The model was developed in the 1950s by Rosenstock with an intention to predict which individuals would or would not take specific action to avoid illness. Rosenstock assumed that to be in good health and to stay so it is an objective common to all people. The HBM is based on the three major components namely individual perceptions, modifying factors and variables affecting the likelihood of taking recommended health action. The model assumes that an individual will take health related action if that person perceives susceptibility, severity of condition, benefits in taking an action to reduce the risk and believes in being able to successfully execute the action required to produce the desired outcome without barriers (Livi, Zeri & Baroni, 2017).

With reference to the concepts introduced about the HBM, adherence can be taken to be the desired health related action or behavior that can be influenced by perceptions, beliefs, attitude of an individual. If such factors are not re-enforced or addressed, they may lead to non-adherence (Castonguay, Filer & Pitts, 2016).

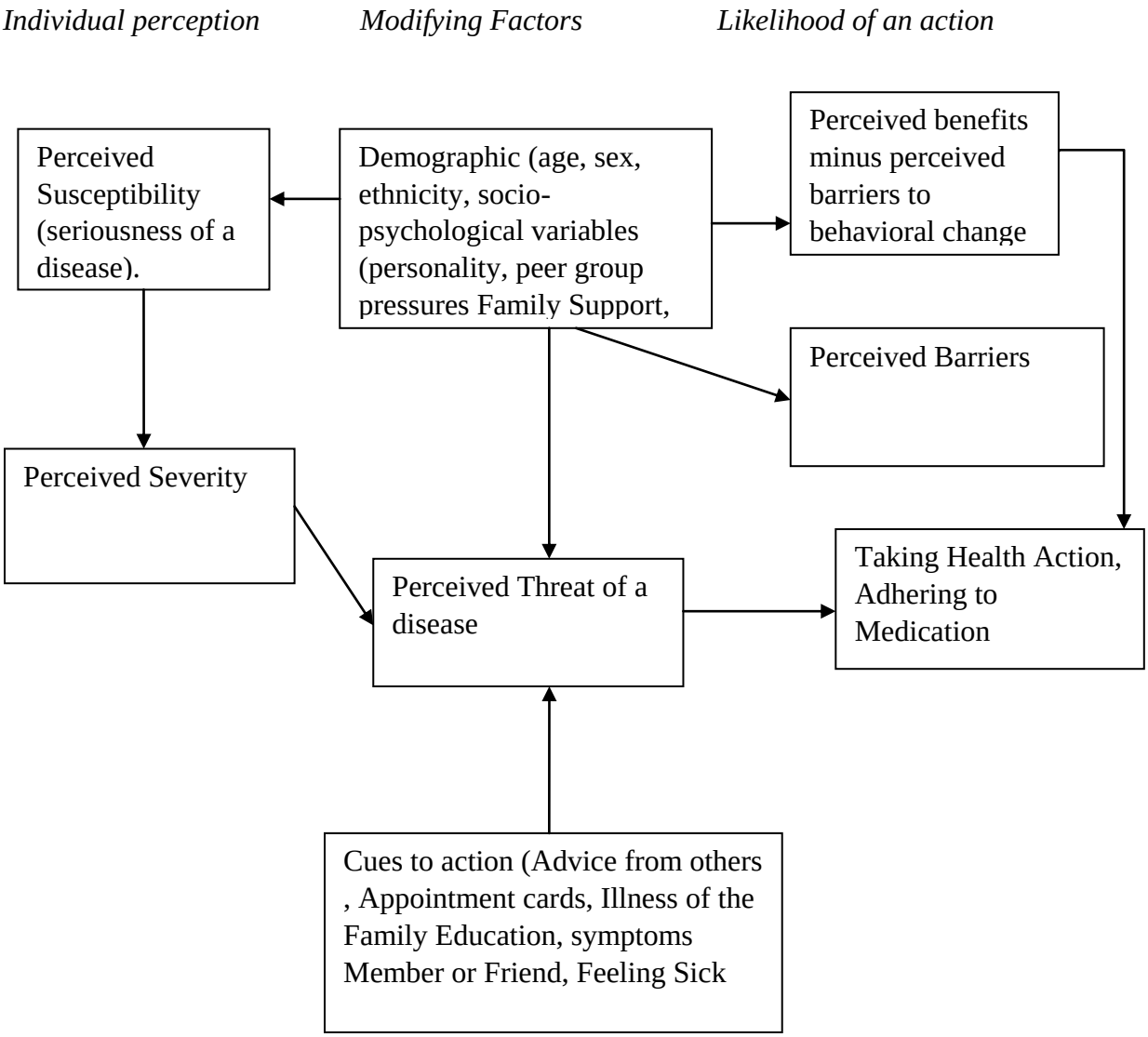

Figure 1: Relationship of the Key Concepts of Health Belief Model

Perceived susceptibility is when people believe they are at risk for a disease, they are more likely to do something to prevent it from happening and when they are not at risk of susceptibility they will do the opposite. Therefore, HIV positive client's belief that they are susceptible to AIDS when they do not take their Antiretroviral drugs well. This perception is influenced by various factors such as age, gender, or cultural beliefs (Buldeo & Gilbert, 2015).

Perceived severity refers to an individual's belief about the seriousness or severity of the disease. It also come from the beliefs a person has about the difficulties a disease would create or the effects it would have on his life in general. When the perception of susceptibility is combined with seriousness, it results in perceived threat. Knowledge and beliefs of the consequences of having AIDS include muscle wasting, skin rashes Hospitalization, loss of job and early death. This perception is likely to influence an individual to take a health action which leads to a

perceive threat of deterioration (Baghianimoghaddam et al., 2010). Modifying factors that influence person's perceptions include demographic variables such as age, gender, marital status and ethnicity. An unmarried person may adhere better to treatment regimen than married one because of the freedom they might have to make choices and decisions (Asare & Sharma, 2012).

Socio-psychological variables: Cultural and spiritual beliefs may encourage or hinder engaging in preventative health behaviors such as use of condom. Structural variables such as past experience, knowledge about the HIV and prior contact with it may have positive influence on adherence to ART. Other factors include economic status, communication may influence on decision and choices made by an individual on health actions according to Buldeo and Gilbert (2015).

Cues to action: These are events, people or things that move people to change behavior. Cues can either be internal or external. Internal cues include feeling of fatigue, uncomfortable symptoms or thoughts about the condition of another HIV positive client who is close. External cues that may affect adhering to drugs may be advice from others, pill taking reminders, and illness of family member of a friend as posited by Asare and Sharma (2012).

Likelihood of an action: This is the behavior adapted in order to reduce threat based on the perceived benefits and barriers of the behavioral change (Castonguay, Filer & Pitts, 2016). Perceived benefits of the action are the person's opinion of the value or the usefulness of adopting a new behavior in decreasing the risk of developing the disease or alleviating the existing symptoms well (Castonguay, Filer & Pitts, 2016). Perceived Barriers of the action is an individual's own evaluation of the obstacles in the way of adapting a new behavior or continuing with the same behavior. Perceived barriers to adhering to ART including pill burden, food restrictions, dosing schedule, side effects and stigma may lack support from family members or friends as disease has a social stigma (Buldeo & Gilbert, 2015).

Theory of Reasoned Action (TRA)

Research using the Theory of Reasoned Action (TRA) has explained and predicted a variety of human behaviors since 1967. Based on the premise that humans are rational and that the behaviors being explored are under volitional control, the theory provides a construct that links individual beliefs, attitudes, intentions, and behavior.

A specific behavior defined by a combination of four components: action, target, context, and time (e.g., implementing a sexual HIV risk reduction strategy (action) by using condoms with commercial sex workers (target) in brothels (context) every time (time) (Tosolari, 2009). The intent to perform a behavior is the best predictor that a desired behavior will actually occur. In order to measure it accurately and effectively, intent should be defined using the same components used to define behavior: action, target, context, and time. Both attitude and norms, described below, influence one's intention to perform a behavior (Palitza, 2009).

A person's positive or negative feelings toward performing the defined behavior. Behavioral beliefs are a combination of a person's beliefs regarding the outcomes of a defined behavior and the person's evaluation of potential outcomes. These beliefs will differ from population to population. For instance, married heterosexuals may consider introducing condoms into their relationship an admission of infidelity, while for homosexual males in high prevalence areas it may be viewed as a sign of trust and caring (Horsmann, 2010). A person's perception of other people's opinions regarding the defined behavior is what is constitutes norms. Normative beliefs are a combination of a person's beliefs regarding other people's views of a behavior and the person's willingness to conform to those views. As with behavioral beliefs, normative beliefs regarding other people's opinions and the evaluation of those opinions will vary from population to population (Ochieng et al., 2015).

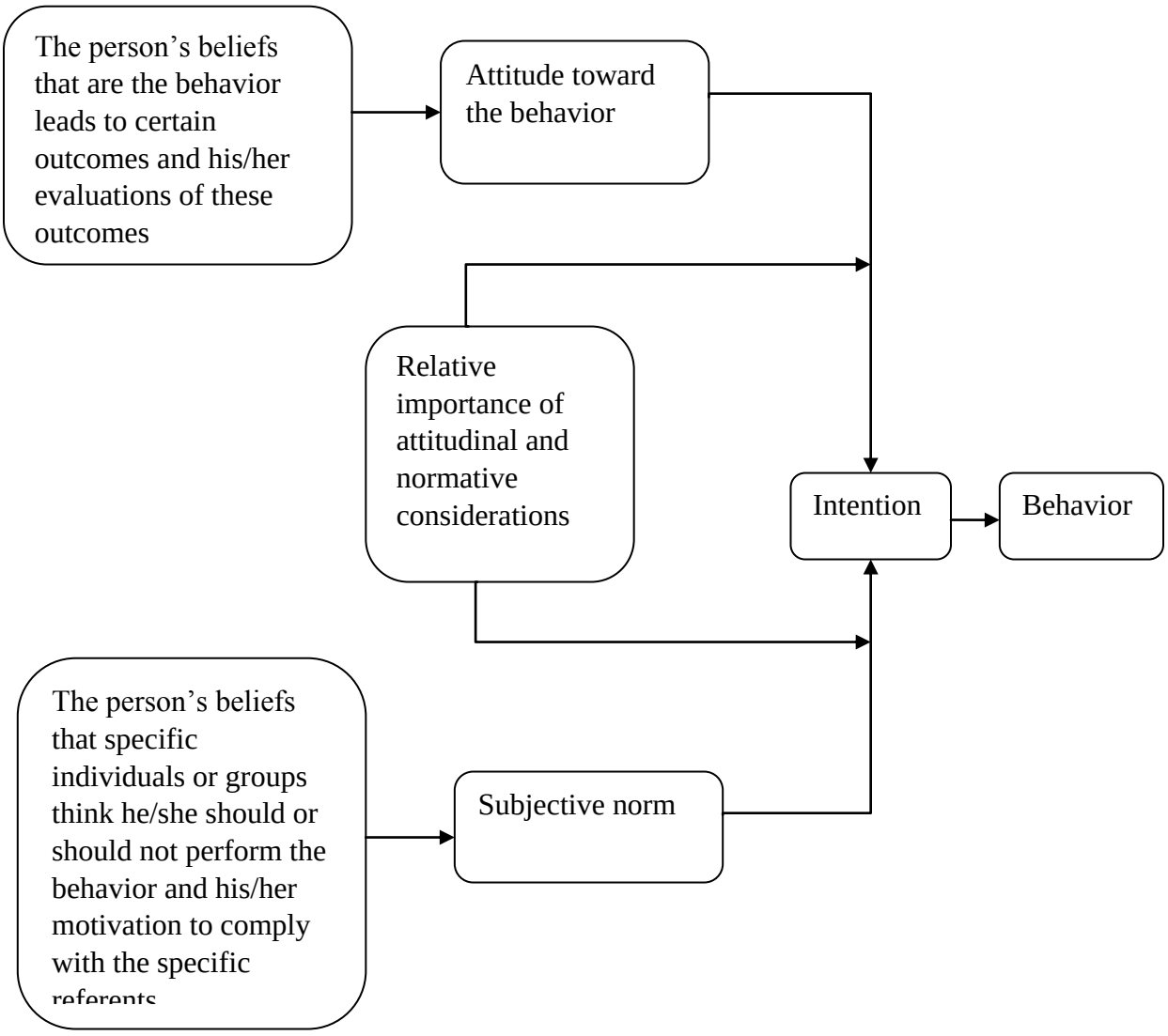

Figure 2: Theory of Reasoned Action (TRA)

The TRA provides a framework for linking each of the above variables together. Essentially, the behavioral and normative beliefs -- referred to as cognitive structures -- influence individual attitudes and subjective norms, respectively. In turn, attitudes and norms shape a person's intention to perform a behavior. Finally, as the proponents of the TRA (Mukui, et al., 2016) argue, a person's intention remains the best indicator that the desired behavior will occur. Overall, the TRA model supports a linear process in which changes in an individual's behavioral and normative beliefs will ultimately affect the individual's actual behavior. In this context, a person's intention can be used to determine if they are willing to adhere to ART. If not, the factors leading to this situation can be identified through this theory.

The attitude and norm variables, and their underlying cognitive structures, often exert different degrees of influence over a person's intention. For example, results from a study of northern Thai males revealed that men's perceptions of peer norms were the best predictor of condom use (Livi, Zeri & Baroni, 2017). Yet in a study of college females in the United States, attitudinal beliefs exerted greater influence on the intent to use condoms by sexually inexperienced females (Sayles et al., 2009). In order to develop appropriate interventions for a specific population and behavior, therefore, it is important to determine which variable and its corresponding cognitive structures exert the greatest influence on the study population (Sayles et al., 2009).

To date, behaviors explored using the TRA include smoking, drinking, signing up for treatment programs, using contraceptives, dieting, wearing seatbelts or safety helmets, exercising regularly, voting, and breastfeeding (Lucas & Bengsberg, 2009). Studies conducted in Zimbabwe applied the theory to research on condom usage by females and males (Mills, Brester & Morh, 2011). Other study populations for TRA HIV/AIDS research include women, STD clinic patients, female commercial sex workers, men who have sex with men, college students, and injecting drug users.

Some limitations of the TRA include the inability of the theory, due to its individualistic approach, to consider the role of environmental and structural issues and the linearity of the theory components (Sayles et al., 2009). Individuals may first change their behavior and then their beliefs/attitudes about it. For example, studies on the impact of seatbelt laws in the United States revealed that people often changed their negative attitudes about the use of seatbelts as they grew accustomed to the new behavior.

RESEARCH GAPS

The HIV pandemic is one of the most serious health crises the world faces today. Globally, there was an estimated 33 million people living with HIV by the end of 2007 and more than 25 million people since 1981 have died from AIDS. In 2007 there were 2.7 million new infections and 2 million HIV-related deaths (WHO, 2009). Access to antiretroviral therapy has increased tremendously in Sub-Saharan Africa with the World Health Organization (WHO) estimates pointing to an increase from 100,000 people receiving treatment at the end of 2003 to over two

millions in December 2007 representing a 20-fold increase. This has changed the clinical course of Human Immunodeficiency Virus (HIV) with significant decline in morbidity and mortality. Now the challenge has shifted from access to adherence since with increased access to antiretroviral therapy(ART), HIV has become a chronic disease where patients have to take antiretroviral drugs for a long time with substantial side effects and sometimes with complex regimens (WHO, 2009). In Kenya, ART is available in all public, private and even faith based organizations (FBO) at no cost. The Government of Kenya has also put strategic measures in place where CCCs have been established all over country-wide including remote areas. This is to ensure that every client eligible for the therapy gets it. Currently more than 99% of those clients who require ART can access them in a resource limited settings however WHO believes that at least more than 3 million people needing care should be able to access ART (MOH, 2010). The critical factors that influence adherence fall into four main categories: Clients factors such as active drug or alcohol use, age, sex, cultural beliefs and ethnicity; medication for regimen such as dosing complexity, side effects, number of pills, food restrictions; provider-client relationships such as attitudes, beliefs and system of care/service delivery such as long distance travel, inconvenient appointments. There is also the influence that stigma and discrimination has on the uptake of ART amongst HIV/AIDS patients. Of all these, client's behavior is the critical link between a prescribed regimen and treatment outcome. The effectiveness of ART will only fail if the client does not take medication as prescribed of refuse to take them at all (Wood, 2010).

With reference to this study, the health belief model framework (HBM) was used. HBM is a social- psychological model that attempts to explain and predict individual health behavior by focusing on the attitude and beliefs of individuals. Relating to the concepts introduced about the HBM, adherence can be taken to be the desired health related action or behavior that can be influenced by perceptions, beliefs, attitude of an individual. If such factors are not re-enforced or addressed, they may lead to non-adherence. Research using the Theory of Reasoned Action (TRA) has explained and predicted a variety of human behaviors. Based on the premise that humans are rational and that the behaviors being explored are under volitional control, the theory provides a construct that links individual beliefs, attitudes, intentions, and behavior. The TRA provides a framework for linking each of the above variables together. Essentially, the behavioral and normative beliefs -- referred to as cognitive structures -- influence individual attitudes and subjective norms, respectively. In turn, attitudes and norms shape a person's intention to perform a behavior. Many studies have also been done regarding ART adherence, strategies put in place but still issues regarding ART adherence seem to be stagnating. This study is, therefore, intended to identify those factors that influence ART adherence and make recommendations so that guidelines can be provided in order to help combat the problem of non-adherence with specific reference to Meru County.

RESEARCH METHODOLOGY

The study adopted a descriptive research design. A descriptive design is concerned with determining the frequency with which something occurs or the relationship between variables (Bryman & Bell, 2011). Thus, this approach was suitable for this study, since the study intended to collect comprehensive information through descriptions which were helpful for identifying variables. The target population for this study composed of the 12 doctors, 76 nurses and 206 patients living with HIV/AIDS in Meru County. The sample size is a subset of the population that is taken to be representatives of the entire population (Kumar, 2011). A sample population of 167 was arrived at by calculating the target population of 294 with a 95% confidence level and an error of 0.05 using the below formula taken from Kothari (2004).

$$n = \frac{z^2.N.\partial_p^2}{(N-1)e^2 + z^2\partial_p^2}$$

Where: n = Size of the sample,

N = Size of the population and given as 294,

e = Acceptable error and given as 0.05,

∂p = The standard deviation of the population and given as 0.5 where not known,

Z = Standard variate at a confidence level given as 1.96 at 95% confidence level.

The sample size fits within the minimum of 30 proposed by Saunders, Lewis and Thornhill (2012). The study selected the respondents using stratified proportionate random sampling technique. Stratified random sampling is unbiased sampling method of grouping heterogeneous population into homogenous subsets then making a selection within the individual subset to ensure representativeness. The study used simple random sampling to pick the respondents in each stratum. Primary data was obtained using self-administered questionnaires. The questionnaire was made up of both open ended and closed ended questions. The questionnaires were used in an effort to conserve time and money as well as to facilitate an easier analysis as they were in immediate usable form. Pilot testing of the research instruments was conducted using staff and patients at Meru Level 5 County Hospital since it had a similar setting. A total of 17 questionnaires were administered to the pilot survey respondents who were chosen at random. After one day the same participants were requested to respond to the same questionnaires but without prior notification in order to ascertain any variation in responses of the first and the second test. The study used content validity which draws an inference from test scores to a large domain of items similar to those on the test. Content validity was concerned with sample-population representativeness. Gillham (2011) stated that the knowledge and skills covered by the test items should be representative to the larger domain of knowledge and skills. Expert opinion was requested to comment on the representativeness and suitability of questions and give suggestions of corrections to be made to the structure of the research tools. This helped to improve the content validity of the data that will be collected. The questionnaires were

administered to a pilot group of 17 randomly selected respondents from the target population and their responses were used to check the reliability of the tool. This comprises 10% of the sample size. A construct composite reliability co-efficient (Cronbach alpha) of 0.7 or above, for all the constructs, is considered to be adequate for this study (Rousson, Gasser and Seifer, 2012).

The drop and pick method was preferred for questionnaire administration so as to give respondents enough time to give well thought out responses. The researcher personally administered the research instruments to the respondents. This enabled the researcher to establish rapport, explain the purpose of the study and the meaning of items that may not be clear as observed by Best and Khan (2003). Data was analyzed using Statistical Package for Social Sciences (SPSS Version 21.0). All the questionnaires received were referenced and items in the questionnaire were coded to facilitate data entry. After data cleaning which entailed checking for errors in entry, descriptive statistics such as frequencies, percentages, mean score and standard deviation was estimated for all the quantitative variables and information presented inform of tables. The qualitative data from the open ended questions was analyzed using conceptual content analysis and presented in prose.

Inferential data analysis was done using multiple regression analysis. Multiple regression analysis will be used to establish the relations between the independent and dependent variables. Multiple regressions were used because it is the procedure that uses two or more independent variables to predict a dependent variable. Since there a were four independent variables in this study the multiple regression model generally assumed the following equation:

$$\boldsymbol{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon}$$

Where:-

Y= Adherence to ART

β_0=constant

$\beta_1, \beta_2, \beta_3$ and β_4 = regression coefficients

X_1= Client factors

X_2= Medication factors

X_3= Provider-client factors

X_4= Stigma and Discrimination factors

ε=Error Term

RESEARCH RESULTS

Multiple Regression Analysis

In this study, a multiple regression analysis was conducted to test the effect among predictor variables. The summary of regression model output is presented in table 1.

Table 1: Summary of Regression Model Output

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.898	0.807	0.801	1.806

The study found that independent variables selected for the study (i.e. client factors, medication factors, provider-client factors and stigma and discrimination factors) accounted for 80.1% of the variations on adherence to ART. According to the test model, 19.9% percent of the variation adherence to antiretroviral therapy (ART) among youth in Meru County could not be explained by the model. Therefore, further studies should be done to establish the other factors that contributed the unexplained (19.9%) of the variation on adherence to antiretroviral therapy (ART) among youth in Meru County. The analysis of variance results for the relationship between the four independent variables and adherence to antiretroviral therapy (ART) among youth in Meru County is shown in table 2.

Table 2: Summary of One-Way ANOVA results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1624.82	4	406.205	88.239	0.000
	Residual	534	116	4.603		
	Total	2012.82	120			

The probability value of 0.000 indicates that the regression relationship was significant in predicting the effects of client factors, medication factors, provider-client factors and stigma and discrimination factors on adherence to ART. The calculated F (88.239) was significantly larger than the critical value of F= 5.6125. This again shows that the overall test model was significant. The Regression coefficients for the relationship between the four independent variables and adherence to ART are shown in table 3.

Table 3: Regression coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.884	0.223		3.964	0.0001
Client factors	0.866	0.342	0.776	2.532	0.0120
Medication factors	0.681	0.216	0.545	3.153	0.0020
Provider-client factors	0.716	0.317	0.643	2.259	0.0258
Stigma and Discrimination factors	0.543	0.136	0.431	3.993	0.0001

The established multiple regression equation for predicting adherence to ART from the four independent variables was:

$$Y= 0.884+0.866X_1 + 681X_2 + 0.716X_3 + 0.543X_4 + \varepsilon$$

The regression equation above has established that taking all factors into account (client factors, medication factors, provider-client factors and stigma and discrimination factors) constant at zero, Adherence to ART was 0.884.

Client Factors

The findings presented also show that taking all other independent variables at zero, a unit increase in the client factors would lead to a 0.866 increase in the scores of Adherence to ART. The study also found that that active drug level influences adherence to antiretroviral therapy and that level of education determines good social skills in antiretroviral therapy. This correspond to Shubber et al., (2016) who claimed that a Lower level of general education and poorer literacy impacts negatively on some patient's ability to adhere whilst a higher level of education has a positive impact. Further the study revealed that age of the patient determines adherence to antiretroviral therapy and that continuous alcohol use disrupts antiretroviral therapy. This is in line with Van Dyk (2010) who argues that age may influence adherence where apart from the most elderly adherence increases with age. The study also showed that sex of the youth fairly influences consistency of antiretroviral therapy, those financial concerns fairly influences consistency in antiretroviral therapy and that cultural beliefs lowly affect the antiretroviral therapy. This concurred with Grierson, et al (2009) who revealed that poverty is an increasing feature of the face of HIV especially in the third world where many people are living below the poverty line.

Medication Factors

Further the study found that a unit increase in the scores of medication factors would lead to a 0.681 increase in the scores of Adherence to ART. The study also revealed that side effects increases mortality rate of youth in antiretroviral therapy. This concurs with Buldeo and Gilbert (2015) who argues that anticipation and fear of side effects also impacts upon adherence. The study also revealed that number of pills discourages youth to undergo antiretroviral therapy. This was in line with Mehta et al. (2016) who argued that if ARV treatment is changed to a more potent regime, the mutants will decrease again, but they are archived in memory cells and can re-emerge if ARVs to which they are resistant are used in future. Further the study showed that drug resistance influence adherence to antiretroviral therapy This was similar to Chan (2011) who argued that drug hypersensitivity is far more common in patients with HIV and regimen associated toxicity is a common predictor of, and reason for, non-adherence across many studies The study also revealed that food restrictions fairly influence consistency in antiretroviral therapy. Furthermore the study showed that dosing complexity discourages youth from antiretroviral therapy. This correspond to Castonguay, Filer and Pitts (2016) who argued that a high pill load, thrice-daily dosing, dietary and dosing idiosyncrasies, large capsules or tablets, and specific storage instructions results to regimen complexity which significantly impacts upon a patient's ability to adhere.

Provider-client Factors

Further, the findings shows that a unit increases in the scores of provider-client factors would lead to a 0.716 increase in the scores of Adherence to ART. The study also indicated that non-

judgmental attitude of the health care providers contribute to better adherence. This was in line NACC (2009) who argued that a friendly, supportive and non-judgmental attitude of the health care providers, convenient appointment scheduling and confidentiality contribute to better adherence. Again, the study revealed that that clinical setting and service delivery helps a client to overcome significant barriers to antiretroviral therapy adherence. This was similar to Paterson (2010) who argued that the effect that the clinic setting has on adherence should not be underestimated where clinic characteristics that impact on adherence include: proximity to the patient's home or place of work, the expense of getting there, lengthy delays between appointments, clinic opening and closing times, long waiting times, lack of services such as child care, privacy, confidentiality, and unsympathetic or inconsiderate staff. Again the study revealed that service provision and treatment decisions motivates ART adherence and that poor social support influence the degree of adhering to the prescribed ART regimen. This was in line with WHO (2009) which claimed that inconvenience of the regimen where a client becomes frustrated by the health care provider especially in situations where misunderstandings occur, treatment becomes complex and side effects becomes unmanageable have shown to result to non-adherence. The study also revealed that difficulties with ART re –supply are obstacles to adherence and disagreed that beliefs and good relationship doesn't improve the adherence. This was contrary to Paterson (2010) whose two recent studies done on client- provider relationship to show the effect of trust of the client on physician and the impact on client's ART adherence showed that good relationship improved the adherence ten-fold when compared to those clients who had no trust on the physician.

Stigma and Discrimination

The study also found that a unit increase in the scores of stigma and discrimination factors would lead to a 0.543 increase in the scores of Adherence to ART among youth in Meru County. The study found that less outdoor activities discourage youth to undergo antiretroviral therapy. This was similar to Williamson and Martin (2010) who argue that there is need for general awareness of the contexts in which disclosures are made and the general response that follows such disclosures. Further the study found that poor social skills influence degree of adhering to the prescribed ART regimen. This concurred with Chan (2011) who examined the relationship between HIV serostatus disclosure and adherence to antiretroviral therapy and found greater adherence among PLWHA who reported greater serostatus disclosure to others. However the study revealed that few friends attitude of the health care providers contribute to better adherence. This concurs with Lucas and Bengsberg (2009) who argue that stigmatization comes about as the society uses psychological processes designed by natural selection to avoid people with a stigmatized attribute and join forces with normal people for competition and exploitation purposes.

CONCLUSIONS

The study concluded that the client factors influences adherence to antiretroviral therapy (ART) among youth in Meru County positively and significantly. From the results, the study deduced that active drug level influences adherence to antiretroviral therapy and that level of education determines good social skills in antiretroviral therapy. Further the study established that age of the patient determines adherence to antiretroviral therapy the study showed that sex of the youth fairly influences consistency of antiretroviral therapy and that cultural beliefs lowly affect the antiretroviral therapy.

Further the study concluded that the medication factors influenced adherence to antiretroviral therapy (ART) among youth in Meru County positively. From the findings, the study deduced that side effects increases mortality rate of youth in antiretroviral therapy and that number of pills discourages youth to undergo antiretroviral therapy Further the study deduced that drug resistance influence adherence to antiretroviral therapy and that dosing complexity discourages youth from antiretroviral therapy.

The study also concluded the provider-client factors influenced adherence to antiretroviral therapy (ART) among youth in Meru County significantly and positively. From the results, the study deduced that non-judgmental attitude of the health care providers contributes to better adherence and that clinical setting and service delivery helps a client to overcome significant barriers to antiretroviral therapy adherence. Again the study deduced that poor social support influence the degree of adhering to the prescribed ART regimen. The study also deduced that difficulties with ART re –supply are obstacles to adherence.

Again, the study concluded that the stigma and discrimination factors influenced adherence to antiretroviral therapy (ART) among youth in Meru County positively. As per the results the study deduced that less outdoor activities discourage youth to undergo antiretroviral therapy and that poor social skills influence degree of adhering to the prescribed ART regimen. The study also revealed that few friends attitude of the health care providers contribute to better adherence. Overall, the study concluded that client factors had the greatest effect on the Adherence to ART, followed by provider-client factors, then medication factors while stigma and discrimination factors had the least effect to the Adherence to ART and that all the variables were significant.

RECOMMENDATIONS

The study recommends that people living with HIV should be encouraged not to continuously use alcohol which disrupts antiretroviral therapy. This can be done through specially organized seminars and workshops as well as media advertisements. This will assist the respective patients in improving adherence to ART. The study recommends that the county government should take an initiative of providing medics to all its residents as well as sensitizing the youths on the importance of adhering to ART. This will make the pills available and easily accessible to all people hence improving consistency on adherence.

The study recommends that the manufacturer should focus on the complexity of dosage such that one pill which contains all the requirements can be manufactured in order to reduce the dosing complexity which is highly believed to have discouraged youth from antiretroviral therapy. This will improve the adherence. Further the study recommends that the government should carry out pre-tests on the pills to make sure that before they are distributed to its residents, they are free from side effects. This will reduce the fear most of the youths have that the pills have side effects hence improving that adherence to ART.

Further the study recommends that the clinics should be set strategically where they are accessible to all the residents. This will ease keeping clinic appointments where care providers should emphasize keeping clinic appointments by caregivers, and target those who miss clinic appointments for intensive adherence counseling to avert treatment failure hence improving the adherence to ART. The study also recommends that the health care providers should be encouraged not to be non-judgmental and instead offer the correct advice to the victims. This will create a friendly environment between the patients and the health care providers which will improve the adherence to ART.

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