

**FACTORS ASSOCIATED WITH ADHERENCE TO ANTIRETROVIRAL TREATMENT
AMONG ADOLESCENTS ATTENDING KALISIZO HOSPITAL,
KYOTERA DISTRICT**

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DECLARATION

I, declare that the work contained in this research report on the **factors associated with adherence to antiretroviral treatment among adolescents attending Kalisizo Hospital, Kyotera District**, is mine and has never been presented before any academic institution for any award.

Signature Date.....

NAJJEMBA GRACE

APPROVAL

This Bachelors; of Nursing undergraduate research report titled, **“factors associated with adherence to antiretroviral treatment among adolescents attending Kalisizo Hospital, Kyotera District”**, was under my guidance as the supervisor and is now ready to be submitted to Clarke International University for marking.

Signature..... Date:

**APIO JUDITH ALLSAINTS
(SUPERVISOR)**

DEDICATION

I dedicate this work to my family members.

ACKNOWLEDGEMENT

I extend my appreciation to husband Mr. Kasujja Martin for all the support, care and other life responsibilities. Very important to mention are financial, moral and psychological support since we came together and during this course. Your role has been and still very instrumental in fulfilling my life goals.

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DEFINITION OF OPERATIONAL TERMS

- Adherence** : Attachment or commitment of adolescents to take ARVs as prescribed by the health care providers as per ART guidelines.
- Adolescent** : This is a person between 10 and 25 years
- Antiretroviral Therapy** : ART are medications that treat HIV. The drugs do not kill or cure the virus. However, when taken in combination they can prevent the growth of the virus. When the virus is slowed down, so is HIV disease. Antiretroviral drugs are referred to as ARV. Combination ARV therapy (cART) is referred to as highly active ART (HAART).

LIST OF ABBREVIATIONS

AIDS	:	Acquired Immune Deficiency Syndrome
AOC	:	Adolescent Only Clinic
ART	:	Antiretroviral Therapy
ARV	:	Antiretroviral drugs
CDC	:	Centers for Disease Control and Prevention
CME	:	Continuous medical education
DHO	:	District Health Officer
FPC	:	Finite Population Correlation Factor
HCT	:	HIV Counseling and Testing
HIV	:	Human Immune Virus
PDSA	:	Plan-Do-Study-Act
PEPFAR	:	Presidential Emergency Plan for AIDS Relief
RCT	:	Routine Counseling and Testing
UDHS	:	Uganda Demographic Health Survey
UNAIDS	:	United Nations on Acquired Immune Deficiency Syndrome
UNICEF	:	United Nations Children’s Fund
VCT	:	Voluntary HIV counseling and testing
WHO	:	World Health Organization

ABSTRACT

Introduction: About 127,000 adolescents aged 10 to 19 are living with HIV in Uganda (UNAIDS, 2013). Both good adherence and retention in care are a prerequisite to successful management of adolescents living with HIV (ALHIV). Poor adherence is associated with poor treatment outcome (UNICEF, 2017). In the case of ART, optimal adherence is taking 95 % and above of prescribed medication (Gokarm et al., 2012). However in a study carried out in among adolescents attending Kalisizo Hospital, Kyotera District in July 2018 adherence was found to be low, thus a need for this study. This study aimed to assess the factors associated with adherence to antiretroviral treatment among adolescents attending Kalisizo Hospital, Kyotera District in July 2018. This was based on study specific objectives that included; assessing the individual, drug related and health care related factors associated with adherence to antiretroviral treatment among adolescents attending Kalisizo Hospital Kyotera District.

Methodology: The study used a descriptive cross-sectional design where a sample of 355 respondents who were adolescents between 10 and 25 on antiretroviral treatment was used. Stratified and simple random sampling techniques were used to select the respondents and data was collected using self-administered questionnaires and analyzed using SPSS.

Results: The level of adherence to antiretroviral treatment was low at 33%. This was far lower than the national target of 90%. This was attributed to individual, drug and healthcare factors. Individual factors were; gender ($\chi^2 = 59.13$ P=0.001), age ($\chi^2 = 9.74$ P=0.021), marital status ($\chi^2 = 8.10$ P=0.044), Education ($\chi^2 = 12.88$ P=0.005), place of residence ($\chi^2 = 50.94$ P=0.001), family size ($\chi^2 = 11.02$, P=0.012) and religion ($\chi^2 = 12.68$, P=0.027). Drug related factors included; having all the drugs they were supposed to take ($\chi^2 = 18.58$, P=0.001), challenges faced with the drugs ($\chi^2 = 19.16$, P=0.001), Frequency of taking ARV pills in a day ($\chi^2 = 4.06$, P=0.044), challenges faced when taking ARVs ($\chi^2 = 5.28$, P=0.022) and accessibility to ARV drugs ($\chi^2 = 4.27$, P=0.039). Health related factors were; getting routine education and counseling about adherence to ARVs ($\chi^2 = 71.63$, P=0.001), source of information ($\chi^2 = 62.03$, P=0.001), had nearby health care facility to pick ARV drugs ($\chi^2 = 68.70$, P=0.001), Distance between health facility and respondents home ($\chi^2 = 45.45$, P=0.001), availability of ARV on appointment day ($\chi^2 = 14.60$, P=0.001), availability of health care workers for ARV services ($\chi^2 = 31.41$, P=0.001), How often have you been coming for ARVs refill at the clinic ($\chi^2 = 60.25$, P=0.001) and waiting time on the appointment day to pick the drugs ($\chi^2 = 75.71$, P=0.011).

Conclusion: The level of adherence to antiretroviral treatment was low. This was attributed to missing of taking of drugs due stigma, drug stock outs, failure to get routine education about ART, distance to health facility, inadequacy of information given and long waiting time.

Recommendations: The researcher recommends that; health education through counseling should be emphasized, drug restocking should be regular, use of reminders, facilitating patients with transport fares and prompt attendance to them when they come for drug refill.

CHAPTER ONE: INTRODUCTION

1.0 Introduction

This chapter contains the background of the study, problem statement, general objective, specific objectives, significance and conceptual framework of the study. These are discussed as follows.

1.1 Background of the study

Adolescence typically describes the years between 13 and 19 which is the transitional stage from childhood to adulthood. However, the physical and psychological changes that occur in adolescence can start earlier during the preteen or tween years (ages 9 through 12) (UNICEF, 2017). On the other hand World Health Organization defines adolescence as the age between 10 and 24 years (WHO, 2017). In this study adolescent was considered to be between 10 and 2 years of age.

Treatment adherence is one of the strongest predictors of virological failure, development of drug resistance, disease progression and death (Ochieng et al., 2015). Poor adherence to combination antiretroviral therapy (CART) is common in both developing and developed nations. It was found in around 20% of HIV-infected patients in Africa and in around 14% in the United States of America (Safren et al., 2015).

By year-end 2014, approximately 37 million people were living with the human immune-deficiency virus (HIV) globally, with nearly all from low- and middle-income countries. Of those, an estimated 15 million HIV-infected persons were receiving antiretroviral drug (ARV) therapy (ART), a doubling of numbers on ART from 2010 (UNAIDS, 2015). The use of ART has significantly reduced morbidity and mortality over time in persons living with HIV. Globally in 2014, 1.2 million persons died from AIDS-related causes, representing a 42% reduction since the peak in AIDS deaths in 2004 (UNAIDS, 2015).

Adolescents and young people represent a growing share of people living with HIV worldwide. In 2016 alone, 610,000 young people between the ages of 15 to 24 were newly infected with HIV, of whom 260,000 were adolescents between the ages of 15 and 19 (UNICEF, 2017).

Estimates of ART adherence among adolescents living with HIV (ALHIV) in Low and Middle-Income Countries (LMIC) vary substantially. Adherence rates ranged from 16% to 99% among adolescents globally (Hudelson and Cluver, 2015). Meta-analysis findings among adolescents and young adults (12-24 years) in 53 countries since 2014 found adherence based on either self-report or viral load measures at 84% in both Africa and Asia (Ridgeway et al., 2018).

Into the third decade of the HIV/AIDS epidemic, there are 34 million people living with HIV in the world, of whom five million are aged between 15 and 24 years (UNICEF, 2011). Adolescence is a period of mental, physical and emotional maturation wherein commonly individuals undergo behavioural experimentation, identity formation, risk taking and face difficult choices on romantic relationships, sexual behaviour and alcohol and recreational drug use (UNICEF, 2017).

There has been one previous review of ART adherence among HIV-infected youth, which showed adherence rates ranging from 28.3 to 69.8% in the USA (UNICEF, 2017). A multicenter prospective cohort study in 17 European countries with 1323 adult patients showed 80% of its population achieving virological suppression (95% CI, 78–82) (Kim, Gerver, Fidler and Ward, 2016).

UNAIDS estimates that 2.0 million adolescents aged 10–19 were living with HIV in 2014 (UNAIDS, 2014), among which 9,600 were in Thailand. Despite increasing access to ART, several studies in Thailand and worldwide have found decreased adherence and rebound in mortality in adolescents receiving ART as compared to adults and young children (Lowenthal et al., 2014).

Virologic data show that rates of viral suppression (less than 400 copies/ml) range from 27% to 89% in Africa, from 52% to 87% in Asia and from 37.5% to 49% in Central and South America (Ferrand et al., 2016).

The vast majority of people living with HIV are in low- and middle-income countries. Sub-Saharan Africa is the most affected region, with an estimated 25.6 million people living with HIV in 2015. About 66% of new HIV infections in 2015 occurred in sub-Saharan Africa (PEPFAR, 2017). Data indicate that only 15% of adolescent girls and 10% of adolescent boys aged 15-19 in sub-Saharan Africa – the region most affected by HIV – have been tested for HIV in the past 12 months and received the result of the last test (UNICEF, 2017). The burden of the epidemic lies largely in sub-Saharan Africa, where the prevalence is estimated to be 2.2% among young women (15–25 years) and 1.1% among young men compared to global estimates of 0.4% and 0.3%, respectively (UNICEF, 2016)

In a study from Zimbabwe, 39% of adolescents reported suboptimal adherence, but significantly fewer reported suboptimal adherence if guardians were present in the room (Gross et al., 2015).

About 127,000 adolescents aged 10 to 19 are living with HIV in Uganda (UNAIDS, 2013). Both good adherence and retention in care are a prerequisite to successful management of adolescents living with HIV (ALHIV). Poor adherence is associated with poor treatment outcome (UNICEF, 2017). In the

case of ART, optimal adherence is taking 95 % and above of prescribed medication (Gokarm et al., 2012).

1.2 Statement of the Problem

Adherence is a complex health behavior that is influenced by the drug regimen, patient and family factors, and patient-provider relationship (Shaw and Amico, 2016). The limited availability of once-daily and single-tablet regimens and palatable formulations for infants and young children is especially problematic. Furthermore, adolescents are dependent on others for medication administration: barriers faced by adult caregivers that can contribute to non-adherence in children include forgetting doses, changes in routine, being too busy, and child refusal (Clay, Nag, Graham and Narayanan, 2015). Some caregivers may place too much responsibility for managing medications on adolescents before they are developmentally able to undertake such tasks.

Statistics show that, out of 50 HIV positive adolescents who registered with Kaliisizo Hospital between 2015 January and December 2017, 13 adolescents were lost (never followed up), 22 adolescents had 89% adherence, 10 adolescents had 69% while 5 adolescents had a 60% adherence as measured by self-report, clinic based pill counts and electronic cap methods, respectively (Kaliisizo Hospital Statistics, 2017).

Adolescents with low ARVs adherence are prone to a number of health complications. In 2017 in Kaliisizo Hospital, out of the 50 adolescents 6 (12%) were diagnosed with mental disorder, 9 (18%) had frequent lapses of malaria and 3 (6%) had respiratory complication. This could be attributed to low immunity due to non-adherence to ARVs (Kaliisizo Hospital Statistics, 2017).

Despite increased expenditure on purchase of ARVs, giving HIV/AIDS health education to caretakers in the health care facilities and over the media, adherence to AVR's among adolescents is still very low. Key issues arising are low adherence to antiretroviral therapy while AIDS complications prevalence is rising. Unfortunately, there is hardly any document on the factors associated with adherence to ARVs/ART among adolescents attending Kaliisizo Hospital, Kyotera District. There was therefore an urgent need to determine the factors associated with adherence to ARVs/ART among adolescents attending Kaliisizo Hospital, Kyotera District hence this study.

1.3 Objectives of the study

1.3.1 General Objective of the study

To determine the factors associated with adherence to antiretroviral treatment among adolescents attending Kalisizo Hospital, Kyotera District in July 2018.

1.3.2 Specific objectives of the study

- i. To assess the level of adherence to antiretroviral treatment among adolescents attending Kalisizo Hospital, Kyotera District in July 2018.
- ii. To determine individual factors associated with adherence to antiretroviral treatment among adolescents attending Kalisizo Hospital, Kyotera District in July 2018.
- iii. To determine drug-related factors associated with adherence to antiretroviral treatment among adolescents attending Kalisizo Hospital, Kyotera District in July 2018.
- iv. To assess health care factors associated with adherence to antiretroviral treatment among adolescents attending Kalisizo Hospital, Kyotera District in July 2018.

1.4 Research Questions

- i. What is the level of adherence to antiretroviral treatment among adolescents attending Kalisizo Hospital, Kyotera District in July 2018?
- ii. What are the individual factors associated with adherence to antiretroviral treatment among adolescents attending Kalisizo Hospital, Kyotera District in July 2018?
- iii. What are the drug-related factors associated with adherence to antiretroviral treatment among adolescents attending Kalisizo Hospital, Kyotera District in July 2018?
- iv. What are the health care factors associated with adherence to antiretroviral treatment among adolescents attending Kalisizo Hospital, Kyotera District in July 2018?

1.5 Significance of the study

The study will generate information about factors that influence adherence to antiretroviral treatment among adolescents and the recommendations will help identify areas where interventions may be most successful in increasing to combat the problems of non-adherence to ARVs/ART. This is expected to reduce the burden of adolescent death from HIV/AIDS and poor health of adolescents in Kyotera district living with HIV/AIDS and other neighbouring areas.

HIV service delivery organizations in Kyotera district may use the findings of the study to lay their work plan in extending help to HIV affected families. This may aid them to tailor antiretroviral treatment programs that are youth-friendly and provide high-quality voluntary counseling and testing among adolescents.

The study will help the researcher to be awarded a bachelor’s degree in Nursing Sciences of Clarke International University since it is a partial fulfillment for that award.

1.6 Conceptual framework of the study

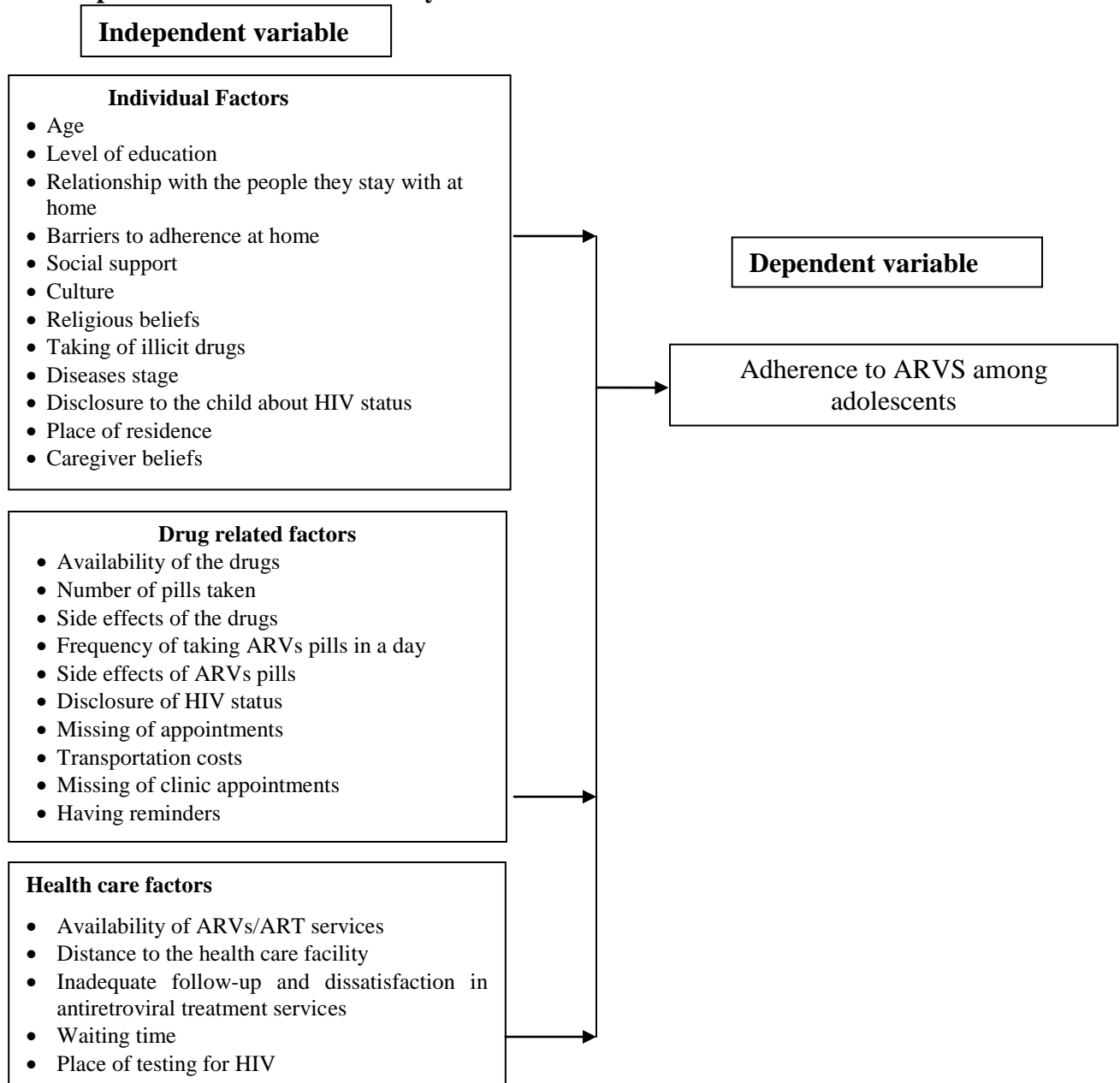


Figure 1: A conceptual framework showing the factors associated with adherence to antiretroviral treatment among adolescents attending Kaliisizo Hospital, Kyotera District

Description of the conceptual frame work

The frame work highlights the relationship between the independent and dependent variables of the study. The independent variables included; Individual factors, drug and health care factors while the dependent variable is adherence to ARV treatment among adolescents. Adherence to ARV treatment depended on how favourable the individual factors, drug and health care factors are towards ARV treatment as show in the figure above.

Individual related factors included; age, level of education ,relationship with the people they stay with at home, barriers to adherence at home, social support, Culture, religious beliefs, taking of illicit drugs, diseases stage, disclosure to the child about HIV status, place of residence and caregiver beliefs

Drug related factors included; availability of the drugs, number of pills taken, side effects of the drugs, frequency of taking ARVs pills in a day, side effects of ARVs pills, disclosure of HIV status, missing of appointments, transportation costs, missing of clinic appointments and having reminders.

Health care factors included; Availability of ARVs/ART services, distance to the health care facility, inadequate follow-up and dissatisfaction in antiretroviral treatment services, waiting time and place of testing for HIV

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter presents information from acknowledged studies related to the study at hand. This information was reviewed in relation to the study specific objectives that included; to assess the level of adherence to antiretroviral treatment among adolescents, to determine individual, caretaker and health care factors associated with adherence to antiretroviral treatment among adolescents. The detailed reviewed of these factors follows;

2.1 Level of adherence to ARVS among adolescents

The adherence threshold for ART historically has been set at 95% for the prescribed doses based on older ART Regimes (Kipsang et al., 2018). In a study carried out in California, in USA results showed medication adherence between 80% and 90% which was sufficient in suppressing viral replication (Gordon et al., 2015).

In a study carried out in China, on self- adherence to antiretroviral treatment and correlates in Hunan Province showed that the adherence threshold for ART historically has been set at 95% for the prescribed doses based on older ART regimes (Huang, et al., 2013). However, a study carried out in California State in the United States of America, reported adherence rate of 80%-90% based on the current regimes which is sufficient in suppressing viral replication (Gordon et al., 2015). It should however be noted that the adherence in China is based on WHO guide uptake recommendation of at least 90% of the prescribed that the actual adherence in China could be lower than the recommended doses thus a problem in fighting against HIV and AIDS (Kipsang et al., 2018).

In a study that examined the effects of individual adherence counseling and twice-weekly SMS reminders for adult patients carried out in Nigeria, found suboptimal adherence to ART treatment at 76.9% intervention and 55.8% control (Maduka and Obin-West, 2013). This was associated with the level of counseling services received by the patients.

Mekuria et al., (2011) in study carried out in Addis Ababa on the kind of adherence measure using a self-report, clinician recorded or pharmacy refill that was carried among 879 randomly selected patients found out that majority 664 (76.3%) of the patents who were retained in the HIV care and adhered to the ARV treatment. This was attributed to the closing monitoring of the patients by the health care providers through phone contacts.

In a cross-sectional study carried out in Zimbabwe, on the factors associated with self-reported adherence among adolescents on antiretroviral therapy revealed that, out of 262 infected adolescent's aged between 10-19 years on ARV therapy found suboptimal adherence with only 101(39%) reporting excellent adherence (Gross et al., 2015). This was attributed to absence of the guardian at each clinical encounter, discomfort with asking questions to the health provider and failure to participate in group sessions led by a professional facilitator. This implies that adolescents were not provided with right information about adherence to ART treatment.

In a study carried out in Zambia by Okawa et al., (2018) on the psychological well-being and adherence to antiretroviral therapy among adolescents living with HIV found out that of all participants, 94.2% were taking ART, but 28.3% were non-adherent. Factors associated with non-adherence to ART were loss of a mother (AOR 3.00; 95% CI 1.05-8.58) and lack of basic knowledge about HIV (AOR 3.25; 95% CI 1.43-7.40). Qualitative data identified the following challenges to ART adherence: management of medication, physical reactions to medicine, and psychosocial distress.

In a study carried out in Kenya on adherence among adolescents in Kangundo District by Kimanthi (2016) results showed that out of the 98 participants that took part in the study 65 (66.3%) had suboptimal adherence to the clinicians' appointment while 33 (33.7%) missed at least one scheduled appointment in the six months before the study. It was further noted that 66.7% and 33.3% of the respondents had missed their clinicians' appointment by more than three days once and twice respectively in the six months before the survey.

Disclosure to the child about HIV status

Zegeye and Sendo (2015) in a study on adherence to antiretroviral Therapy among HIV-infected children attending Hiwot Fana and Dil-Chora ART Clinic at Referral hospital in Eastern Ethiopia showed that, majority of the adolescents had good adherence to ARV drugs. Out of the 313 HIV positive patients assessed, 310 (99%) took greater than 95% of the whole batch of prescribed doses. Average adherence in the study was recorded at 284 (90.7%) where the major reason was disclosure of the child's sero-status to the adolescent. This was associated to the fact that respondents had got enough information about their health from trained health care providers.

2.2 Individual factors associated with adherence to ARVs/ART among adolescents

The individual factors affecting HIV voluntary counseling and testing among youths considered here include; education level, gender, religion, sexual behavior, marital status, peer pressure and culture of an individual. The details of the factors are as follows.

Level of education

Hansana et al., (2013) in a cross-sectional survey on adherence to antiretroviral therapy (ART) among people living with HIV carried out in Setthathirath Hospital in the capital Vientiane and Savannakhet Province Hospitals in Lao PDR reported that, adolescents' level of education was associated with adherence to art treatment. Findings showed that women with grade 1-6 level of education were less likely to report adherence compared to women who had tertiary level of education. This was because adolescents with tertiary education had better access to care as they could afford transport costs to the drug collection centres plus being with adequate knowledge about the importance of regular adherence to ART treatment. This was because respondents were busy with work due to being employed as they could not regularly refill their medications. Similar results were reported in a study carried out in Vietnam where adherence was higher among University graduates were more adherent to ART as compared to those with low education or no formal education (Tam et al., 2011).

On the contrary, a study carried out in Bangalore India found out that education had no effect on adherence to ART treatment (Cauldbeck et al., 2009). This was due to the fact that respondents were generally educated and thus were aware about the problems of sub-optimal treatment.

On the contrary, in a mixed-methods study that involved 1709 parturient women in the Eastern Cape, South Africa, where multi-centre retrospective analysis was used to interview purposively selected mothers under PMTCT program, it was found out that, women who had grade 1-6 level of education were more likely to have complete adherence as compared to women who had tertiary level of education (Adeniyi et al., 2018). This was because HIV and ART adherence were highly emphasis in the education curriculum of lower grades than in upper grades because of the vulnerability of younger learners who were feared to engage in irresponsible sexual intercourses.

Gender

In a cross sectional study carried out in the Congo Brazzaville, where adherence was higher among females than males (Cardorelle, et al., 2014). This was attributed to females having more time to attend to health care services which were not the case with males who had to work. These differences were associated to work schedules and sample selection methods in the two studies.

Age

In an observational longitudinal study carried out in Mumbwa district located 150 km west of Lusaka the capital city of Zambia, about adherence to ART during the early months of treatment in rural Zambia found out that, respondents who were older were more likely to adhere to ART as compared to younger respondents (Sasaki et al., 2012). Adolescents above 20 years were more adherent than younger adolescents because they were old enough to know how to manage their life and had children whom they wanted to care about so that they also grow. This is why they wanted to be in good health.

However, these results differed from those revealed in a cross sectional and pilot cross sectional studies carried out in Congo Brazzaville and Gaborone, Botswana respectively where younger age of adolescence was associated with adherence to ART treatment (Cardorelle et al., 2014; Ndiaye, et al., 2013). This contrast was due to the fact that in previous studies, younger adolescents were directly under the supervision of their caretakers at home and school while in the present study; it was the adolescents' initiative to take the drugs.

Religious beliefs

In a study carried out in different Sub-Saharan countries on the impact of religion in adherence to ARVs/ART treatment revealed that religious beliefs were found to highly hinder adherence to ART among adolescents living with HIV (Danford, 2016). In a study carried out in the Democratic Republic of Congo, found out that respondents who had a belief that ART has God's blessings were more likely to adhere to ART treatment while adolescents who had a belief that accepting God and enough were less likely to adhere to ART treatment. Similar findings were reported in another qualitative study carried out in the Congo where believers who had a mind-set that God makes everything possible were less likely to adhere to ART treatment.

Marital status

Similar results were reported in a study carried out in Nigeria who found out that forgetfulness to take or collect pills from the ART clinic was highly associated to lack of support to be remaindered or encouraged to adhere to ART (Uzochukwu et al., 2009). This was more prevalent among respondents who were singles or had lost partners due to AIDS.

In a study carried out in urban and rural settings in Uganda were adherence to ART treatment among adolescents was higher among married couples (Musiime, et al., 2012).

Place of residence

In a Malawian qualitative study that explored the factors associated with ART adherence and retention in care under option B+ strategy, found out that, place of residence where adolescents resided highly influenced the level of adherence to AVR treatment (Gugsa et al., 2017). Adolescents who were settled in place where more likely to adhere to ART treatment as compared to adolescents who never stayed in one place. This was because ever moving adolescents could not easily access drugs where they had gone due to last of transfer letters and treatment notes for the new health care providers to start from.

In a study carried out in Uganda, adherence was worse among the rural compared to urban living adolescents. This was contrary to findings in a cohort study from 2006 to 2011 which was conducted among 1000 children resident in urban and rural settings of Uganda to compare the response to ART among urban versus rural children and the factors associated with this response. Adherence of $\geq 95\%$ was observed in 88.2 % of urban versus 91.3 % of rural children by self-report, and in 78.8 % of urban versus 88.8 % of rural children by pill counts. This study also reported that rural children had more favorable clinical outcomes and were more likely to adhere optimally to ART than urban children (Musiiime et al., 2012). However, our study consisted of adolescents who are a special group that needs a lot of psychosocial support. The urban located facilities in our study had more adolescent friendly services, peer support groups and more innovations to support ALHIV than in the rural facilities which could explain the better adherence. Studies show that adolescents are attracted to such adolescent friendly services (Atuyambe et al., 2009).

Relationship with the people they stay with at home

Campbell et al (2011) study also identified a friendly atmosphere displayed by nurses which entails shaking hands, which is a culturally accepted way of greeting, taking time to know more about the adolescents' lives by listening to adolescents' problems and addressing adolescents' religious beliefs as some of factors that facilitated adherence to ART. The same study revealed that patients appreciated interest shown by staff as they tried to know fully their lives by closely interacting with them during every clinic visit (Campbell et al 2011). As HIV is now classified as a chronic condition where patients frequently visited the ART clinics some patients preferred to maintain a regular health provider since they would have developed close relationships with particular health care providers (Marukutira 2012).

Good relationship between adolescent and health care provider facilitates optimal adherence. ART being a complex treatment require patients to be involved in their treatment decisions which entail cordial relationship and open discussions between patients and health care providers, focusing mainly on exploring adolescents' decisions about the treatment support adherence required (Nunes et al., 2009:6). Chizanga, (2010) also reported that patients cope better with their illnesses and adhere more to ART if there is an existing friendly and trusting relationship between patients and health care providers enables.

Similar results were reported in a study on adherence to antiretroviral therapy among HIV infected children measured by caretaker report, medication return, and drug level in Dar Es Salaam, Tanzania, adolescents who never stayed with their biological parents had poor adherence to ART as compared to those that stayed with their parents (Mghamba et al., 2013).

Nabukeera-Barungi, et al., (2015) in a study on adherence to antiretroviral therapy and retention in care for adolescents living with HIV from 10 districts in Uganda, revealed that, adolescents who never stayed with their biological parents were less likely to adhere to ART treatment as compared to adolescents who stayed with their parents. This was because the former were exposed to mistreatment and abuse. Findings showed that the most annoying incidents were being insensitive that some family members publicly disclosed the HIV status of the adolescents living with HIV before their peers which demoralized them. This discouraged them to take their medication as they were supposed to do it thus had poor drug adherence.

Similar results were reported in a study still carried out in Uganda but this time particularly in rural settings where respondents who never adhered to ART therapy complained of isolation by family members such as refusing to use the same razor blade, safety pins, sleeping together, share the same plate of food and separating their plates from those of other family members (Musiime et al., 2012). This reduced the confidence of HIV positive adolescents in living a better life thus derailed from taking ART therapy thus poor drug adherence.

Social support

Reisner et al., (2009) in a study carried out in the United States of America revealed that, lack of social support from people adolescents lived with contributed to non-adherence to ARV treatment among adolescents. Inadequacy of social support was reflected in failure of family members to always remind the patient to take his or her drugs in time, discrimination by family members and friends which

eventually led to stigma among patients. It was due to this laxity that adolescents could not even go to the clinics to collect their drugs thus non adherence.

A study carried out in Thailand on antiretroviral therapy adherence among patients living with HIV/AIDS revealed that having a higher income, financial aid or support with travel costs generally improves adherence (Li et al., 2010). Though Thailand has a high National Gross Domestic Product, most of the people have low incomes, which make access to health care services difficult. Findings showed that, many adolescents in Thailand who fail to adhere to ARV treatment come from low income families that, cannot afford accessing treatment where the major challenges are travel costs and lack of enough disposable income to feed well so that they take the treatment with less complications.

Another study carried out in the United States of America, on understanding the mental health of youth living with perinatal HIV infection findings indicated that family support was associated with ART therapy adherence (Mellin and Malee, 2013). Findings revealed that majority of the respondents critically lacked stability and support from parents where 63% were orphans who neither had a father nor a mother while only 14% had a biological parent. It was subsequently found out that their caretakers never had parental love for the adolescents to advise them about the importance of taking their ART therapy as prescribed. This led to missing of doses due to coercion from family members or not facilitating them to have the drugs always available.

Similar findings were reported in a study carried out in South Africa, showed that, majority of the respondents (adolescents) that participated in the study lacked family support (Rochat et al., 2015). Findings showed that, such respondents had psychological torture due to resentment from their family members which discouraged them to take the drugs as prescribed due to the stigma they faced.

Adolescence is a unique and challenging stage of life characterized by rapid growth and development, increased autonomy, independence and an intense desire to associate and identify with fellow adolescents (WHO, 2013).

Forgetfulness

A hospital based study carried out in India on adherence to ART among adolescents found out that forgetting to take the pills was one of the major factors for missing pills thus poor adherence (Gokarn et al., 2012). This was more prevalent among respondents who were not staying with a companion to remind them of taking their drugs or assist them to collect them from the ART clinic on appointment days in case they were busy or weak.

Similar results were reported in a study carried out in Nigeria who found out that forgetfulness to take or collect pills from the ART clinic was highly associated to lack of support to be reminded or encouraged to adhere to ART (Uzochukwu et al., 2009). This was more prevalent among respondents who were singles or had lost partners due to AIDS.

A retrospective chart review study conducted among adolescents aged less than 19 years it was found out that lack of psychological support was associated with non-adherence to ART because they could also forget to take the drugs as prescribed. This was because most of them never had person reminders and were depressed at the same time thus missing drug doses. This was most prevalent among adolescents who were in boarding schools who even had the stigma to take the drugs before other students.

Side effects

A study on the skin disease among HIV infected adolescents in Zimbabwe, it was found out that skin disfiguration was associated with increased adherence to ART therapy among adolescents (Lowe et al., 2010). Given that the youth feared to be discriminated and excommunicated by their peers they thought that taking their medication will help them

Taking of illicit drugs

In a study carried out in the United States of America on the review of HIV antiretroviral adherence and intervention studies among HIV-infected youth, it was found out that, adolescents who used illicit drugs were less likely to adhere to ART treatment as compared to adolescents who never used illicit drugs (Reisner et al., 2009). Findings showed that, adolescents who took less alcohol in the past week before the study and less drugs in the previous three months were more likely to adhere to ART treatment as compared to their counterparts who had used more of them. Higher adherence was found among adolescents who never took any illicit drugs as compared to those who used them.

A cross sectional study carried out in West Bank and East Jerusalem on the knowledge and adherence to medications among Palestinian geriatrics living with Chronic disease revealed that, smoking and taking alcohol were highly related to poor ARV adherence (WHO, 2016). Adolescents who used drugs were very forgetful to take their medication on time as most of them claimed to have forgotten but the real truth was that they felt a lot of fatigue and nausea when they took drugs before or immediately after taking ARV drugs.

Mekuria et al., (2011) in study carried out in Addis Ababa, Ethiopia on the kind of adherence measure using a self-report, clinician recorded or pharmacy refill that was carried among 879 randomly selected patients found out that, youths who used illicit drugs such as alcohol and smoking had low ARV treatment adherence. This was attributed to the fact that, most of the youth who used drugs feared accusations from health care providers about their behavior of taking illicit drugs since it was not recommended to patients on ARV treatment.

Culture

A study on an exploration of factors influencing adherence to highly active antiretroviral therapy (HAART) among people living with HIV/AIDS in Northern Thailand reported that, in families where family culture acknowledged taking of modern medication on different complication, there was good adherence to antiretroviral therapy (Ruanjahn, et al., 2010). This was attributed to fear of being excluded from their families and society which was a highly feared life experience since people worked and shared as families.

In a study carried out on the evaluation of a specialized psychosocial support intervention 'Teen Club' in improving retention among adolescents on antiretroviral treatment (ART) at a tertiary referral hospital in Malawi, revealed that, majority of the respondents poor adherence to ART treatment was associated to negative cultural perceptions such as AIDS being a result of which witchcraft and bad omen (Agarwal et al., 2013). This discouraged adolescent from taking their medication as prescribed by the health care workers.

A study on the barrier to ARV adherence among HIV/AIDS positive persons taking ARV therapy in two Tanzania Regions between 8-12 months revealed high belief of being bewitched or of having a spell case on them or AIDS devil/spirit being witchcraft lead to low drug adherence (Nsimba, et al., 2010). Most adolescents who stayed with elders who had poor health care seeking behavior were most likely to have much trust in traditional medicine and subsequent great belief in cultural norms and were less likely to adhere to modern medicine where a case in point was poor adherence to ART treatment.

Caregiver beliefs

A qualitative study carried out in Sub Saharan Africa on disclosure to adolescents about their HIV status, revealed that, adherence to AVR treatment was associated to adolescents age (Vaz et al., 2010). Respondents who were between 15 and 18 years were more likely to adhere to ART treatment as compared to adolescents who were between 19 and 24 years. The explanation was that younger

adolescents were more likely to remind their caretakers their medication as young children are more obedient to their elders which was not the cases with older adolescents who were disobedient to their caretakers and felt stigmatized by their age mates who saw them taking the drugs.

Similar results were reported in a study carried out in different Sub Saharan countries where adolescents who held beliefs that HIV can be treated with other medications apart from ARVs were less likely to adhere to ART treatment (Danford, 2016).

Diseases stage

A pilot cross-sectional study on the risk factors for suboptimal antiretroviral therapy adherence in HIV-infected adolescents in Gaborone, Botswana showed that the diseases stage was associated adherence to ART treatment to the disease stage (Ndiaye, et al., 2013). Findings revealed that adolescents in WHO stage III/IV were more likely to adhere to treatment compared to their counterparts who were in lower stages. This was associated to the fact that relatively healthy adolescents were reluctant about taking their medications because most of them perceived it an inconvenience since they were not feeling bad.

Number of family members

A study cross sectional study on the factors associated with adherence to antiretroviral therapy among HIV infected children in Kabale district, Uganda adherence was higher among families with smaller number of members as compared to those with many members (Wadende et al., 2018). The difference was that, in a study carried out in Kabale larger families had poor adherence due to need of labour to work in agriculture to produce food for the family while in the present study larger families prioritized resources to feeding.

2.4 Drug relation factors associated with adherence to ARV treatment among adolescents

Availability of the drugs

A study carried out in middle and low income countries about antiretroviral therapy adherence and retention showed that availability of drugs is influenced by structural factors that may not be directly related to patient or medication (Nachega et al., 2010). Biadggilign et al., (2011) in a study carried out in Ethiopia found out that limited availability and accessibility to antiretroviral medications and health care facilities for diagnosis was responsible for poor adherence to ART treatment.

An observational longitudinal study carried out in Mumbwa district located 150 km west of Lusaka the capital city of Zambia, about adherence to ART during the early months of treatment in rural Zambia

found out that, around 70% of those living with HIV in need of treatment accessed antiretroviral therapy (ART) by 2009 (Sasaki et al., 2012). However sustaining, sustaining high levels of adherence to ART is a challenge due to inadequacies in medical supplies by the government.

On the contrary in a study on factors associated with self-reported adherence to antiretroviral therapy in a Tanzanian setting adolescents who missed out on appointment days never had the drugs refills and were less likely to adhere to ART because time when they did not have drugs to take (Watt et al., 2010). This was mainly due to lack of transport fares to the ART clinics.

Similar results were reported in the Ministry of Health report (2013) where adolescents who had timely drug refills were more adherent to ART treatment as compared to those that never had timely drug refills. This is because respondents had the drugs regularly and could always take them as prescribed.

Duration on drugs

A cross sectional study carried out in Lao People's Democratic Republic about adherence to ART among people Living with HIV found out that patients who had been on ART for more than two years were non-adherent as compared to those who had just been initiated on ART (Hansana et al., 2013). This was associated to complacency patients developed overtime that they no longer followed the strict regimen. In a study carried out in Northern Vietnam about the barriers to and strategies for adherence to antiretroviral therapy among HIV patients found out that being on ART for a period between two and half years to five years was significantly associated with non-adherence to ART (Tam, et al., 2011). This was because that over time family members who had initially played a supportive role in helping patients take their pills assumed that they had become used and didn't make strict follow up thus decreased adherence.

Number of pills taken

Medication related factors that promote adherence entails prescription of regimens that are simple to take, with minimal side-effects, medication with no food restrictions and prevention of drug stock outs. Among some of the factors that were seen to influence adherence were issues related to size of pill, number of pills, side-effects, food restrictions as well as dosing times had a negative influence on adherence (Marukutira 2012; Boopa 2016). In addition to the number of pills, antiretroviral treatment users are expected to take their doses at the same regular intervals for life and follow dietary requirements which might not be an easy task.

Side effects of the drugs

A study carried out in England among 809 patients it was found out that respondents who were on TB drugs had challenges with early ART where patients were not ready to start life-long ART and feared the potential for immune reconstruction inflammatory syndrome (Havlir et al., 2011). They revealed that most of the patients had a challenge of increased pill burden and overlapping drug toxicities.

Adolescents adhere better to medications with low incidence or less side-effects, regimens that are simple to take, have a low pill burden and low frequency dosing (HSS Panel Antiretroviral Guidelines for Adults & Adolescents 2013). Side-effects from antiretroviral medication were one of the most common factors that contributed to non-adherence to treatment. When patients experienced side-effects some skipped their doses whilst some completely stopped treatment despite the fact they were given relevant information about the discomfort (Boopa 2016). Some of the reported side-effects included vomiting, swollen legs, increased heart rate, nausea, anaemia, headache, skin rashes and dizziness (WHO 2006). It was also noted that additional medications taken for symptomatic relief such as TB drugs, Cotrimoxazole, cough remedies and other medications used for symptomatic relief further added to the pill burden (Nyambura 2009).

Reports of Adverse drug reaction reports from Medicines Control Authority of Zimbabwe (MCAZ), a body which monitors safety of drugs, indicated that majority (94%) of the reports were drug reactions due to ARVs, about 42% were due to one drug, Stavudine toxicity (Ministry of Health and Child Welfare 2009). In response WHO recommended phasing out the use of Stavudine because of its long term toxicity and side-effects and it was substituted with a less toxic drug (WHO, UNICEF & UNAIDS 2011).

In a study carried out in Cameroon reports showed that non adherence to ART treatment was associated to side effects of the drugs (Fonsah, et al., 2017). Suboptimal adherence was related to reasons such as the drugs cause heart burn to them, loss of appetite for foods, and nausea which made them uncomfortable especially when they were in public places.

A mixed-methods approach study carried out in Rwanda on antiretroviral therapy adherence, revealed that non adherence to ART treatment was related to the side effects of the drug (Vyankandondera et al., 2013). The side effects were generally blamed for being the major hindrance to ART adherence because the respondents complained of general body weakness and stiffness of the muscles after

taking them which limited them from doing other personal activities. This eventually led to poor adherence among adolescents.

Frequency of taking ARVs pills in a day

A cross sectional study on the factors associated with adherence to antiretroviral therapy among adolescent in Kabale district in southwestern, Uganda it was found out that, out of the 153 adolescents that participated in the study, 121(79%) adhered to ART therapy seven days prior to the study (Wadunde et al., 2018). This implied that they never missed ART dose within that period, however, it was explained whether they took the drugs in time as it was required as par the prescriptions. This was because most of such adolescents could meet the transport costs to collect the drugs from the clinics.

A study carried out in Kabale district on the factors associated with adherence to antiretroviral therapy among adolescents, revealed that out of 153 respondents, 32 (21.5%) of the respondents missed ART doses within the previous week preceding to this study. This was due to lack of support from caregivers to remind the respondents about taking their drugs.

A cross sectional study on the response to anti- retroviral therapy of HIV type 1-infected children in urban and rural settings of Uganda, reported better adherence to ART among respondents who took pills once a day. This was because taking drugs once saved the respondents of the probability of forgetting taking the drugs and could also travel to distant areas unlike those who could travel with the drugs yet they had to take them twice. Similar results were reported in a study carried among urban and rural adolescent in Uganda (Musiime, et al., 2012).

Taking of illicit drugs

A study carried out in South Africa, on the factors affecting adherence to antiretroviral therapy among pregnant women in the Eastern Cape, South Africa it was found out that adolescent who took illicit drugs were less likely to adhere to ART treatment because they feared to face health care providers when they were either drug or their blood could test positive for drugs (Adeniyi et al., 2018). These mainly included marijuana and cocaine

Side effects of ARVs pills

A study among participants recruited through clinics and AIDS service organizations in North Carolina, United States of America, reported that a number of respondents reported side effects that brought challenges with medication taking (Muessig, et al., 2015). The most reported challenges in the past year were gastrointestinal and neurologic effects while on more modern ART regimens.

Respondents who never got advice from health care providers had lower adherence as compared to ones who got advice from health care providers.

A cross-sectional study carried out in North-east Ethiopia, on the adherence to antiretroviral therapy and its associate factors among children at South Wollo Hospital reported that, respondents who never adhered to ART treatment associated it to the side effect they had with ART pills (Arage et al., 2014). They revealed that whenever they take the pills they feel dizzy and cannot carry on with other activities which make life very difficult for them.

Disclosure of HIV status

A mixed-method study carried out in Nepal on the factors influencing adherence to antiretroviral treatment stated that, disclosure of the HIV status to the adolescent was associated with adherence to ARV treatment (Wasti et al., 2011). The study reported that disclosure of one's HIV status to either a friend and /or a family member was found to be associated with adherence to HIV medication. Patients who did not disclose their status were at a high risk of suboptimal adherence.

A cross section study carried out in Ghana on facilitators and barriers to antiretroviral therapy adherence among adolescents it was revealed that disclosure of the HIV status to the adolescent was associated with adherence to ARV treatment (Ankrah et al., 2016). Findings revealed that, among adolescents who had low adherence to ARV treatment, some of them never knew the reason for taking some of the medication they were given thus a number of them did not take them seriously. This implies that non-disclosure of the HIV status to adolescent leaves them ignorant of the purpose of regular taking of ARV treatment.

Similar findings were reported in a cross-sectional study carried out in Zambia on the social factors affecting ART adherence in rural setting stated that, disclosure of the HIV status to the adolescent was associated with adherence to ARV treatment (Nozaki et al., 2011). It was found out that fear of disclosure and stigma led to low adherence to ART treatment. Findings showed that it was very shameful for an adolescent to disclose that he or she is HIV positive since he or she would be perceived as an immoral person. This created fear of social stigma and disruption in the social network thus could not free collect their medication thus suboptimal adherence.

Missing of appointments

A study on the Contemporary issues on the epidemiology and antiretroviral adherence of HIV-infected adolescents in sub-Saharan Africa among bullying and violence during routine ART refill visits

hindered adherence to ARVs treatment among adolescents (Adejumo et al., 2015). This was because they feared same and discomfort on the next appointment.

A study carried out in Kenya on adherence to antiretroviral therapy among HIV infected adolescents at Kangundo District revealed that adolescents who missed doses of ARV drugs was mainly due to forgetfulness as it accounted for 70.2% of the respondents (Kimanthi, 2016). Other reasons were fear that someone could find out that they are on ARV drugs (17.5%) while others lacked food to take along medication (11.3%). This made it very unbearable were forgetfulness was associated to lack of adequate health from family members to remind them take their medication and inadequate education about the effects such as drugs resistance that would occur in case they missed their ART drug therapy.

A study carried out in Tanzania on the factors associated with self-reported adherence to antiretroviral therapy found out that adolescents who missed appointments found out that missing clinic appointments and non-adherence were related (Watt et al., 2010). Most of the adolescents that missed clinic days never had medication refills and ran out of pills thus missing out on doses and the subsequently did not adhere to treatment requirements. The major reasons for missing out were inconvenient appointment schedule as some of them were working where work and clinic days collided. Other respondents were not full involved in their treatment process where drugs were collected by caretakers and other family members which became a problem during their absence. This led to lack of pill refill and subsequently poor adherence.

Similar findings were reported in a study carried out in Uganda on a survey on where plasma drug level was used to validate self-report adherence found out that, patients who frequently missed clinic appointments were more likely to have poor adherence to ART therapy as compared to those who had not missed clinic appointments (Balikuddembe et al., 2012). This implies that missing clinic appointments meant that it was difficult to always have the drugs as required because they were collected on clinic days and if missed they were highly likely to go out of drugs since the next appointment meant collecting drugs. It was also on clinic days that patients were health educated by the health care providers about ART therapy where the major areas of emphasis are challenges they face with it. Missing clinic appointment meant missing information thus could easily no adhere to ART therapy.

Having reminders

A study carried out in Botswana on the evaluation of the effects of cellular SMS reminders on consistency of antiretroviral therapy pharmacy pickups in HIV-infected patients, reported that after six months, 85% of respondents that received SMS reminders were 100% on time picking up monthly ART refills compared to 70% in the control group ($p = 0.064$) (Reid et al., 2017). This implies that, that adolescent needed to be reminded for better adherence just like any other patient who needs a caretaker.

Similar findings had earlier been reported in a study carried out in Cameroon where reminders were very effective in medication adherence (Mbuagbaw et al., 2012). Findings revealed that, adolescents who had reminders were able to even remind their caretaker to give them transport fares to enable them access drug distribution centres. This implies that clinic refills were always in time thus the patient always had drugs to take which was subsequently associated with good adherence.

2.5 Health care factors associated with adherence to ARV treatment among adolescents

Transportation costs

Wasti et al., (2012) in a mixed-method study on the factors influencing adherence to antiretroviral treatment in Nepal, revealed that non adherence to ART treatment was associated with transportation costs. Findings showed that, most of the drug collection centres were distantly located from adolescent's homes yet most of adolescents living with HIV were from low income earning families

Distance to the health care facility

A study carried out in Nepal, on the factors influencing adherence to antiretroviral treatment, it was found out that distance to the health care facility was associated with adherence to ART treatment (Sharada et al., 2012). Long distance travelled to the health care facility negatively influence adherence to ART treatment because most of the adolescents could not afford transport fares to drug collection centres.

Respondents who stayed less than a kilometer from the health care facility were more likely to adhere to treatment as compared to who stayed far away. Similarly a study carried out in Nepal and Kenya found out that Long distance travelled to the health care facility negatively influence adherence to ART treatment because most of the adolescents could not afford transport fares to drug collection centres (Sharada et al., 2012, Ministry of Health, Kenya, 2010) respectively.

Similar findings were reported in a study carried out in Uganda, a report released by the Ministry of Health, (2010) where it was found out that, the failure of ART therapy in most the country side areas was due to immobility in most of the rural areas where adolescents could not easily access drug distribution centers (Musiime et al., 2012). It was reported that most distribution centres are located in town areas yet most of the patients that suffered most were from remote areas which never even had access roads yet public health care providers never organized mobile HIV clinics to access them

Availability of ARVs/ART services

Results reported in a study carried out in the USA where respondents who never got advice from health care providers had lower adherence as compared to ones who got advice from health care providers (WHO, 2017).

World Bank, (2015) notes that, in most developed countries, ARVs/ART services are stations in most of the clinics which are easily accessible to majority of the adolescents who need to seek their services. There is also a lot of sensitization and health education about the importance of adherence to ART treatment. However, in developing countries, especially in Africa, most health care facilities lack adequate supplies of ARV drugs and a few that have them lack the required human resource to offer such services (UNAIDS, 2012). This gives less opportunity to adolescents to know the proper treatment plan which make adherence to treatment very difficult even if they are willing to utilize them.

In relation, a study carried out in Nigeria it was found out that, in areas where ARVS/ART services were available, adolescents who had routine education and sensitization about ART were more adherent to ART as compared to those who were not health educated (Ubesie, et al., 2016). This was because both studies were carried out from rural settings where social demographic characteristics of the respondents were similar.

Inadequate follow-up and dissatisfaction in antiretroviral treatment services

In a study carried out in Tanzania about adolescents' adherence to ART therapy reported that adherence to ART treatment was associated with the waiting time for the services at the health facility by adolescents who had gone to collect the drugs (Watt et al., 2009). Findings showed that waiting for more than 10 hours in a hospital setting to access ART treatment, reduced clinic attendance and eventually led to poor drug adherence.

Watt et al., (2009) in a study carried out in Tanzania revealed that on adolescent adherence to ART treatment, revealed that, the major challenges that hindered were inadequate follow-ups to adolescents and lack of confidence in health care officials. Majority of the respondents revealed that, they were not sure of the competence of the health care providers because they could not give them clear information regarding the state of their health.

Behaviour of the health care workers

Creating of a cordial and friendly treatment environment through proper interpersonal communication between the adolescents and caregivers is crucial in adherence to ART treatment (UNAIDS, 2017). In a study carried in Nigeria among bullying and violence during routine ART refill visits hinder adherence to ARVs treatment among adolescents (Adejumo et al., 2015). Findings indicated that health care providers who accused adolescents of their HIV status, not seeking another dose in time and abused them caused most of them to skip treatment thus poor adherence.

Place of testing for HIV

A study carried out in South Africa on mobile screening in Cape Town with emphasis on clinic impact, cost and cost-effectiveness of ART services, it was found out that, adolescents who were tested from the HIV clinics were thrice more likely to initiate and adhere to ART as compared to respondents who were tested in HIV mobile clinics (Basset et al., 2014). This implies that, adolescents who sought services from HIV clinics got more counseling as they had enough time with the health care providers which built their confidence to take the medication which could have been a different case with mobile clinics that came once in a while. Also seeking services from clinics meant a better health care seeking behavior which correlated with adhering to health care instructions such as adherence to ART therapy which could be a different case with patients found on the way.

Waiting time

A study carried out in Zimbabwe on the contextual and psychological influence on antiretroviral therapy adherence in rural Zimbabwe, revealed that ensuring privacy at clinics and waiting areas gave great courage to adolescents to freely seek ART services (Skovdal et al., 2011).

Patients are less likely to miss appointments if they are attended to within a reasonable time. Maokisa (2011) study revealed that patients who experienced long waiting hours were discouraged from going to the clinics for their monthly reviews and refill. Waiting for long hours is stressful and sometimes it can be worsened by poor interpersonal communication between patients and health care providers, where patients were sometimes asked to sit down on the floor when benches were all occupied

(Campbell et al., 2011). Similar findings were reported in a study carried out in Uganda where patients who had to wait for more than three hours before they were served with drugs were less likely to come back for the next appointment thus poor adherence (Nasuuna, et al., 2018)

CHAPTER THREE: METHODOLOGY

3.0 Introduction

In this chapter, the description of the research method is given. It included the study design, study setting, study population, sample size determination, sampling method, definition of study variables, data collection method and tools, quality control for data, data presentation and analysis, ethical issues, limitations of the study, and plan for dissemination of the study results.

3.1 Study design

A descriptive cross-sectional study research design was used to carry out this study. It was descriptive because it detailed information about the factors associated with adherence to antiretroviral treatment among adolescents attending Kaliisizo Hospital, Kyotera District in statistical way. Also it was cross sectional because data was collected at one point in time in a short period. The study was conducted in July 2018. Quantitative data was collected using semi and structured close and open ended questions. It was advantageous to the researcher because they were affordable and suitable for answering within a short period of time.

3.2 Sources of data

Primary and secondary data were used in this study. Primary data was gathered right from the respondents by the principle researcher and researcher assistants through self-administered questionnaires. Secondary data was collected from approved published studies, journals, reports and other medical documents by different researchers, scholars organization and other entities. This mainly constituted chapter one and two.

3.3 Study setting

The study was carried out in HIV clinic of Kaliisizo Hospital in Rakai District. The hospital is located in the town of Kaliisizo in Rakai District, on the Masaka-Mutukula Road, about 30 kilometres (19 mi) southwest of Masaka Regional Referral Hospital and 163.3 km via Masaka Road. The coordinates of the hospital are: 0°32'08.0"S, 31°37'22.0"E (Latitude:-0.535543; Longitude: 31.622779).

Kalisizo lies on the main highway between Masaka and the border town of Mutukula on Uganda's border with Tanzania. Kalisizo is located approximately 29 kilometres (18 mi), by road, southwest of Masaka, the nearest large city. Kalisizo is approximately 61 kilometres (38 mi), by road, north of Mutukula, the town at the international border with Tanzania. Kaliisizo Hospital serves people from Kyotera, Lengo, Rakai districts.

Kalisizo General Hospital is government-owned hospital with a bed capacity of 120. The hospital treats many cases of communicable and non-communicable diseases such as; HIV, waterborne and airborne diseases, and among others malaria, particularly among children. As with most government hospitals in the country, Kalisizo hospital has challenges related to lack of appropriate medical equipment, lack of blood, and lack of appropriate medicines especially to vulnerable groups such as people living with HIV/AIDS. This was because the hospital received many HIV positive adolescents.

3.4 Study population

The study population was categorized into target and access population of HIV/AIDS positive adolescents attending the HIV clinic of Kalisizo Hospital. This group was chosen because there was high death among HIV/AIDS positive adolescents more than other age groups due to poor adherence to antiretroviral treatment yet the reasons were not clearly known to the caretakers and healthcare providers to address the problem.

Target population consisted of all HIV/AIDS positive adolescents attending the HIV clinic of Kalisizo Hospital. The hospital has a total of 650 registered HIV positive adolescent 10-24 years. The access population was adolescents who attended Kaliisizo Hospital at the time of study.

3.5 Eligibility criteria

3.5.1 Inclusion criteria

The study population included all adolescents between 10 and 25 years on antiretroviral treatment who attended Kaliisizo Hospital. These were adolescent who had been on ART treatment for six months and consented to take part in the study.

3.5.2 Exclusion criteria

All HIV/AIDS positive adolescents who attended Kaliisizo Hospital, Kyotera District not on antiretroviral treatment or who had been on antiretroviral treatment for less than six months, or deaf or dumb, mentally ill or the very ill were excluded from the study.

3.6 Sample size determination

A sample size of adolescents on antiretroviral treatment was determined using the Kish and Leslie sample size formula given below, (Kish, and Leslie, 1965).

$$n = \frac{Z^2 PQ}{D^2}$$

Where:

n = The minimum sample size

z = z-value is the desired confidence level at 95% which equated at 1.96

P = Is the estimated proportions of HIV/AIDS positive adolescents who adhere to ARVs/ART.

Approximately 70% of adolescents were non-retained in care at Katooke Health Center, Mid-Western Uganda. Consequently, a quality improvement (QI) project was started to increase retention from 29.3% in May 2016 to 90% in May 2017 (Izudi et al., 2018).

q = Is given by 1-P.

e = Margin of error at 5% (0.05)

$$n = \frac{Z^2 P(1-P)}{D^2}$$

$$n = \frac{1.96 \times 1.96 \times 0.30 \times 0.7}{0.05 \times 0.05}$$

$$n = \frac{3.8416 \times 0.21}{0.0025}$$

$$n = \frac{0.806736}{0.0025}$$

n= 323 Respondents

To account for the expected errors that were met during the data collection process a 10% increment was considered and added to the calculated sample size

$$n = \frac{110}{100} \times 323 = 355$$

Therefore a sample size of 355 respondents was used in this study

3.7 Sampling

3.7.1 Sampling Technique

The study used both probability and non-probability sampling methods to select the respondents. Stratified and simple random sampling techniques were the probability and purposive sampling was the non- probability. Kaliisizo Hospital, Kyotera District was chosen by convenience because; it was more accessible to the researcher than other wards in Kaliisizo Hospital, Kyotera District since it was the researcher's place of work and residence.

3.7.2 Sampling Procedure

The researcher was first selected Kaliisizo Hospital, Kyotera District by purposive sampling. This was done because it is the largest hospital in the district and a referral Centre for all the nearby areas.

The researcher selected the respondents from the adolescent patients who had attended on the HIV/AIDS clinic day. This was done by simple random sampling depending on the number of adolescents who were found at the clinic during the time of study. The researcher carried out the study for 20 days in a period of one month of July 2018 (That was from Monday to Friday for two weeks). An average of 18 respondents was selected daily until the required sample of 355 respondents was achieved.

On accessing the hospital each day, the researcher counted the number of adolescents who had attended. They were then briefed about the intentions of the study and sought their consent from the caretakers and assent to participate. For those who consent and assented, the researcher then wrote papers equivalent to their number. Adolescents who picked papers having numbers from 1-18 were enrolled into the study and rest were not considered. After getting these members the study commenced.

3.8 Study variables

The dependent variable was adherence to ARV treatment among adolescents. This was considered basing on Initiation, implementation and discontinuation of treatment.

Independent variables:

- i.** Individual factors were; age, education level, occupation, tribe, gender, family size, employment status and marital status.
- ii.** Drug related constituted; number of pills, doses of the drug, cost and side effect of the drugs
- iii.** Health facility related factors comprised of; drug availability, availability of health workers, relationship with health workers, distance to the health facility and waiting time

3.9 Data collection methods and tools

In this study; quantitative data was collected using researcher-administered questionnaires. An interview guide containing both close ended (structured) and open ended (semi-structured) questions on individual, drug related and health care factors associated with adherence to ARVs/ART among

adolescents were used. This was done to create a rapport between the researcher and the respondents and to follow up all important issue the respondents had.

3.10 Quality control for field data

Quality control measures were put in place to ensure validity and reliability of collected data in the following ways;

- i. The researcher developed a researcher-administered questionnaire and was pretested in Masaka Hospital among 35 HIV/AIDS positive adolescents on antiretroviral treatment. This was 10% of the sample size before application to the study area since it had a similar setting.
- ii. The researcher-administered questionnaire was translated from English language to Luganda language which was the local language understood by the majority of the hospital attendants. This increased response from the respondents because they easily understood the concept of the study.
- iii. Researcher-administered questionnaire was used to gather data with the help of research assistants who were trained by the principal investigator before the commencement of the study.
- iv. Researcher-administered questionnaire were double checked for consistence and completeness of information obtained from the study participants so as to ensure reliability of the collected information. Before closure, all interviews will be double checked for completeness and approved for storage by the principal investigator.
- v. Researcher-administered questionnaire papers that were answered were kept in safety lockers under lock and key and only accessible by the principal investigator. This ensured confidentiality of the study results.

3.11 Plan for data presentation and analysis

Data was cleaned, coded and entered then right away entered into the computer using the Statistical Package for Social Scientists (SPSS). Descriptive statistics and analysis were carried out and were presented in tables and graphs which had percentages and frequencies. These were relied upon to quantitatively describe the variables univariately.

Bivariate analysis was attained through cross tabulation where chi-square tests and correlations were done to establish the P-values upon which levels of significance were determined. The levels of significance were attained by finding the relationship between each independent variable and the

dependent variable. After the results were compiled into a report in form of quotes and narratives to supplement the quantitative data.

3.12 Ethical consideration

On completion of the research proposal, it was approved by the supervisor who recommended the researcher to be issued with an introductory letter by the School of Nursing. This was addressed and presented to Kalisizo Hospital where the research study was carried out. The letter was handed to the Medical Superintendent of the hospital and after reading it, endorsed it and another accompaniment letter was written by her and forwarded it to the HIV/AIDS clinic to allow the researcher collect data. On accepting the researcher to carry out the study from the hospital, she educated the study population about the purpose of the study and its contents. Patients who consented or whose parents/caretakers consented to the study were enrolled into the study as respondents.

Before the commencement of the study, respondents signed a written informed consent form as described in Appendix I below then they were subjected to research questions as illustrated in Appendix II. For all collected data, confidentiality was maintained by not revealing the participants' identities. Data was safely stored in a safety box under lock and key only accessible to the study investigators.

3.13 Limitations of the study

The researcher had the following challenges during the course of the study.

- i. There was non-response from some respondents due to stigma. Some adolescents felt irritated by the questions asked them yet most of them said were responsible for their HIV infection. This at some stages negatively affected the authenticity and scope of the study findings. This was minimized by clearly explaining to the respondents the purpose of the study, counseling and comforting.
- ii. Some respondents had own biases about the study where some of them had a hostile attitude to the researcher at some point. The researcher minimized this by thoroughly explaining to the respondents about the purpose of the study and use of diverging techniques which restored hope and morale in the respondents.

3.14 Plan for dissemination

Results of the study were compiled into a research report and a number of copies were printed and submitted as follows; one copy to Clarke International University, a second copy to the administration of Kaliisizo Hospital, Kyotera District, another to Kyotera District Health Office and the researcher

retained a personal copy for future reference. In future a manuscript may be written for submission as a medical journal and presentation to various conferences.

CHAPTER FOUR: RESULTS

4.0 Introduction

This chapter presents results of the study carried out among adolescents on ARV treatment attending Kalisizo Hospital, Kyotera District. Results are based on specific study objectives that included; assessing the level of adherence to antiretroviral treatment among adolescents, determining individual, drug and health care factors associated with adherence to antiretroviral treatment among adolescents attending Kaliisizo Hospital, Kyotera district.

4.1 Distribution of the respondents by Individual factors

Table 1: Frequency distribution of the respondents by Individual factors

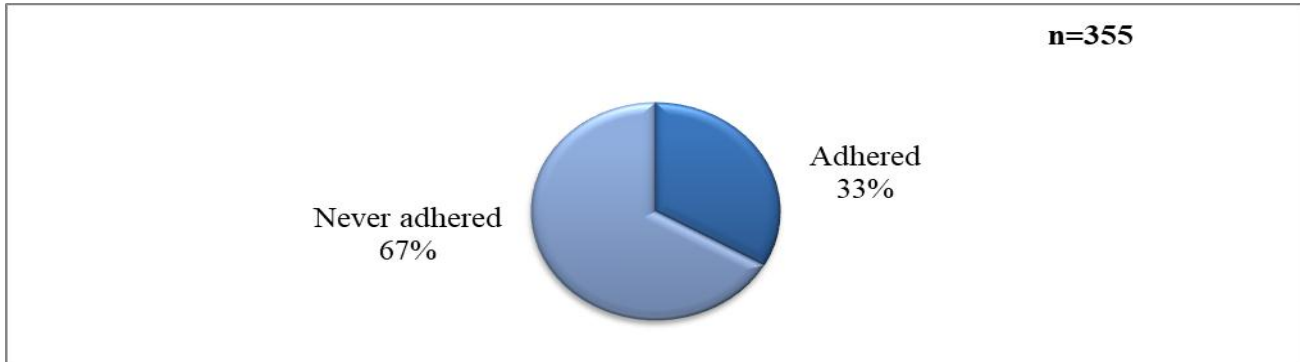
Variable	Category	Frequency	Percentage
Gender	Males	150	42
	Females	205	58
Age	Less than 15 years	61	17
	16-18 years	95	27
	19-22 years	117	33
	23-25 years	82	23
Marital status	Singles	139	39
	Married	167	47
	Separated	39	11
	Widows/widower	10	03
Education	No formal education	30	08
	Primary	106	30
	Secondary	132	37
	Tertiary	87	25
Occupation	Housewives	73	20
	Self-employed/Business	50	14
	Unemployed	130	37
	Students	83	23
	Casual labourers	19	05
Place of residence	Urban	158	44
	Rural	197	56
Family size	Less than 3 people	95	27
	4-5 people	136	38
	6-8 people	71	20
	More than 9 people	53	15
Financial status	Earn less than 2,000/= a day	184	52
	Btn 2,000/= to 5000 a week	100	28
	Btn 5,001/= to 150,000 a months	71	20
Religion	Catholics	133	37
	Protestants	121	34
	Seventh day Adventists	70	20
	Moslems	05	01
	Born Again Christians	08	02
	Orthodox Christians	18	05

Source: Primary data

Out of 355 respondents who participated in the study, majority 205 (58%) were females, 117(33%) were aged between 19 and 22 years, 167 (47%) were singles, 132 (37%) had secondary education, 130 (37%) were unemployed, 197 (56%) were from rural areas, 136 (38%) were from families with 4-6 people, 184 (52%) earned less than 2000/= a day and 133 (37%) were Catholics.

4.2 Adherence to ARV treatment among adolescents attending Kaliisizo Hospital

Figure 2: Level of adherence to ARV treatment among adolescents attending Kaliisizo Hospital



Source: Primary data

The level of adherence to ART among adolescents was 33%.

Table 2: Adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District

Variable	Category	Frequency	Percentage
Time when respondents knew were HIV positive	Early childhood	39	11
	The time when they visited the health facility for testing and counseling	263	74
	Rumours from relatives and neighbours	53	15
Started taking ARVs the moment they knew were HIV positive	Yes	327	92
	No	28	08
Ever missed taking ARV drugs in any day	Yes	237	67
	No	118	33
Frequency of missing taking ARV	Once	107	45
	Twice	85	36
	Thrice	28	12
	Four times and more	17	07
In last three months, missed taking ARV drugs in any day	Yes	171	72
	No	66	28
Number of doses missed	One	94	55
	Two	55	32
	Three	14	08
	More than four doses	09	05
Reasons for missing treatment	Stigma	86	50
	Drug stock out	38	22
	Forgot to take the drug	29	17
	Was misled	19	11

Source: Primary data

Out of the 355 of the respondents that participated in the study, majority 263 (74%) knew their HIV status the first time they visited the health facility for testing and counseling, 327 (92%) started taking ARVs the moment they knew were HIV positive, 237 (67%) had ever missed taking ARV drugs in any day since they were initiated on ART where majority 107 (45%) missed once. In the last three months 171 (72%) had missed taking ARV drugs in any day where 94 (55%) missed one dose mainly because they felt stigma (86; 50%).

4.1 Bivariate analysis of the individual factors associated with adherence to antiretroviral treatment among adolescents attending Kaliisizo Hospital, Kyotera District

Table 3: Bivariate analysis of the individual factors associated with adherence to antiretroviral treatment among adolescents attending Kaliisizo Hospital, Kyotera District

Variable	Category	Adherence		χ^2	P-values
		Adhered	Never adhered		
Gender	Females	75 (63.6%)	124 (52.3%)	4.04	0.044
	Males	43 (6.4%)	113 (47.7%)		
Age	Less than 15 years	14 (11.9%)	85 (35.9%)	33.83	0.001
	16-18 years	28 (23.7%)	69 (29.1%)		
	19-22 years	40 (33.9%)	36 (15.2%)		
	23-25 years	36 (30.5%)	47 (19.8%)		
Marital status	Singles	34 (28.8%)	133 (56.1%)	8.10	0.004
	Married	73 (61.9%)	51 (21.5%)		
	Separated	8 (6.8%)	28 (11.8%)		
	Widows/widower	3 (2.5%)	25 (10.5%)		
Education	No formal education	13 (11.0%)	30 (12.7%)	10.56	0.014
	Primary	24 (20.3%)	82 (34.6%)		
	Secondary	51 (43.2%)	68 (28.7%)		
	Tertiary	30 (25.4%)	57 (24.1%)		
Occupation	Civil servant	11 (9.3%)	4 (1.7%)	27.13	0.001
	unemployed	27 (22.9%)	82 (34.6%)		
	students	51 (43.2%)	79 (33.3%)		
	self employed	14 (11.9%)	58 (24.5%)		
	Self-employed/Business	15 (12.7%)	14 (5.9%)		
Place of residence	Urban	84 (71.2%)	74 (31.2%)	50.94	0.001
	Rural	34 (28.8%)	163 (68.8%)		
Family size	Less than 3 people	44 (37.3%)	51 (21.5%)	11.02	0.012
	4-5 people	40 (33.9%)	96 (40.5%)		
	6-8 people	17 (14.4%)	54 (22.8%)		
	More than 9 people	17 (14.4%)	36 (15.2%)		
Financial status	Earn less than 2,000/= a day	67 (56.8%)	117 (49.4%)	3.63	0.163
	Btn 2,000/= to 5000 a week	34 (28.8%)	66 (27.8%)		
	Btn 5,001/= to 150,000 a months	17 (14.4%)	54 (22.8%)		
Religion	Catholics	52 (44.1%)	81 (34.2%)	12.68	0.027
	Protestants	34 (28.8%)	87 (36.7%)		
	Seventh day Adventists	17 (14.4%)	53 (22.4%)		
	Moslems	2 (1.7%)	3 (1.3%)		
	Born Again Christians	6 (5.1%)	2 (0.8%)		
	Orthodox Christians	7 (5.9%)	11 (4.6%)		

Source: Primary data

Most of the social demographic factors were significantly associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District. These were; gender ($\chi^2 = 4.04$ P=0.044), age ($\chi^2 = 33.83$ P=0.001), marital status ($\chi^2 = 8.10$ P=0.001), Education ($\chi^2 = 10.56$ P=0.014), occupation ($\chi^2 = 27.13$ P=0.001), place of residence ($\chi^2 = 50.94$ P=0.001), family size ($\chi^2 = 11.02$, P=0.012) and religion ($\chi^2 = 12.68$, P=0.027). However financial status was not significantly associated with adherence to antiretroviral treatment (P>0.005).

4.2 Individual factors associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District

Table 4: Individual factors associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District

Variable	Category	Adherence		χ^2	P-values
		Adhered	Never adhered		
Persons respondents stayed with	Relatives	13 (11.0%)	30 (12.7%)	8.16	0.043
	Brother/sister	24 (20.3%)	71 (30.0%)		
	Both biological parents	51 (43.2%)	68 (28.7%)		
	One biological parent	30 (25.4%)	68 (28.7%)		
Were given adequate support to access ART	Yes	86 (72.9%)	87 (36.7%)	18.58	0.001
	No	32 (27.1%)	150 (63.3%)		
Cultural values acknowledge ARV treatment	Yes	39 (33.1%)	113 (47.7%)	6.89	0.009
	No	79 (66.9%)	124 (52.3%)		
Took illicit drugs	Yes	14 (11.9%)	62 (26.2%)	9.57	0.002
	No	104 (88.1%)	175 (73.8%)		
Believed that taking ARV treatment everyday makes health better	Yes	104 (88.1%)	154 (65.0%)	21.27	0.001
	No	14 (11.9%)	83 (35.0%)		
Carried beliefs that their health can be better on other treatment other than ARVs	Yes	17 (14.4%)	99 (41.8%)	26.82	0.130
	No	101 (85.6%)	138 (58.2%)		

Source: Primary data

Individual factors were significantly associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District. These included; relationship were persons respondents stayed with ($\chi^2 = 8.16$, P=0.043), were given adequate support to access ART ($\chi^2 = 18.58$, P=0.001),

cultural values acknowledge ARV treatment ($\chi^2 = 6.89$, $P=0.009$), took illicit drugs ($\chi^2 = 9.57$, $P=0.002$), and believed that taking ARV treatment everyday makes health better ($\chi^2 = 21.27$, $P=0.001$).

4.3 Drug related factors associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District

Table 5: Drug related factors associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District

Variable	Category	Adherence		χ^2	P-values
		Adhered	Never adhered		
Had all the drugs they were supposed to take	Yes	105 (89.0%)	161 (67.9%)	18.58	0.001
	No	13 (11.0%)	76 (32.1%)		
Number of pills	One	68 (57.6%)	79 (33.3%)	3.92	0.141
	Two	50 (42.4%)	158 (66.7%)		
Frequency of taking ARV pills in a day	Once	42 (35.6%)	111 (46.8%)	4.06	0.044
	Twice	76 (64.4%)	126 (53.2%)		
Faced challenges when taking these drugs	Yes	45 (38.1%)	121 (51.1%)	5.28	0.022
	No	73 (61.9%)	116 (48.9%)		
Challenges	Pill burden (Irritations, taking every day)	27 (61.4%)	60 (50.0%)	19.16	0.001
	Stigma	16 (36.4%)	46 (38.3%)		
	Forgetting	1 (2.3%)	14 (11.7%)		
Easy access to drugs	Yes	69 (58.5%)	111 (46.8%)	4.27	0.039
	No	49 (41.5%)	126 (53.2%)		

Source: Primary data

Most of the drug related factors were significantly associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District. These included; having all the drugs they were supposed to take ($\chi^2 = 18.58$, $P=0.001$), challenges faced with the drugs ($\chi^2 = 19.16$, $P=0.001$), Frequency of taking ARV pills in a day ($\chi^2 = 4.06$, $P=0.044$), challenges faced when taking ARVs ($\chi^2 = 5.28$, $P=0.022$) and accessibility to ARV drugs ($\chi^2 = 4.27$, $P=0.039$). However, the number of pills taken a day was not significantly associated with adherence to antiretroviral treatment ($P>0.005$).

4.3 Health related factors associated with adherence to ARV treatment among adolescents

Table 6: Bivariate analysis of the health related factors associated with adherence to ARV treatment

Variable	Category	Adherence		χ^2	P-values
		Adhered	Never adhered		
Got routine education and counseling about adherence to ARVs	Yes	84 (71.2%)	58 (24.5%)	71.63	0.001
	No	34 (28.8%)	179 (75.5%)		
Sources	Healthcare facility	55 (46.6%)	31 (13.1%)	62.03	0.000
	School	22 (18.6%)	120 (50.6%)		
	Humanitarian	10 (8.5%)	22 (9.3%)		
	Friends	14 (11.9%)	38 (16.0%)		
	Media	12 (10.2%)	11 (4.6%)		
	Family members	5 (4.2%)	15 (6.3%)		
Had nearby health care facility to pick ARV drugs	Yes	71 (60.2%)	40 (16.9%)	68.70	0.0001
	No	47 (39.8%)	197 (83.1%)		
Distance between health facility and respondents home	Less than 500 meters	50 (42.4%)	33 (13.9%)	45.45	0.001
	Btn 501 and 1000m	24 (20.3%)	117 (49.4%)		
	Between 1-3 km	13 (11.0%)	26 (11.0%)		
	Between 4-6 km	10 (8.5%)	26 (11.0%)		
	Between 7-10 km	14 (11.9%)	20 (8.4%)		
	More than 10 km	7 (5.9%)	15 (6.3%)		
ARV were always available on appointment day	Yes	109 (92.4%)	179 (75.5%)	14.60	0.001
	No	9 (7.6%)	58 (24.5%)		
health workers gave enough information about adherence	Yes	68 (57.6%)	112 (47.3%)	3.39	0.006
	No	50 (42.4%)	125 (52.7%)		
health care workers were always available for ARV services	Yes	80 (67.8%)	86 (36.3%)	31.41	0.001
	No	38 (32.2%)	151 (63.7%)		
How often have you been coming for ARVs refill at the clinic	Bi-weekly	35 (29.7%)	5 (2.1%)	60.25	0.001
	Monthly	61 (51.7%)	163 (68.8%)		
	Bi-monthly	17 (14.4%)	50 (21.1%)		
	More than 2 months	5 (4.2%)	19 (8.0%)		
Waiting time on the appointment day to pick the drugs	Up to one hour	53 (44.9%)	16 (6.8%)	75.71	0.011
	1-3 hours	30 (25.4%)	97 (40.9%)		
	4-5 hours	26 (22.0%)	72 (30.4%)		
	More than 5 hours	9 (7.6%)	52 (21.9%)		

Source: Primary data

All the health care related factors were significantly associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District.

CHAPTER FIVE: DISCUSSION OF RESULTS

5.0 Introduction

This chapter presents an elaborate view of the study findings showing its implications, comparisons and contrast with other acknowledged studies on adherence to antiretroviral treatment among adolescents. These results are in line with the study specific objectives that included; assessing the level of adherence to antiretroviral treatment among adolescents, determining individual, drug and health care factors associated with adherence to antiretroviral treatment among adolescents attending Kaliisizo Hospital, Kyotera district.

5.1 Adherence to antiretroviral treatment among adolescents attending Kaliisizo Hospital, Kyotera District

The level of adherence to antiretroviral treatment among adolescents attending Kaliisizo hospital was low at 33%. It was found out that majority of the respondents knew their HIV status the first time they visited the health facility for testing and counseling, started taking ARVs the moment they knew were HIV positive, had ever missed taking ARV drugs in any day since they were initiated on ART where majority missed once. In the last three months almost three quarters had missed in at least a day to take their ARV drugs mainly because they felt stigma.

Given the fact that majority of the respondents knew their HIV status the time they first visited the health facility for testing and counseling, this could have attributed to poor adherence because it was quite hard to instill a behavior of taking drugs daily into adolescent who felt stigma. Despite the fact that nine out of ten respondents started taking their ART treatment the moment they knew were HIV positive, adherence was hampered by missing of the drug doses.

Similar results were reported in a study carried out in Kenya in Kangundo District by Kimanthi (2016) showed that 33.7% of the respondents had optimal adherence to the clinicians' appointment while 33 (33.7%) missed at least one scheduled appointment in the six months before the study. It was further noted that 66.7% and 33.3% of the respondents had missed their clinicians' appointment by more than three days once and twice respectively in the six months before the survey. These similarities could have resulted from both studies being carried out in rural areas among adolescents who could have lacked adequate information about ART treatment to reduce stigma among them.

Results showed that almost seven out of ten respondents had ever missed drugs, where majority had ever missed once. Also seven out of ten respondents had missed drugs in the last months before the study. The major reasons given were stigma and drug stock outs and forgetfulness. These findings

were in relation to a study carried out in Kenya where adolescents who missed doses of ARV drugs was mainly due to forgetfulness as it accounted for 70.2% of the respondents (Kimanthi, 2016). Despite these findings being similar in the present study stigma was the major cause of non-adherence.

The nursing implication is that stigma is still a stumbling block to adherence to treatment from both the health care providers and the caretakers and community members at large. Health care providers have not done enough to health educate adolescents about ART to have confidence and hope to take which has led to poor adherence.

The public health implication is that most community members feel it unbearable and a real burden to take drugs for life long which leads to stigmatizing those taking it. This is probably due to inadequate public education and sensitization about taking ART treatment. This lessens the patients' confidence to take the drugs thus poor adherence.

5.2 Individual factors associated with adherence to antiretroviral treatment among adolescents attending Kaliisizo Hospital, Kyotera District

Most of the individual factors were significantly associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District. These were; gender ($\chi^2 = 59.13$ P=0.001), age ($\chi^2 = 9.74$ P=0.021), marital status ($\chi^2 = 8.10$ P=0.044), Education ($\chi^2 = 12.88$ P=0.005), place of residence ($\chi^2 = 50.94$ P=0.001), family size ($\chi^2 = 11.02$, P=0.012) and religion ($\chi^2 = 12.68$, P=0.027). However, respondents' occupation and financial status were not significantly associated with adherence to antiretroviral treatment (P>0.005).

Other individual factors were significantly associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District. These included; relationship were persons respondents stayed with ($\chi^2 = 8.16$, P=0.043), were given adequate support to access ART ($\chi^2 = 18.58$, P=0.001), cultural values acknowledge ARV treatment ($\chi^2 = 6.89$, P=0.009), took illicit drugs ($\chi^2 = 9.57$, P=0.002), believed that taking ARV treatment everyday makes health better ($\chi^2 = 21.27$, P=0.001) and carried beliefs that their health can be better on other treatment other than ARVs ($\chi^2 = 26.82$, P=0.000). These are discussed as follows

Findings showed that adherence was significantly associated with the respondents gender ($\chi^2 = 59.13$ P=0.001). Females adhered more than males in this study. This could be attributed to the fact that females are always humble and follow instructions unlike males who are mainly stubborn or always occupied with different activities. Similar results were reported in a cross sectional study carried out in

the Congo Brazzaville, where adherence was higher among females than males (Cardorelle, et al., 2014). This was attributed to females having more time to attend to health care services which were not the case with males who had to work. These differences were associated to work schedules and sample selection methods in the two studies.

The nursing implication is that, given that most females were found HIV positive during antenatal care, they had better chances of getting information about ART thus were more likely to adhere to treatment as compared to males who had fewer chances of attending health care services to know their HIV status.

The public health implication is that, females are always soft hearted thus can easily be convinced to take an HIV test and thus comply to treatment unlike males who are always radical to consent to different health tests and diagnosis.

Respondents' age was also a significant factor in adherence to antiretroviral treatment ($\chi^2 = 9.74$ P=0.021). Adolescents who were 19 and 25 years were more likely to adhere to antiretroviral treatment as compared to other adolescents who were younger than them. This was attributed to the fact that older youth were educated enough to know the importance of adherence and some of them had some income that they could collect the drugs themselves. This could have given them an opportunity to always have the drugs to take them as prescribed. However, these results differed from those revealed in a cross sectional and pilot cross sectional studies carried out in Congo Brazzaville and Gaborone, Botswana respectively where younger age of adolescence was associated with adherence to ART treatment (Cardorelle et al., 2014; Ndiaye, et al., 2013). This contrast was due to the fact that in previous studies, younger adolescents were directly under the supervision of their caretakers at home and school while in the present study; it was the adolescents' initiative to take the drugs.

The nursing implication is that, younger adolescents probably below 18 years of age should take their ART treatment under the supervision and guidance of the caretaker to ensure adherence. This is done because younger adolescents can easily be misled not to take the pills or lack resources to collect the drugs themselves and may lack the knowledge about ART due to low exposure. In the present study though younger adolescents were supervised it was not enough since most of the people they stayed with didn't give them adequate support such as food and finance to cater for transport to ART clinics. This could have resulted from the low incomes given that the study was carried out in a rural area where most of families have low incomes.

The public health implication is that younger people are not taken as individuals who deserve full human rights. They are always compromised and their rights are down-trodden which denies them a chance to health good health care services. This could have been responsible for low adherence among younger adolescents where they were not accorded full rights and chances to access ART treatment.

Adherence was also associated with respondents' marital status ($\chi^2 = 8.10$ P=0.044). Married respondents were more likely to adhere to antiretroviral treatment probably because they were reminded by their spouses to take the drugs or could support them financial to collect them from the health centre. One could collect the others drugs and vice versa which made it easy to adhere to treatment. Also the compassion they had could have created a harmonious understanding that each felt mercy and empathy for others' life thus could always remind them to take the drugs resulting into higher adherence. Similar results were reported in a study carried out in Nigeria who found out that forgetfulness to take or collect pills from the ART clinic was highly associated to lack of support to be remaindered or encouraged to adhere to ART (Uzochukwu et al., 2009). This was more prevalent among respondents who were singles or had lost partners due to AIDS.

Similar results were also reported in a study carried out in urban and rural settings in Uganda where adherence to ART treatment among adolescents was higher among married couples (Musiime, et al., 2012). This was attributed to sharing of information between spouses which strengthened their awareness about how to take the pills and its importance to their health that they were to have boosted immunities thus lesser chances of getting opportunistic infections. The results seemed similar probably because the two studies were done from almost the same settings with the same methodologies.

The nursing implication is that, married patients under ART treatment should always cooperate to adhere to treatment because it lessens the viral load which is advantageous to both of them due to little re-infection. Marriage implies cooperation among ART patients who improves sharing information about ART thus adherence.

The public health implication is that, married couples under ART, each would always need the other to be in good health because of the love and compassion they have. This accelerates their adherence to ART treatment because each would not want to lose the other through death. This creates an opportunity for each to always take the responsibility to have the other taking his or her medication as prescribed.

Regarding the levels of education, it was found out that adherence was highest among respondents with secondary education and closely followed by those that had tertiary education ($\chi^2 = 12.88$ P=0.005). This could have helped the respondents to have the knowledge about antiretroviral treatment such as; knowing that they could have poor health if they never took the drugs as prescribed because they had been taught in school and had perceived the health education at the clinic well.

Similar findings were reported in a study carried out among people living with HIV in Lao PDR where;, adolescents' especially women with grade 1-6 level of education were less likely to report adherence compared to women who had tertiary level of education. This was because adolescents with tertiary education had better access to care as they could afford transport costs to the drug collection centres plus being with adequate knowledge about the importance of regular adherence to ART treatment.

This was however different from a study carried out in Vietnam where education had no effect on adherence to ART treatment (Cauldbeck, et al., 2009). This was due to the fact that almost all the respondents had good levels of education thus were aware about the danger of sub-optimal treatment to their health. They knew that it would lower their immunity thus giving chance to opportunistic infections.

The nursing implication is that, ART patients with reasonable level of education are in better position to understand and apply knowledge they get from health care providers as compared to those with lower levels of education. This is partially due to the fact that better educated patients can always make more research about what they were health educated or even ask more questions which make them understand better than patients with lower levels of education who may not have the etiquette to ask probing questions about ART treatment.

The public health implication is that patients with lower levels of education have inferiority complex to ask about their health or even air out the challenges they meet with treatment due to fear from trained health workers at times which people they can't ably communicate with them. Given that the study was done from a rural setting where even the quality of education could have been poor, some respondents with lower education could have feared to seek more information about ART thus poor adherence.

Place of residence affect affected respondents adherence to antiretroviral treatment ($\chi^2 = 50.94$ P=0.001). Higher adherence was more among urban dwellers as compared to rural based respondents.

It was easier for an urban dweller to get money for transport to the hospital for drug refill as compared to one from rural areas where most of them were unemployed and far distant from the health facility. Similar results were reported in a study carried out in Malawi where patients from urban areas had higher adherence as compared to those from rural areas because most of the health care facilities were located in urban areas (Gugsa et al. (2017). In the two studies was that, ones place of residence determined accessibility to the ART clinic in terms of transport costs because most of them were low income earners.

Nursing implication is that, health care services should be client based for better accessibility. Given the local dynamics in Public Health care systems in Uganda, it is not easy for every client to have health care services at his or her disposal thus creating distance between services centres despite the fact that they are placed in areas with relatively higher population. This is probably due to inadequate human and financial resources. The weakness however is that the government has not recruited adequate field personnel for ART to reach out to all patients under ART treatment to know their challenges with adherence to ART treatment thus poor adherence especially among vulnerable groups such as the children, adolescent and pregnant mothers whose rights are compromised and have low incomes.

The public care implication is that, rural based people regard themselves as ‘forgotten’ people who are less catered for in health care service provision because fewer health care units are opened up in hard to reach areas than easy to reach areas. This leads to a poor health care seeking behavior among them thus poor adherence to health initiatives such as ART.

Respondents who came from family with less than three members were more likely to adhere to antiretroviral treatment as compared to those from families with more than three families ($\chi^2 = 11.02$, $P=0.012$). This was because respondents from families with fewer members had more resources to cater for activities such collection of drugs, feedings and other life needs as compared to those from families with many members who had to spend so much on them. Respondents from smaller families dedicated resources to medication as compared to those from larger families who prioritized feedings and other life needs. Similar results were reported in a study carried out in Kabale District in Uganda where adherence was higher among families with smaller number of members as compared to those with many members (Wadende et al., 2018). The difference was that, in a study carried out in Kabale larger families had poor adherence due to need of labour to work in agriculture to produce food for the family while in the present study larger families prioritized resources to feeding.

The nursing implication is that, family size influences health care seeking behavior because the fewer the members in a family, the more the chances of seeking health care because resources are available.

The public health implication is that large families are associated with poor health care seeking behavior mainly due to misconceptions about the cause of poor health and inadequacy of resources to seek rightful health care.

Lastly religion was significantly associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital ($\chi^2 = 12.68$, $P=0.027$). Catholics were more likely to adhere to antiretroviral treatment as compared to other religious affiliations. This because Catholicism doesn't deny one to take medication as compared to other religious that build confidence in believers that it is only God that heals. On the contrary findings from a study carried out in different Sub-Saharan countries on the impact of religion in adherence to ARVs/ART treatment revealed that religious beliefs were found to highly hinder adherence to ART among adolescents living with HIV (Danford, 2016). For instance in a study carried out in the Democratic Republic of Congo, found out that respondents who had a belief that ART has God's blessings were more likely to adhere to ART treatment while adolescents who had a belief that accepting God and enough were less likely to adhere to ART treatment.

The nursing implication is that health care services should be sought without any religious affiliations between whatever anyone's religion, health care services have to be sought the same way. Nurses should health educate

The public implication is that many people are misled and don't take medication as prescribed because their religious leaders convince them that with God everything is possible so they just have to believe that they are healed and get healed without medication. This has led to poor adherence to ART treatment as some religious beliefs regard HIV/AIDS as satan's work which can easily be done away with strong faith to God.

However, respondents' occupation and financial status were not significantly associated with adherence to antiretroviral treatment ($P>0.005$). This could due to the fact that antiretroviral treatment was free of charge that no costs were asked when one came for the treatment.

Majority of the respondents stayed with their biological parents and this was significantly associated with adherence to antiretroviral treatment ($\chi^2 = 8.16$, $P=0.043$). Highest adherence was among respondents who stayed with their biological parents which could have provided a chance to the

parents to have the passion to get drugs for their child. This was followed by respondents who had one biological parent. Ideally a parent takes more responsibility about the health of the child than anyone else. Similar results were reported in a study carried out in a study carried out in Dar-es-Salaam in Tanzania where adolescents who never stayed with their biological parents had poor adherence to ART as compared to those that stayed with their parents (Mghamba et al., 2013).

Similar results were also reported in Uganda among adolescents on ART from 10 districts where adolescents who never stayed with their biological parents were less likely to adhere to ART as compared to those that stayed with their biological parent (Nabukeera-Barungi et al., 2015). Non biological parents were found to mistreat and discriminate against HIV positive children who were not their biological children because they regarded them as burden.

Nursing implication is that, ART treatment should be handled by people who have sympathy with the patient because it needs a lot of precaution to adhere to treatment.

The public health care implication is that, most community members have a mind-set that biological parents are the ones responsible for the care of their HIV positive children/adolescents because they are responsible for their infection. This hampers the treatment process for those adolescents who are orphans because they would have lesser chances of having people who would be sympathetic to their fate. This leads to poor adherence to ART treatment.

Findings showed that majority of the respondents never had family support which hampered their adherence to ART treatment though respondents who were given adequate support to access ART from the people they stayed with were more likely to adhere to antiretroviral treatment compared to those who never had support ($\chi^2 = 18.58, P=0.001$). Support comprised financial support to help in transport fares, feeding, and others needs that constitute effective treatment. This instilled a sense of hope among patients that they were loved and medication was done for the better of their health. This was mainly among adolescents who stayed with their biological parents who really could have provided to them the best they could.

Similar results were reported in a study carried out in the United States of America where adolescents who never stayed with their biological parents were mainly orphan, didn't get adequate support and had poor adherence to ART (Mellin and Malee, 2013). This implies that in the present study, despite the fact that majority of respondents stayed with their biological parents who could have provided utmost care didn't have support probably due to low incomes which could not have been a case in America where the government has special programs for HIV positive parents and their children.

The nursing implication is that, a family member is the first nurse to any patients because he is the one who provides first-hand information in case a patient cannot tell it to the health care provider. In limited income

settings, it is a big challenge to adherence to ART because most of the family members who are the caretakers can hardly provide the necessary information to the patients so that they comply to treatment.

The public health care implication is that, any group of people one stays with is his or her family and they bear the initiative to ensure his or her wellbeing where good health is among the first priorities. It is however observed that, in the study setting most of the family members whose members are HIV positive hardly seek right health care which derail them from ideal care thus non adherence. They mainly engage in use of traditional herbal medicine which leads to poor adherence.

Respondents cultural values were also significantly associated with adherence to antiretroviral treatment ($\chi^2 = 6.89$, $P=0.009$). Respondents whose cultural values never acknowledged ARV treatment were more likely to adhere to antiretroviral treatment as compared to those who believed in cultural values that never acknowledged ART treatment. Non-adherent respondents believed that HIV/AIDS was witchcraft and had to be got rid off by taking local traditional herbs for cure. This was wrong which worsened the health conditions of the respondents. Similar results were reported in a cross sectional study carried out in Tanzania where HIV positive patients who had a belief that they were bewitched had poor adherence to ART (Nsimba et al., 2010). The difference was that in the present study, it was some cultural norms that did acknowledge modern medicine while in a study carried out in Tanzania, respondents thought that their illness was cause by super natural powers that had to be fight using traditional herbal medicine.

Nursing care implication is that health care is provided regardless of ones' cultural values, because epidemiology is the same for all races and ethnicity. Basing on cultural values to seek ART services was wrong and hindered adherence to ART.

The public health care implication is that, many local people in the area where the study was carried out trusted the use of herbal medicine to either have the capacity to heal a number of ailments, prevent them or treat their signs and symptoms. This led to some caretakers to subject some adolescents to other forms of treatment despite being on ART at the same time.

Majority of the respondents never took illicit drugs despite the fact that, taking illicit drugs was significantly associated with adherence to antiretroviral treatment ($\chi^2 = 9.57$, $P=0.002$). Respondents who took illicit drugs were less adherent to ART treatment compared to those who never took drugs. It could be that those who took drugs lost their right sense to positively thinking about the importance of taking drugs thus missed doses or. Similarly, in a study carried out in South Africa, where adolescent

who took illicit drugs were less likely to adhere to ART treatment because they feared to face health care providers when they were either drug or their blood could test positive for drugs (Adeniyi et al., 2018)

Nursing implication is that, medically illicit drugs are strictly prohibited to patients under treatment such as ART. This is because they alter the chemical properties of the drugs which lead to adverse drug effects.

The public health care implication is that, patients with strong diseases such as HIV should try a number of try a number of treatments apportions which leads to use of traditional herbal medicine thus poor adherence to ART.

Beliefs that taking ARV treatment everyday makes health better was statistically significantly associated with adherence to antiretroviral treatment ($\chi^2 = 21.27$, $P=0.001$). Respondents who believed that taking ART treatment everyday could make their health better had higher adherence as compared to those that never had that belief. This was because they had been health educated about the importance of taking ARVs daily which was meant to keep the viral load low. Similar results were reported in a study carried out in different Sub Saharan countries where adolescents who held beliefs that HIV can be treated with other medications apart from ARVs were less likely to adhere to ART treatment (Danford, 2016).

Nursing implication is that having a good knowledge about treatment of any disease positively influences ones attitude towards seeking the very treatment due to awareness of its importance. Adolescents that are well educated about ART treatment have a high likelihood of seeking ART treatment due to positive belief that they are to get better as compared to those with inadequate knowledge.

The public health care implication is that, some people in the area of study held negative beliefs about ARVs which included; ARVs being toxic, causing cancer, irritation and nausea were less adherent to ART treatment thus a problem.

Despite that fact that majority of the respondents never held a belief that apart from ART treatment there are other treatment options that can make them better, a beliefs that their health can be better on other treatment other than ARVs was significantly associated with adherence to antiretroviral treatment ($\chi^2 = 26.82$, $P=0.000$). Respondents who believed that apart from ARVs there were other medications were less adherent to antiretroviral treatment as compared to those who did not have that belief. These mainly included those that were misled to use other drugs especially traditional herbal

medicine to treat the signs and symptoms of AIDS. These mainly included; cough, skin rash and fever. This however worsened the patients conditions which resulted in other comorbidities mainly tuberculosis. Similar results were reported in a multi-method study that considered global literature on adherence among adolescents between 12 and 24 years were non adherence was highly associated to beliefs that were held in particular regions where respondents stayed (Kim et al, 2014)

Nursing implication is that adolescents under ART having a belief that they can be better with adherence to antiretroviral treatment are the major pillar in adherence.

The public health care implication is that, most community members mislead adolescents under ART about treatment options where many advise them to use traditional herbal medicine to treat some of the signs and symptoms. This is mainly due to inadequate knowledge about HIV and ART.

5.3 Drug related factors associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District

Most of the drug related factors were significantly associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District. These included; having all the drugs they were supposed to take ($\chi^2 = 18.58$, $P=0.001$), challenges faced with the drugs ($\chi^2 = 19.16$, $P=0.001$), Frequency of taking ARV pills in a day ($\chi^2 = 4.06$, $P=0.044$), challenges faced when taking ARVs ($\chi^2 = 5.28$, $P=0.022$) and accessibility to ARV drugs ($\chi^2 = 4.27$, $P=0.039$). However, number of pills taken a day was not significantly associated with adherence to antiretroviral treatment ($P>0.005$).

Having all the drugs they were supposed to take was significantly associated with adherence to antiretroviral treatment ($\chi^2 = 18.58$, $P=0.001$). Adherence was higher among respondents who had all the drugs they needed as compared to those who never had all the drugs. Those who always had the drugs could hardly miss the dose as compared to those who never had all the drugs. Similar results were reported in a study carried out in Zambia where 70% of those living with HIV in need of treatment accessed antiretroviral therapy (ART) by 2009 (Sasaki et al., 2012). Sustaining, sustaining high levels of adherence to ART is a challenge due to inadequacies in medical supplies by the government which was similar in the present study carried out in Kaliisizo Hospital. Also in Tanzania adolescents who missed out on appointment days never had the drugs refills and were less likely to adhere to ART because time when they did not have drugs to take (Watt et al., 2010).

Nursing implication is that, ART treatment is meant to be on a daily basis that missing a day without taking means non adhering. This was however not the case because there were some drug stock outs at times at the ART clinic mainly due to delayed supply.

The public health care implication is that, most adolescents were less likely to attend all the appointment days as scheduled due to a number of challenges such as lack of transport fares to ART clinics and support from family members such as reminding them in case they had forgotten to collect the drugs.

Higher adherence was among respondents who never had challenges with the drugs ($\chi^2 = 19.16$, $P=0.001$). Respondents who never felt the pill burden, stigma, nausea among others were more likely to adhere to antiretroviral treatment as compared to those who had challenges. Slightly similar was that in a study carried out in North Carolina, United States of America, majority of the respondents had challenges with medication (Muessig, et al., 2015). These included; gastrointestinal and neurologic effects while on more modern ART regimens. Similar responses were reported in a study carried out in North-east Ethiopia, at South Wollo Hospital where respondents felt dizzy and couldn't not carry on with other activities which made life very difficult for them (Arage et al., 2014).

Nursing implication is that, many patients under ART had a number of challenges that range from pill burden, high treatment costs, lack of appropriate feeding, fatigue, which discourage them to continue taking the drugs.

The public health care implication is that, many people tend to stop taking medication the moment they get side effects with it. This is mainly due to fear that their situation would become worse which is a result of inadequate health education about the effect of administration of the drug. Generally there is low public awareness of the side effects of drugs due to poor information flow through different channels such as media which is accessed by majority of the people.

Frequency of taking ARV pills in a day was associated with adherence to antiretroviral treatment where majority of the respondents took the drugs twice a day where one pill was taken in the morning and the other in the evening before sleep ($\chi^2 = 4.06$, $P=0.044$). Respondents who took drugs once were more likely to adhere to antiretroviral treatment as compared to those that took twice. This was because taking drugs once saved the respondents of the probability of forgetting taking the drugs and could also travel to distant areas unlike those who could travel with the drugs yet they had to take them

twice. Similar results were reported in a study carried among urban and rural adolescent in Uganda (Musiime, et al., 2012).

Nursing implication is that, respondents who took pills twice a day were put on that regimen because they were the pills available according to supply from the National Medical Stores while those that took pills once a day were mainly pregnant mothers who were intended to be relieved of pill burden to have adequate sleep.

The public health care implication is that, most of community members have a negative attitude towards taking medication which leads them to miss some doses. This could partially have contributed to missing doses because most of the adolescents were supposed to take pills twice a day yet felt it as a burden thus poor adherence.

Accessibility to ARV drugs also influenced adherence to antiretroviral treatment ($\chi^2 = 4.27, P=0.039$). Respondents who had easy access to drugs were more likely to adhere to antiretroviral treatment as compared to those who never accessed drugs. Respondents who poor access missed doses thus poor adherence. Similar results were reported in a study carried out in Ethiopia where limited availability and accessibility to antiretroviral medications and health care facilities for diagnosis was responsible for poor adherence to ART treatment (Nachega et al., 2010; Biadgilign et al., 2011).

Nursing implication is that ART treatment should be accessible to the user because they are supposed to be taken daily. This is why patients' contacts are supposed to be taken to have a proper follow up.

The public health care implication is that, many adolescents are far away from ART clinics due to long distance which discourages many of them to collect the drugs on appointment days which leads to poor adherence.

However, number of pills taken a day was not significantly associated with adherence to antiretroviral treatment ($P>0.005$). This could be attributed the fact that with good education respondents were free to take any number of pills a day.

5.4 Health related factors associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District

Most of the health related factors were significantly associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District. These were; getting routine education and counseling about adherence to ARVs ($\chi^2 = 71.63$, $P=0.001$), source of information ($\chi^2 = 62.03$, $P=0.001$), had nearby health care facility to pick ARV drugs ($\chi^2 = 68.70$, $P=0.001$), Distance between health facility and respondents home ($\chi^2 = 45.45$, $P=0.001$), availability of ARV on appointment day ($\chi^2 = 14.60$, $P=0.001$), availability of health care workers for ARV services ($\chi^2 = 31.41$, $P=0.001$), How often have you been coming for ARVs refill at the clinic ($\chi^2 = 60.25$, $P=0.001$) and waiting time on the appointment day to pick the drugs ($\chi^2 = 75.71$, $P=0.011$). However, health workers gave enough information about adherence was not significantly associated with adherence to antiretroviral treatment ($P>0.005$).

Getting routine education and counseling about adherence to ARVs ($\chi^2 = 71.63$, $P=0.001$). Respondents who had regular education and counseling about adherence to ARVs were more likely to adhere to antiretroviral treatment. Regular education and sensitization equipped respondents with adequate information about the importance of adherence to antiretroviral treatment. In relation, a study carried out in Nigeria found out that, adolescents who had routine education and sensitization about ART were more adherent to ART as compared to those who were not health educated (Ubesie, et al., 2016). This was because both studies were carried out from rural settings where social demographic characteristics of the respondents were similar.

Nursing implication is that health education and sensitization is key to ideal adherence to ART because it has a lot of challenges that need to be taught to the patient so that he or she knows them and doesn't misunderstand them for other effects. These include fatigue, nausea and muscles pain among others that come up due to taking of the drug.

The public health care implication is that, few community members adhere to seek information about ART despite the fact that it is broadcasted over the media. This is due to a poor research culture among most of the community members.

Source of information about antiretroviral treatment was associated with adherence to antiretroviral treatment ($\chi^2 = 62.03$, $P=0.001$). Respondents who got information from health care facilities were more likely to adhere to antiretroviral treatment as compared to those who didn't. Similar results were reported in a study carried out in the USA where respondents who never got advice from health care

providers had lower adherence as compared to ones who got advice from health care providers (Muessig, et al., 2015).

Nursing implication is that health care providers are the most reliable source of information about adherence to ART because they are trained to treatment and health educate, sensitize and counsel patients under ART.

The public health care implication is that, most community members have more trust in information from their fellow community members than trained personnel in ART possibly because they are the people they normally stay with. This leads to misconceptions thus poor ART adherence.

Majority of the respondents stayed in a distance of more than three kilometers which could have made it difficult for the respondents to access ART clinics. Respondents who stayed nearby health care facility to pick ARV drugs adhered to antiretroviral treatment ($\chi^2 = 68.70$, $P=0.001$). Staying nearer health care facilities eased transportation to pick the drugs which increased adherence to antiretroviral treatment. Respondents who stayed less than a kilometer from the health care facility were more likely to adhere to treatment as compared to who stayed far away. Similarly a carried out in Nepal and Kenya found out that Long distance travelled to the health care facility negatively influence adherence to ART treatment because most of the adolescents could not afford transport fares to drug collection centres (Sharada et al., 2012, Ministry of Health, Kenya, 2010) respectively.

Nursing implication is that ART health care services should be brought nearer to adolescents so that they always have the drugs they need so that they don't miss their doses. This is can be done through prior notification to the patients before their drugs get finished through patient reminders.

The public health care implication is that, ART adolescent who stayed in long distances from ART clinic had poor adherence which could be associated to lack of transport fares to ART clinics.

Availability of ARV on appointment day and health care workers for ARV services were associated with adherence to antiretroviral treatment ($\chi^2 = 14.60$, $P=0.001$) and ($\chi^2 = 31.41$, $P=0.001$) respectively. This meant that respondents had the chance to get the drugs and information about how to take them. On the contrary, in a study carried out among bullying and violence during routine ART refill visits hindered adherence to ARVs treatment among adolescents (Adejumo et al., 2015).

Nursing implication is that ARV s should always be provided to the adolescents so that they have the chance to take them daily.

The public health care implication is that, most community members would be reluctant to collect their drugs at some days because they are used to unavailability of drugs in most of public health care facilities.

Frequency of coming for ARVs refill at the clinic was associated with adherence to antiretroviral treatment ($\chi^2 = 60.25$, $P=0.001$). Majority of the respondents had to collect their drugs on a monthly basis and these were more likely to adhere to antiretroviral treatment as compared to those who didn't. Having drugs on a monthly basis saved adolescents of transport expenses they would incur if they were to collect the drugs on a bi-weekly basis. Similar results were reported in the Ministry of Health report (2013) where adolescents who had timely drug refills were more adherent to ART treatment as compared to those that never had timely drug refills.

Nursing implication is that, ART drugs should be collected on a regularly basis so that adolescents under ART should always have the drugs when they need them.

The public health care implication is that, many adolescents feel burdened to collect drugs within a short or after a long period of time due to transport costs challenges and forgetting respectively. This could be the reason why adherence was higher among respondents who collected drugs on a monthly basis.

Waiting time on the appointment day to pick the drugs associated with adherence to antiretroviral treatment ($\chi^2 = 75.71$, $P=0.011$). Respondents who waited for less than an hour were more likely to adhere as compared to those who waited for longer. Similarly in a study carried out in Zimbabwe on the contextual and psychological influence on antiretroviral therapy adherence in rural Zimbabwe, revealed that ensuring privacy at clinics and waiting areas gave great courage to adolescents to freely seek ART services (Skovdal et al., 2011). Patients are less likely to miss appointments if they are attended to within a reasonable time. Maokisa (2011) study revealed that patients who experienced long waiting hours were discouraged from going to the clinics for their monthly reviews and refill. Waiting for long hours is stressful and sometimes it can be worsened by poor interpersonal communication between patients and health care providers, where patients were sometimes asked to sit down on the floor when benches were all occupied (Campbell et al., 2011).

Nursing implication is that, ideally patients should wait for less than an hour before they are served or attended to. This is the standard time as par the Ministry of Health guideline for good client service. It is however observed that due to inadequacy of resources for ART especially health care providers,

patients under ART have to wait longer before they are served thus poor adherence to adolescents who could not wait for long.

The public health care implication is that, many community members have a poor health care seeking due to long waiting time at health care facilities. Adolescents who waited long for ART services had poor adherence because some of them were weak to seat for long so they opted not to come for the drugs.

However, health workers gave enough information about adherence was not significantly associated with adherence to antiretroviral treatment ($P>0.005$).

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

This chapter presents a summary of the key study findings and endorsement to fill up the gaps that were identified. These were done in relation to the study specific objectives that included; assessing the level of adherence to antiretroviral treatment among adolescents, determining individual, drug and health care factors associated with adherence to antiretroviral treatment among adolescents attending Kaliisizo Hospital, Kyotera district.

6.1 Conclusion

In a study that was carried out about the factors associated with adherence to antiretroviral treatment among adolescents attending Kaliisizo Hospital, Kyotera district, it was found out that, the level of adherence to antiretroviral treatment was low at 33%. This was far lower than the national target of 90%. This was attributed to; individual, drug and healthcare factors.

Individual factors that were significantly associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District were; gender, age, marital status, Education, place of residence, family size and religion.

Drug related factors that were significantly associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District included; having all the drugs they were supposed to take, challenges faced with the drugs, Frequency of taking ARV pills in a day, challenges faced when taking ARVs and accessibility to ARV drugs.

Health related factors that were significantly associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District were; getting routine education and counseling about adherence to ARVs, source of information, had nearby health care facility to pick ARV drugs, distance between health facility and respondents home, availability of ARV on appointment day, availability of health care workers for ARV services, frequency of ARVs refilling at the clinic and waiting time on the appointment day to pick the drugs.

6.2 Recommendations

The researcher recommends that;

- The health workers should health educate all adolescents on antiretroviral treatment on how to adhere to treatment through counseling. This would instill hope and confidence into them to take the drugs regularly and timely.

- Drug restocking should be regularly done by the Ministry of Health in collaboration with Kaliisizo Hospital.
- Reminders should be used so that adolescent always knows when to take their drugs and when to refill. Telephone calls should be used for the patients and their caretakers or next of kin.
- Facilitating patients with transport fares should be done to help in mobility of the adolescents. This is because most of the adolescents are unemployed thus lack sources of income.
- There should be prompt attendance to adolescents when they come for drug refill because most of them come from very far while others are weak to wait for so long. This will morale boost them to have the courage to come back for the drugs at the next appointment.
- Pill counting and physical supervision should be instituted so that its confirmed that the patients really take them as prescribed. This should be under the supervision of caretakers or a next of kin who would have empathy for the patient.
- The health facility should recruit adequate trained health care workers in ART. This would help to cope up with increasing workloads in the ART clinics thus reduce the waiting times. This would motivate the adolescents to come back on the next appointment.
- Increase access to ART clinics more especially to the adolescents by improving the existing infrastructures and laboratory services. This should be done by increasing the rate of opening existing clinics and starting up clinics nearer to where most people stay. These clinics would decongest the hospitals by reviewing patients who have initiated treatment at a larger hospital.

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APPENDICES

APPENDIX I: SUBJECT CONSENT TO PARTICIPATION IN RESEARCH

Dear respondent, am **Najjembe Grace**, Reg. No: **2015-BNS-TU-031**, a student of International Health Sciences University pursuing a Bachelor’s Degree in Nursing. As a course requirement, a research study is supposed to be carried out to fulfill. You are invited to participate in the study under the title, **“Factors associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District”**. The information will be confidentially treated and strictly used for research purpose.

For the respondent

I am agreeing to participate in a research project with a purpose of assessing the **Factors associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District**. The information I will give will be the basis for measurement of level of management of HIV/AIDS.

I will be asked a series of interview questions and the investigator will record my answers and all remain confidential. The whole exercise will take about 15 minutes. My privacy and safety will be maintained. I can decline to answer any question or withdraw from the study any time. The interview is entirely voluntary and does not entail any foreseeable risks and direct benefits. All data will be maintained in a safe place by the researcher for one year and then shredded. Benefits of participation may include a contribution to scholarly research that identifies prevention and treatment of HIV/AIDS.

Participation: My refusal to participate will involve no penalty or loss of benefits to which I am otherwise entitled. I will not be compensated for my participation. An offer is to answer all the questions about the study. I will be given a copy of the dated and signed consent form to keep.

Signed..... **Date**.....

Investigator **Date**.....

Thank you so much for your time

APPENDIX II: RESEARCHER-ADMINISTERED QUESTIONNAIRE

Dear respondent, am **Najjemba Grace**, Registration Number, **2015-BNS-TU-031**, a student of International Health Sciences University pursuing a Bachelor's Degree in Nursing. As a course requirement, a research study is supposed to be carried out to fulfill. You are invited to participate in the study under the title, "**Factors associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District**" is carried out. I dearly appeal for your participation to make it a success. The information provided will be treated with privacy and will strictly be used for academic research purposes by the researcher. Your time and cooperation will highly be appreciated.

Instruction: Tick the most appropriate option against the questions

SECTION A:

Social demographic factors associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District

1. Gender of the respondent

a) Male b) Female

2. Age of the respondent?

a) Less than 15 years b) 16-18 years

c) 19-22 years d) 23-25 years

3. Marital status of the respondent?

a) Single b) Married

c) Separated d) Widow/widower.

e) Others, (specify)

4. Level of education?

a) No formal education b) Primary

c) Secondary..... d) Tertiary education

e) Others, (specify)

5. What is your occupation?

a) Civil servant b) Self-employed/Businessman

c) Self-employed d) Unemployed

e) Others, (specify)

6. Place of residence

a) Urban b) Rural

7. Family size

- a) Less than 3 people b) 4-5 people
c) 6-8 people d) More than 9 people

8. Financial status?

- a) Earn less than 2,000/= a day b) Between 2,000/= to 5000 a week
c) Btn 5,001/= to 150,000 a months

9. What is your religion?

- a) Catholic b) Protestant
c) Seventh day Adventist d) Moslem.
e) Born Again Christians f) Orthodox Christian
g) Others specify.....

SECTION B: ADHERENCE TO ART

10. i) When did you know that you are HIV positive?

- a) Early childhood
b) When I first visited the health facility for testing and counseling
c) Rumours from relatives and neighbours

11) Did you start taking ARVs the moment you knew you were HIV positive

- a) Yes b) No

ii) If yes for how long have been on these drugs?

- a) < Three months b) Between 3-6 months
c) Btn 6 months to 1 years d) 1-5 years
e) 6-10 years f) 11-15 years
g) 16-20 years h) 21-25 years
e) All my life

11. i) Have you ever missed ever miss taking your ARV drugs in any day?

- a) Yes b) No

ii) If yes how often

.....

iii) In the last three months, did you ever miss taking your ARV drugs in any day?

- a) Yes b) No

ii) If yes above, how many doses did you miss?

- a) One doses b) Two doses
c) Three doses d) More than four doses
e) Others specify.....

iii) If Yes above, give reasons why you missed treatment

- a) Drug stock out b) I forgot to take the drug
c) I was misled d) Stigma
e) Other, specify.....

SECTION C:

Individual factors associated with adherence to ARVs/ART among adolescents

12. i) Whom do you stay with?

- a) Biological mother b) Biological Fathers
c) Both biological parents d) Aunt/Uncle
e) Distant Relative f) Others (specify).....

ii) Does this person give you adequate support to access antiretroviral treatment?

- a) Yes b) No

iii) If no why?

.....
.....

13. i) Does your cultural values acknowledge antiretroviral treatment?

- a) Yes b) No

14. i) Do you take illicit drugs?

- a) Yes b) No

iii) If yes, what illicit drugs do you take?

- a) Alcohol b) Cocaine
c) Marijuana d) Banji
e) Others (specify).....

15. i) Do you carry any beliefs that your health can be better on other treatment other than antiretroviral treatment?

- a) Yes b) No

SECTION D:

Drug Related Factors associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District.

17. Do you always have the drugs that you are supposed to take?

- a) Yes b) No

18. i) How many pills do you take a day?

.....

ii) How many pills do you take at a single point?

.....

iii) How often do you normally take your ARVs pills in a day?

- a) Once b) Twice
a) More than twice

19. i) Do you face any challenges when taking these drugs?

- a) Yes b) No

ii) If yes mention them?

.....

20. Do you have easy access to the drugs?

- a) Yes b) No

SECTION E:

Health Related Factors associated with adherence to ARV treatment among adolescents attending Kaliisizo Hospital, Kyotera District

21. i) Do you get routine education and counseling about adherence to ARVs?

- a) Yes b) No

ii) If yes, where do you get it from?

- a) Health care facility b) School
c) Humanitarian d) Friends
c) Media d) Others (specify).....

22. i) Is there any nearby health care facility from which you can pick your ARV drugs?

- a) Yes b) No

ii) How far is the health facility from your home?

- | | | | |
|-------------------------|--------------------------|-------------------------------|--------------------------|
| a) Less than 500 meters | <input type="checkbox"/> | b) Between 501 metres to 1 km | <input type="checkbox"/> |
| c) Between 1-3 km | <input type="checkbox"/> | d) Between 4-6 km | <input type="checkbox"/> |
| e) Between 7-10 km | <input type="checkbox"/> | f) More than 10 km | <input type="checkbox"/> |

23. Do you always find the ARV drugs at the health facility whenever you are supposed to collect them?

- | | | | |
|--------|--------------------------|-------|--------------------------|
| a) Yes | <input type="checkbox"/> | b) No | <input type="checkbox"/> |
|--------|--------------------------|-------|--------------------------|

24. i) Are health care workers always available at the health care facility whenever you need them about ARV treatment?

- | | | | |
|--------|--------------------------|-------|--------------------------|
| a) Yes | <input type="checkbox"/> | b) No | <input type="checkbox"/> |
|--------|--------------------------|-------|--------------------------|

ii) Do health workers always given enough information about adherence?

- | | | | |
|--------|--------------------------|-------|--|
| a) Yes | <input type="checkbox"/> | b) No | |
|--------|--------------------------|-------|--|

25. How often have you been coming for ARVs refill at the clinic? (*Tick only one*)

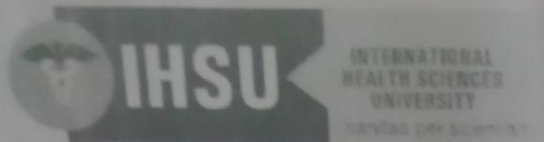
- | | | | |
|----------------------------|--------------------------|------------|--------------------------|
| a) Bi- weekly | <input type="checkbox"/> | b) Monthly | <input type="checkbox"/> |
| c) Bi- monthly | <input type="checkbox"/> | | |
| d) Others, (specify) | | | |

26. What is the waiting time on the appointment day to pick the drugs?

- | | | | |
|-------------------|--------------------------|----------------------|--------------------------|
| a) Up to one hour | <input type="checkbox"/> | b) 1-3 hours | <input type="checkbox"/> |
| c) 4-5 hours | <input type="checkbox"/> | d) More than 5 hours | <input type="checkbox"/> |

Thanks for cooperation

APPENDIX III: INTRODUCTORY LETTER



making a difference in health care

Office of the Dean, School of Nursing

Kampala, 28th September 2018

KALISIZO HOSPITAL

Dear Sir/Madam,

RE: ASSISTANCE FOR RESEARCH

Greetings from International Health Sciences University.

Handwritten note: Allowed to conduct research in the facility. Hospital ADMINISTRATOR KALISIZO HOSPITAL 02 OCT 2018 Sign: [Signature] P.O. BOX 40 KALISIZO [Signature]

This is to introduce to you **Najjemba Grace** Reg. No. **2015-BNS-TU-031** who is a student of our University. As part of the requirements for the award of a Bachelors degree in Nursing of our University, the student is required to carry out research in partial fulfillment of the a ward.

The topic of research is: **Factors Influencing Adherence to ART Among Adolescents Attending ART Clinic at Kalisizo Hospital.**

This therefore is to kindly request you to render the student assistance as may be necessary for the research.

I, and indeed the entire University are grateful in advance for all assistance that will be accorded to our student.

Sincerely Yours,

[Signature] 27 SEP 2018 Ms. Agwang Agnes Dean, School of Nursing

The International Health Sciences University P.O. Box 7782 Kampala - Uganda (+256) 0312 307400 email: aagwang@ihsu.ac.ug web: www.ihsu.ac.ug

APPENDIX IV: MAP OF THE STUDY AREA

