FACTORS ASSOCIATED WITH NON-ADHERENCE TO ANTIRETROVIRAL THERAPY AMONG HIV INFECTED WOMEN UTILIZING REPRODUCTIVE AND CHILD HEALTH SERVICES AT BUGANDO HOSPITAL MWANZA TANZANIA

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By

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A Dissertation Submitted in (Partial) Fulfillment of the Requirements for Degree of Master of Public Health

Muhimbili University of Health and Allied Sciences

October 2020

CERTIFICATION

The under signed certifies that he has read and hereby recommend for acceptance by Muhimbili University of Health and Allied sciences a dissertation entitled: **Factors associated with non-adherence to antiretroviral therapy among HIV infected women utilizing reproductive and child health services at Bugando hospital Mwanza Tanzania** in partial fulfillment of the requirements for the degree of Master of Public Health of Muhimbili University of Health and Allied Sciences.

_____

Prof. Innocent Semali

(Supervisor)

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Date

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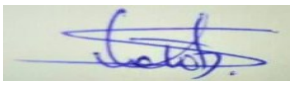
Signature  **Date 30th October 2020**

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DEDICATION

I would like to dedicate my work to my children, let this be an inspiration that you too can accomplish many task no matter how difficult they seem

ABSTRACT

Background: In 2013, Tanzania adopted the WHO's Option B+, PMTCT guideline; whereby all HIV-infected pregnant and lactating women are initiated with lifelong ART. Previous studies have shown that drug-resistance is not the only cause of treatment failure but also Sub-optimal adherence; at the same time women with good adherence to ART have less than 5% chance of transmitting of HIV infection to their children compared to those with poor adherence where the risk rises up to 45%. Despite of the increasing coverage of elimination of MTCT in Tanzania, there is limited information focusing on the level of option B+ adherence and its covariates in the context rural and urban settings among pregnant and breastfeeding women on ART. In 2016, Mwanza region had a prevalence of HIV at 4.2% much lower than the current data of 2018 which is 7.2%, a significant change which may need more studies

Aim: To determine the level of and factors influencing non-adherence to ART among HIV infected women utilizing PMTCT services in Bugando hospital in Mwanza, Tanzania.

Methodology: An analytical study involving 378 HIV positive women attending reproductive and child health clinic in Bugando referral hospital between the months of February and March in the year 2020, at Bugando hospital Mwanza, Tanzania, voluntarily responded to a pre-tested questionnaire containing a semi structured questions and responses were analyzed by STATA 16.

Results: Proportions of women with non-adherence were 5.6% with knowledge level on Option B+ being high for over 95% of the HIV positive women attending the clinic. women with older age were more likely to adhere to ART (aOR=8.2; 95% CI=1.8-36.3; p=0.02), pregnancy increased the odds of adherence to ART when compared to the non-pregnant women (aOR=4.9; 95% CI=1.9-12.7; p=0.006), those with secondary school education or higher were more likely to have adherence levels of above 95%(aOR=4.4; 95% CI=1.0-19; p = 0.05) and women with high knowledge on PMTC were more likely to have high adherence to ART when compared to those with low knowledge on PMTCT (aOR=3.8; 95% CI=0.9 - 15.6; p = 0.063)

Although statistical significance was not strong, disclosing one's HIV status is associated with higher odds of having higher adherence (aOR=1.8; 95% CI=0.6-5.6; p=0.08)

Conclusion: Participants' Age, education, pregnancy status and knowledge on PMTCT were directly related to and predicted the level of adherence in this study therefore adherence counseling focusing to improve knowledge on PMTCT could be more intensified for the young clients paying closer attention to non-pregnant RCH attendees and with less than secondary school education.

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AIDS	Acquired Immuno-Deficiency Syndrome
ANC	Antenatal Care Clinic
ART	Anti-Retroviral Therapy
CDC	Centers for Disease Control
CTC	Care and Treatment Centre
HIV	Human Immunodeficiency Viruses
LNMP	Last Normal Menstrual Period
MUHAS	Muhimbili University of Health and Allied Sciences
NACP	National AIDS Control Program
NVP	Nevirapine
PEFAR	Presidential Emergency Fund for AIDS Relief
PHC	Population and Housing Census
PMTCT	Prevention of Mother to Child Transmission
RCH	Reproductive and Child Health
RCHC	Reproductive and Child Health Clinic
SPSS	Statistical Package for the Social Sciences
STI	Sexually Transmitted Infection
TZS	Tanzanian Shillings
WHO	World Health Organization
OR	Odds Ratio
CI	Confidence Interval
ODK	Open Data Kit

DEFINITION OF TERMS

Antenatal care: refers to regular checkup offered by a doctor, nurse or midwife throughout pregnancy to diagnose diseases or complicating obstetric conditions; offer preventive and curative measures and prepare couple for birth and parenthood.

Prevention of Mother-to-Child Transmission (PMTCT)

Strategies used to prevent the spread (transmission) of HIV from a mother to her child during pregnancy, labor and delivery, or by breastfeeding (through breast milk). Strategies include antiretroviral (ARV) prophylaxis for the mother during pregnancy and labor and delivery, scheduled cesarean delivery, ARV prophylaxis for the newborn infant, and avoidance of breastfeeding (1)

Adherence means sticking firmly to treatment regimen by taking the right medicine, with the right dose, at the right time, in the right frequency, in the right way every day and exactly as agreed between health care providers, clients and care givers(1)

Non-adherence to PMTCT Treatment In this study, was defined as Adherence that is less than 95% of ingested monthly antiretroviral pills

Disclosure: Revealing HIV positive status to family and friends

1. INTRODUCTION

1.1 Background

HIV disease, caused by the HIV is a condition characterized by shortage of immunity which over time leads to AIDS. This condition affects humans where a progressive failure of the immune system allows life-threatening opportunistic infections and cancers to thrive. Without treatment, average survival time after infection with HIV is estimated to be 9 to 11 years, depending on the HIV subtype(1) In most cases, HIV is a sexually transmitted infection and occurs by contact with or transfer of blood, pre-ejaculate, semen, and vaginal fluids. Research has shown (for both same-sex and opposite-sex couples) that HIV is not transmitted through condom less sexual intercourse if the HIV-positive partner has a consistently undetectable viral load(2,3). In Tanzania, HIV infection is caused by HIV-1 subtype. The common HIV-1 sub-types (clades) in Tanzania are A, C, D, and their recombinants(1)

A mother can pass HIV to her child during pregnancy, labor or breastfeeding especially with high viral load which are mainly due to poor adherence to antiretroviral medications(1,4). PMTCT are strategies aimed at preventing the spread of HIV from a mother to her child during pregnancy, labor and delivery, or by breastfeeding (1)

The current global goal is to accelerate progress towards the elimination of new infections from MTC by 2015 and keeping the HIV infected mothers healthy(4). This can be achieved by ensuring that PMTCT interventions are made available to all women that need it. The current global goal's target being to reduce the number of new childhood HIV infections by 90% and to reduce the number of HIV-related maternal deaths by 50%(5) Studies have shown that drug-resistance is not the only cause of treatment failure, the natural history of HIV infection is very unpredictable and people respond to treatment regimes in different way (6). Sub-optimal adherence itself is an important cause of failure; if people are sharing ARVs or interrupting their daily dosage regimes they simply do not get enough of the medicines for effective treatment and they will generate drug-resistance(7). Inappropriate use of ARVs is a multifaceted problem increasing the likelihood of drug-resistance and contributing to direct treatment failure(7)

Predictors of good adherence to ART include client's self-commitment, availability of emotional and practical life support, clients' ability to fit the medications into their daily

routine, uninterrupted availability of ARVs, accessibility to CTC services and good tolerability of ARV(1). In Tanzania, the main barrier to adherence and retention reported was poverty while in other settings intimate partner violence is also found to affect ART adherence though reported to have more impact on women than in men(8). Good antiretroviral therapy adherence among HIV infected patients contributes to better treatments outcome including viral load reduction and has additional importance in preventing the development of drug resistance(1). Without PMTCT intervention the risk of HIV transmission from the mother to her baby ranges between 20-45 per cent(9). Pregnant women infected with HIV are therefore at high risk of transmitting HIV to their infants during pregnancy, birth or through breastfeeding. With an evidence-based set of comprehensive interventions, this transmission rate can be reduced to less than 2 per cent(9)

There are multiple risk factors that increase the chances of a mother in transmitting HIV to her child including high maternal viral load and low CD4 cell count, which occurs in newly infected individuals and in advanced stages of HIV disease (AIDS) where there is high viral load. High viral load in the rest of circumstances is usually caused by poor adherence along with drug resistance. Successful Antiretroviral therapy depends on sustaining high levels of adherence and this is achieved through maintaining optimal adherence of at least 95% (1)

In 2013, Tanzania adopted the WHO's Option B+ guidelines for PMTCT of HIV, whereby all HIV-infected pregnant women are initiated lifelong antiretroviral therapy [13] PMTCT remains one of the core elements of the minimum HIV prevention package for the general population in Tanzania mainland. The performance of this component is perhaps one of the success stories of the first half of NMSF III where a 72% reduction in vertical infections was achieved(10). MTCT services provided in Tanzania's PMTCT program include routine HIV testing and counseling, antiretroviral (ARV) treatment and prophylaxis for mothers and children, safer delivery practices, counseling and support for safer infant feeding practices, long-term follow-up care for mother and child and family planning(1)

1.2 Problem statement

74.9 million people globally have become infected with HIV since the start of the epidemic with transmission of HIV from mother to her child accounting for over 90% of all HIV infections in children aged below 15 years(1,11) With over 25.6 million persons currently living with HIV in sub-Saharan Africa, HIV remains an important public health problem in most sub-Saharan African countries accounting for two-thirds of the recent overall world HIV infections and more than 70 percent of all AIDS related deaths(12)

By 2015 the prevalence of HIV in Tanzania was 5.3% and by 2017 it reduced to 5.0% (65% among females and 35% among males), this decrease in prevalence was accompanied with a substantial increase in HIV prevalence in Mwanza region from 4.2% in 2015 to 7.2% in 2017(13)

A study conducted in Kilimanjaro Tanzania reported that 90% of HIV infected patients had adherence levels of above 95 percent. However on the contrary, a recent cross sectional study on adherence to ART, conducted in CTCs within Nyamagana district Mwanza, from March to June 2016 revealed that adherence to be 54.9%(6,14). These studies had however focused on clients from care and treatment clinics at large and not specifically on the pregnant and lactating women. In a 2018 study in Morogoro, option B+ adherence level was much lower among urban residents as compared to their counterparts in rural areas (26.3% and 61.1 respectively). That notwithstanding there is lack of information on recent level of non-adherence to ART and associated factors in small areas like Mwanza City.

The high fertility rate accompanied with an increase in HIV prevalence in Mwanza, along with the current trend of double infection numbers of HIV in Tanzanian women compared to men, poses a great risk as HIV infected women will at some time become pregnant and lactating.

1.3 Rationale

Reducing rate of MTCT is significance in where one the approach is to identify factors for non-adherence to ART especially in developing countries. Identification of factors associated with non-adherence to ART will help to plan for inventive strategies to manage it and increase viral load suppression in HIV infected women.

“More efforts to monitor option B+ adherence should be made in urban settings” was recommended recently in a study of Morogoro region; this study will also focus on the urban area in Mwanza, highlighting the current data on PMTCT level and factors for non-adherence

The aim of this study will be to identify the current level of adherence to ART and factors associated with it for improvement in adherence level and therefore reduction in mother to child transmission of HIV

1.4 Research question

1. What proportion of HIV positive women attending RCH clinic in Bugando referral hospital are non- adherent to anti-retroviral medication?
2. What is the knowledge level of HIV positive women attending RCH clinic in Bugando referral hospital on the PMTCT?
3. What are the factors associated non- adherence to anti-retroviral medication HIV positive women attending RCH clinic in Bugando referral hospital?

1.5 Conceptual framework

The conceptual framework below shows the relationship between sub-optimal adherence, the dependent variable and factors leading to it (the independent variables). In this study the analysis was done to determine the extent to which the independent variable have influence on the dependent variable in this case non-adherence to ART in HIV positive women attending RCHC in Bugando hospital in Mwanza, Tanzania

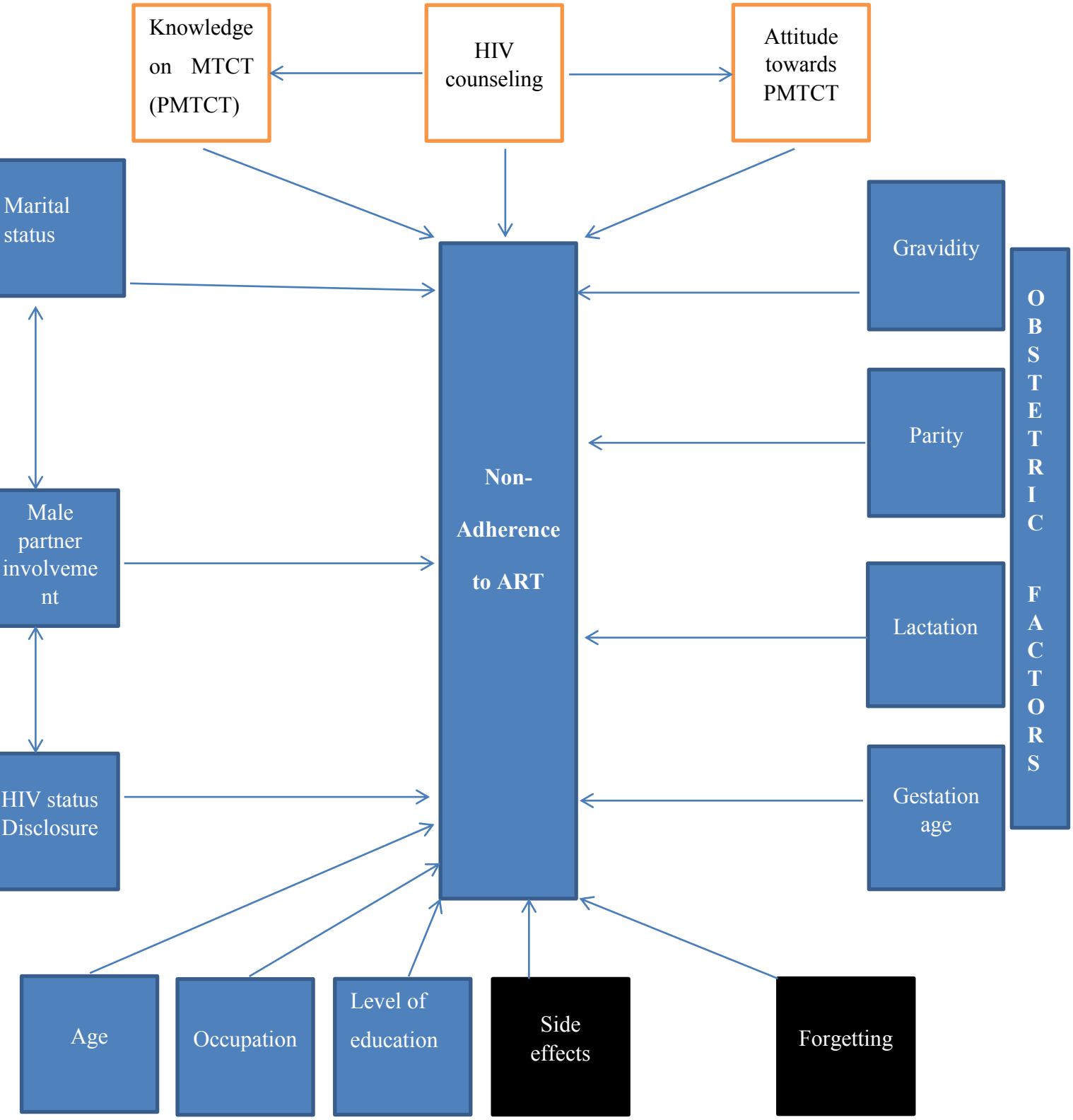
Adherence is a very crucial component in PMTCT program since it has been shown to reduce the rate of mother to child transmission of HIV and is influenced by many factors as shown below. Knowledge on MTCT influences adherence since a woman who knows how HIV can be transmitted to her baby is more likely to take precautions to protect her baby.

From the illustration, socio-demographic factors like marital status, level of education, ART adherence counselling, disclosure status, age and occupation status have been previously shown to influence adherence in different studies, the same for other factors in the framework.

Married women are less likely to have many sexual partners along with husband's support in adhering to ART. Older women would have the wisdom and stability to take care of their families and prevent them from getting infected; the same goes for those with higher number of pregnancies would have the experience in child bearing and more likely to protect their babies.

Level of education and employment status of both the woman and her partner have an influence on non-adherence as they may indicate an advantage one has in acquiring resources to better their lives. ART adherence counselling would provide all the necessary information required to comply with the treatment regimen, therefore having obtained it may determine non-adherence.

Figure 1: Conceptual Framework



1.6 **OBJECTIVES**

1.6.1 Broad Objectives

To identify level of non-adherence to antiretroviral therapy and factors associated it among HIV positive women attending RCH clinic in Bugando referral hospital in Mwanza

1.6.2 Specific Objectives

1. To determine the level of ART non-adherence among HIV positive women attending RCHC in Bugando referral hospital in Mwanza
2. To determine proportion with appropriate knowledge level on HIV among HIV positive women attending RCHC in Bugando referral hospital in Mwanza on PMTCT
3. To determine and compare association between socio-demographic and other variables with non-adherence to ART among HIV positive women attending RCHC in Bugando referral hospital

Literature review

1.7.1 Proportion of ART adherence among women in PMTCT - HIV

Knowing the proportion of PMTCT ART adherence is vital in any setting, it signifies the success of the intervention by showing how well the women from the clinic have positively responded to the therapy where further analysis can be made to identify factors for the rest of women with poor adherence. In a cross-sectional study in Tigray, northern Ethiopia, with 227 women on level of adherence and predictors to Option B+ PMTCT program; the level of adherence was found to be 87.1 percent while in a similar study involving clients from CTC in Nyamagana district, Tanzania was found to be 54.9 an interesting finding which could be updated in this study in Mwanza focusing on the PMTCT group(16,17). Another study on ART adherence in PMTCT group, in Morogoro region Tanzania, ART good adherence was 43.3% from pill-count assessment and 45.9% from self-reporting(16) Pill count adherence and self-reported adherence were strongly concordant to each other. The overall percentage agreement between pill count and self-reported adherence was 97.4% with the kappa statistics of 0.95 ($p<0001$)(15)

1.7.2 Factors for non-adherence to art

Predictors of good adherence to ART include client's self-commitment, availability of emotional and practical life support, clients' ability to fit the medications into their daily routine, uninterrupted availability of ARVs, accessibility to CTC services and good tolerability of ARVs(1) Majority of pregnant women and lactating mothers with poor adherence had reported that remembering to take their pill was the main reason for non-adherence the others said it was due to delayed appointment.(12)

Studies have shown several factors to affect adherence at different proportion both globally and regionally(14,16–19), however it is of interest to study further in different setting as different interventions are implemented day by day to reduce barriers to good adherence. The CDC disburses money to the lake zone regions from PEPFAR to the implementing partners to tackle the challenge of poor adherence in PMTCT and the data after interventions is yet to be known. Knowledge of factors and strategies that influence adherence level of above 95 percent is needed to maximize the benefits of ART. Achieving such high rates over a long period of time is a challenge and periodic data is needed to update on adherence since not so many studies are conducted from time to time

1.7.3 Knowledge on HIV with respect to adherence

HIV infection is acquired through unprotected sexual intercourse with an infected partner; exposure to infected blood and blood products; or transmission from an infected mother to the unborn child in the uterus, during delivery, or from breast milk. More than 90% of adults in sub-Saharan Africa acquire HIV infection through unprotected sexual intercourse with infected partners(20) Transmission of HIV through body fluids other than blood and genital secretions such as cerebrospinal fluid, pleural fluid and amniotic fluids are also possible. However, unless blood is visibly present, saliva, sputum, sweat, tears, feces, nasal secretions, urine and vomits carry a very low risk of transmission of HIV2, also adherence level of above 95% have been shown to prevent HIV transmission not only the mother's baby but also to uninfected sexual partners(21)

1.7.4 Factors predicting good option B+ ART adherence

The odds of good ART adherence among those whose partners had secondary education or higher were 0.18 times lower compared to those whose partners had no education, the married study participants had 1.68 times higher odds of adherence than those who were single(14) Women with partners working in the informal sectors had lower odds of having good ART adherence as compared to women with unemployed partners. Respondents living

in rural areas had 4.41 times higher odds of having good ART adherence compared to those living in urban(15)

Place of residence was significantly association with adherence where those who reside in rural areas were 4.86 times more likely to have good adherence as compared to those lived in urban. Those who were moderately supported by their male partners had 3.5 times higher odds of having good adherence compared to those who had poor male partner support. Moreover, participants who had been on ART for one to two years showed 0.45 times lower odds of good adherence compared to those with less than one year(14)

2.0 METHODOLOGY

2.1 Study design

This was an analytical study involving 378 HIV positive women attending RCH clinic in Bugando referral hospital between the months of February and March in the year 2020

2.2 Study area

The study was conducted at the RCH clinic of Bugando referral hospital in Mwanza Tanzania. Bugando is a large medical center located in the urban area of Nyamagana district serving all the regions in the lake zone. It has 400 clients in its reproductive and child health clinic all coming each month for ARV drugs refill along with other ANC services. All women attending ANC services whose HIV status was unknown or had negative test results more than three months prior to the visit were offered another HIV test. Once they were diagnosed as being HIV positive they were referred to reproductive and child health clinic (PMTCT) for HIV care and treatment.

At the clinic counseling is done to HIV infected women, who are then initiated or continued on lifelong ART regardless WHO clinical staging (Option B +) then scheduled for monthly clinical visits during which drug refill, laboratory monitoring and evaluation are done.

Every time a patient was seen by clinician, a detailed health history, pregnancy status and adherence status were assessed and recorded in monitoring and evaluation tools. Staffs providing these services included medical specialists, medical doctors, intern medical officers and registered nurses with the experience in HIV care and treatment services.

2.3 Study duration

This study involved all HIV positive clients attending Bugando reproductive and child health clinic between the months of February and March in the year 2020

2.4 Study population

The study population comprised of all HIV positive women utilizing reproductive and child health services at Bugando referral hospital with the below criteria

2.5 Inclusion Criteria and Exclusion Criteria

2.5.1 Inclusion

All HIV positive women utilizing reproductive and child health services at Bugando referral hospital

2.5.2 Exclusion criteria

Participants that met the inclusion criteria but adherence could not be ascertained

Women who were very sick

2.6 Sample size

The sample size was determined using the formula developed by Fisher et al., (1998)

$N = Z^2P\ (1\text{-}P)/D^2$

Where:

n = 381: Required sample size

z = 1.96: Standard deviation for a 2 tailed at 95% confidence interval

- p = 54.9% from a 2017 study on ART adherence in Nyamagana District Mwanza [16]
- m = 5%: The margin of error
- $N = 1.96^2\ (0.549)\ (0.451)/(0.05)^2$ = 381 women

2.7 Sampling technique

All clients utilizing reproductive and child health services at Bugando referral hospital were offered to participate in the study and the sample of 378 women was reached without repetition

Clients visiting the reproductive and child health services at Bugando referral hospital on their scheduled visits were informed about the study. Those clients fulfilling study criteria and agreed to participate in the study were provided with consent forms for signing then recruited into the study and the questionnaire was checked for completeness by the data collector

2.8 Data collection

The principal investigator recruited research assistants from the reproductive and child health services at Bugando referral hospital who had skills on HIV/AIDS care and assessment of adherence. The assistants were trained for one day to familiarize on the research purpose, objectives of the study and research tools including how to obtain accurate data within the granted time. Research ethics and logistic information were introduced. Each data collection day at the reproductive and child health services at Bugando referral hospital started with an introductory session about the objectives of the study, the methodology of data collection and assurance on confidentiality. All patients found at the waiting areas participated in the introductory session and those who consented were selected to participate and signed a

consent form before the interview. The questionnaires were in both languages but the Swahili version was preferred by all the participants, pretesting was done leading to re-arrangement and clarification of some questions for comprehension of the questions.

This study utilized semi-structured questions to collect the required information from participants. The information obtained was then entered by ODK then exported to STATA 16 for analysis.

2.9 Variables

The main outcome was non-adherence to ART which is the dependent variable. This was defined as adherence of less than 95 percent

Other factors leading to poor adherence were the independent variables. Demographic information like age, marital status, occupation status, HIV counseling and disclosure status were measured

2.10 Measures of adherence

Adherence was assessed by pill-count method (question 31 in this questionnaire), where number of pills the participant swallowed in the current month was divided by the number of pill she was supposed to have taken that particular month multiplied by 100. Those with ≥95 percent were considered to have high/good adherence and below that non-adherence

The knowledge of the women on PMTCT was measured from Questions 20-25 in this questionnaire. (20) Condom use during sex with an HIV infected partner can prevent HIV transmission? (21) Seropositive women can transmit HIV to their babies during pregnancy (22) HIV-positive women can reduce the risk of HIV transmission to their babies if they take PMTCT drugs (23) Omitting to take some of the ARVs has no effect on the effectiveness of PMTCT (24) Adhering to ARV drugs can reduce the risk of opportunistic infections. (25) The support of male partner during PMTCT care does not have any effect on mothers adhering to PMTCT drugs. Knowledge was considered high if they scored 4-6 and low if they scored 0-3 of the knowledge questions.

Assessment of male partner involvement in adherence to ART was done by 9 questions with a minimum score of 0 and maximum of 9. Question 26 (A to I) in this questionnaire were used. Involvement was considered good for those who had a score of 7 and above, moderate for those who had score 4-6 and low for those who had score 3 and below to the questions on male partner involvement

Documentation of obstetric history parity, gravidity and gestational age was done

2.11 Data processing and analysis

Data was collected by questionnaires and ODK was used to enter them in an electronic format. The data set was then saved as an excel sheet and analyzed by Stata version 16. Data cleaning was done to enhance quality of data by checking and fixing out-of-range or missing values and removing inconsistency and data gaps during data collection also when performing data processing and analysis. Simple frequencies of all variables were computed. A chi-square test was applied to examine association between demographic, behavioral characteristics, and non-adherence. Binary logistic regression was used to determine the independent predictors of ART non-adherence. The level of significance was set at alpha = 0.05. Only variables with a p-value less than or equals to 0.10 were included in the multivariate analysis.

2.12 Validity and Reliability

To insure reliability in this study the questionnaire used in this study was pre-tested and evaluated to insure that all the objectives are covered then administered in Kiswahili, the national language that is understood by all of the study participants. The submitted questionnaires were verified and all missing information filled at data collection. Research methods selected for this study provided consistent and reliable results. In any case where ambiguity rose in this study, statistician and public health specialist were consulted

2.13 Ethical issues

The ethical clearance was sought from Muhimbili University of Health and Allied Sciences (MUHAS) Institutional Review Board. Data collection started after permission from the Bugando Medical Centre in collaboration with CUHAS, who made a thorough review of the proposal and the questionnaire then issued a permit to proceed with the data collection. Respondents were informed about the purpose of the study, data to be collected and their voluntary participation. Those who agreed to participate in the study signed the consent form prior to interviewing. Also, the researcher explained the benefits and risks of the study as described in consent form. Confidentiality of information was upheld and names were not collected or written; only numbers were used for data collection, entry and analysis. Information on freedom to withdraw from the study anytime was provided.

3.0 RESULTS

3.1 Participants' characteristics

A total of 378 participants from Bugando Medical Centre reproductive and child health clinic participated in the study. All the participants had used ART medication for more than one month prior to data collection.

The average age was 33 years (SD = 5.86) with 20 and 48 years being the minimum and maximum age respectively. Average number of pregnancies was 3 (SD = 1.36) with only 114 (30%) of the participants being pregnant at the time of study where the majority of them (70.4%) were below 12 weeks of pregnancy.

Majorities, (70 percent) of the participants were married and the rest being either single, widows or divorced. At the same time 58 percent of the respondents and 53 percent of the partners had primary school education. Almost all (99.2%) of the participants had received ART adherence counseling.

Table 1 below shows percentage distribution of socio-demographic and obstetric characteristics of all the 378 participants

Table 1: Characteristics of the study population

Characteristic	Category	n=378	%
Marital Status	Married	262	69.3
	Not married	116	30.7
Pregnant	No	264	69.8
	Yes	114	30.2
Participants' Education	Primary and below	272	72.0
	Secondary and higher	106	28.0
Partner's Education	Primary and below	272	72.0
	Secondary and higher	106	28.0
Participants' Occupation	Formal Employment	56	14.8
	In-formal employment	322	85.2
Partners' Occupation	Formal Employment	211	55.8
	In-formal employment	167	44.2
Disclosed HIV status	No	58	15.3
	Yes	320	84.7
Counseled on adherence	No	3	0.8
	Yes	375	99.2
Partners support	Low	111	29.3
	Moderate	62	16.4
	High	361	54.2

3.2 ARV non-adherence among HIV positive women

ART non-adherence among participants was found to be 5.6 percent where 21 out of 378 HIV positive women had adherence of less than 95 percent

3.3 Knowledge level of HIV positive women on Option B+ (PMTCT)

Knowledge level on Option B+ was high among HIV positive women with over 95 percent of participants scoring 4-6 (out of 6) question correctly while testing their knowledge on option B+.

3.4 Factors associated with non-adherence

The relationship between non-adherence to ART and various socio-demographic and behavioral characteristics are shown in table 2. Participants' age, (t=-3.5663, P=0.0004), pregnancy state (□=0.006), participants' education (p=0.05) and knowledge on PMTCT (p=0.026) revealed a significant association with non-adherence. Number of pregnancy and non-adherence did not have a significant association when tested (t=-0.2911 with P=0.7711) Ages for both groups were normally distributed with mean age being 34 years (sd 6.73) and 33 years (sd 5.83) for non-adherent and adherent groups respectively.

Table 2: ARV non-adherence with various demographic characteristics

		Adherence to ART			
		Non-Adherent n=21(5.9%)	Adherent (94.1%)	n=357	P-Value
Marital Status	Married	16 (6.1)	246 (93.9)		0.482
	Not Married	5 (4.3)	101 (95.7)		
Pregnant	No	9(3.4)	255(96.6)		0.006**
	Yes	12(10.5)	102(89.5)		
Participants' education	Primary and below	19 (7.0)	253 (93.0)		0.05
	Secondary and higher	2(1.9)	104(98.1)		
Partners' Education	Primary and below	13 (6.0)	203 (94.0)		0.650
	Secondary and higher	8 (4.9)	154 (95.1)		
Participants' occupation	Formal employment	1 (1.8)	55 (98.2)		0.182
	In-formal employment	20 (6.2)	302 (93.8)		
Partners' occupation	Formal employment	14 (6.6)	197 (93.4)		0.303
	In-formal employment	7(4.2)	160(95.8)		
Disclosed HIV status	No	6 (10.3)	52 (89.7)		0.084
	Yes	15 (4.7)	305 (95.3)		
Received ART	No	0 (0.0)	3 (100)		0.673
adherence counseling	Yes	21 (5.6)	354 (94.4)		
Partners support	Low	8 (7.1)	105 (92.9)		0.34*
	Moderate	5 (7.9)	58 (92.1)		
	High	8 (4.0)	194 (96.4)		
PMTCT Knowledge	Low	3 (17.7)	14 (82.4)		0.026
	High	18 (5.0)	343 (95.0)		

Key: * Chi square test, **Fisher's exact test

3.5 Multivariate analysis for predictors of adherence among HIV positive women

When logistic regression analysis was run to determine relative contribution of each factor in the model for ARV adherence and variables with a p-value less than or equals to 0.10 were subjected to multivariate analysis; women with older age were more likely to adhere to ART (aOR=8.2; 95% CI=1.8-36.3; p=0.02), pregnancy increased the odds of adherence to ART when compared to the non-pregnant women (aOR=4.9; 95% CI=1.9-12.7; p=0.006), those with secondary school education or higher were more likely to have adherence levels of above 95%(aOR=4.4; 95% CI=1.0-19; p = 0.05) and women with high knowledge on PMTC were more likely to have high adherence to ART when compared to those with low knowledge on PMTCT (aOR=3.8; 95% CI=0.9 -15.6; p = 0.063)

Although statistical significance was not strong, disclosing one's HIV status is associated with higher odds of having higher adherence (aOR=1.8; 95% CI=0.6-5.6; p=0.08)

Table 3: Adjusted and unadjusted binary logistic regression analysis showing determinants of non-adherence to ART

Variables	Non-Adherent n=21(5.9%)	Adherent n=357 (94.1%)	Unadjusted odd ratio	Adjusted odd ratio
Marital Status				
Not Married	5 (4.3)	101 (95.7)	Ref	
Married	16 (6.1)	246 (93.9)	0.7(0.2-2.1)	
Pregnant				
No	9(3.4)	255(96.6)	Ref	Ref
Yes	12(10.5)	102(89.5)	0.3 (0.1-0.7)	4.9(1.9-12.7)
Participants' Education				
Primary school and below	19(7)	253(93)	Ref	Ref
Secondary school and above	2(1.9)	104(98.1)	3.9 (0.9-17.1)	4.4 (1.0-19.4)
Partners' Education				
Primary school and below	13 (6.0)	203 (94.0)	Ref	
Secondary school and above	8 (4.9)	154 (95.1)	1.2(0.5-3.0)	
Participants' Occupation				
Non formal employment	20(6.2)	302(93.8)	Ref	
Formal employment	1 (1.8)	55 (98.2)	3.6(0.5-27.7)	

Partners' Occupation				
Non formal employment	7(4.2)	160(95.8)	Ref	
Formal employment	14 (6.6)	197 (93.4)	0.6(0.2-1.6)	
Disclosed HIV status				
No	6 (10.3)	52 (89.7)	Ref	Ref
Yes	15 (4.7)	305 (95.3)	2.3 (0.9-6.3)	1.8 (0.6-5.6)
Partners support				
Low	8 (7.1)	105 (92.9)	Ref	
Moderate	5 (7.9)	58 (92.1)	0.9(0.3-2.8)	
High	8 (4.0)	194 (96.4)	1.8(0.7-5.1)	
PMTCT Knowledge				
Low	3 (17.7)	14 (82.4)	Ref	Ref
High	18 (5.0)	343 (95.0)	4.1 (1.1-15.5)	3.8 (0.9-15.6)

Key: cOR- Crude ODDS ratio; aOR – Adjusted Odd Ratio; CI =Confidence interval;
Ref: Reference;

4.0 DISCUSSION

ART non-adherence level in this study was 5.6% closely similar to that in Zambia of 4%, also close to that in Kilimanjaro and Malawi of 10% and 8% respectively(22,23,25,26). Others close to this adherence level were studies in Ebonyi state Nigeria in 2018 and in Western Kenya where adherence was 10.8% and 11% respectively(12,18)

Much higher non-adherence levels were found in similar studies, among PMTCT clients in Mwanza in 2018 was 38.9% and in Dar es Salaam was 51.1%(14,16). The low level of non-adherence in this study could be due to close care provided in this advanced teaching medical center, similar to KCMC and a level one facility in Zambia, where non-adherence levels of 10% and 4% where noted(22,23). Whereas other studies were conducted in lower level hospitals in Tanzania(14,22). Also the contribution of PMTCT interventions from donors and the ministry of health could have played part in the improvement of PMTCT services. The high level of non-adherence, observed in other studies is likely to have been underestimated as the majority of included studies used self-reported measures to estimate adherence (14,16)

Some studies obtained non-adherence to ART levels as low as 4% in Chilenje level one hospital in Zambia and also in Nigeria where pill count method for calculation of adherence was applied as in this study (12,23). Other studies utilized the adherence level from self-reported assessment and the level of adherence was much lower (14) A 2018 study in Lesotho Malawi which utilized both methods, non-adherence was 7.5% and 43.4% from by self-report and pill count methods respectively (26). Self-report method which is prone to social desirability and recall biases could be inferior to pill count method for estimation of non-adherence to ART

Factors associated with non-adherence

In this study association of several factors to adherence were tested. The factors include age, marital status, number of pregnancies, gravidity, gestation age of the currently pregnant, education of participant and partner, male partner support, participant's knowledge on PMTCT, work of both participant and partner, counseling on adherence and if participant had revealed her HIV status.

Of all the above factors, only participant's age, educations, knowledge on PMTCT and pregnancy status were significant predictors of adherence.

Higher proportion of pregnant women had good adherence (96.6%) when compared to non-pregnant mothers (89.5%). The higher percentage of women with good adherence has been observed in Ghana (98% by 86%), in Dar es salaam (66.6% by 51.0%) and also by Nachenga and colleagues (72% by 57%) to be in favor pregnant women when compared to the non-pregnant women(11,14,28) at the same time, a study done in Morogoro Tanzania, found no significant statistical difference of option B+ adherence between pregnant women and non-pregnant women (47% versus 42%)(15)

The lower level of adherence in lactating women could be due the fact that lactating mothers are overwhelmed by the responsibilities of the baby, from breastfeeding to maternal care that makes them prone to be busy and forget to take the medication. It has been pointed out in different studies that lactating mothers are less retained in postnatal ART program and generally have poor ART clinic attendance than pregnant women. This is eventually linked to low level of adherence in lactating mothers(29)

Older women are responsible adults; paying attention to details like cost of raising infants is the most likely reason for the rise of adherence level with age which has also been observed in a study published in 2019, in Zambia(23). Age as a predictor of adherence was supported in other studies in Zambia where it was established that older than 30 years had a 10% increased chance of adhering to option B+ compared to the ones below this, similarly by Haas et al. and in Zimbabwe(23,30,31). Other studies did not find a significant association of adherence with age(12,14,15).

Higher knowledge on PMTCT positively influenced adherence level in this study as well as similar studies in Dar es Salaam and Nigeria but not in Morogoro(12, 14, 15). This finding is most likely due to the resemblance of urban setting of the similar studies and less urbanized Morogoro study.

Knowledge on PMTCT is mostly obtained through adherence counseling in reproductive and child health clinic, although other sources like the internet and television media which are prevalent in town are also good sources of information on the topic. No association was found between adherence counseling and knowledge on PMTCT in this study, a finding supported in another similar study in urban settings.(25)

Higher level of education was noted in participants who had higher level of adherence, which resembled other studies(12,17,32) but differed from others(15,26). Participants status of

disclosure was also positively associated with adherence level same as in Ethiopia but not in Lesotho, Malawi(26,33).

The study had a total of 378 participants, a slightly larger sample than similar studies in Ilala in 2016 and Mwanza in 2018 where the samples were 338 and 305 respectively(12,14,14,16,16,17) Other studies had much smaller samples size(12,17,22–24) This was due to the adherence level of 54% used in the sample size calculation resulting in a slightly larger sample. The larger sample is however beneficial in accuracy of findings

Proportion of women with high knowledge on PMTCT was big in this study, similar to that in Ebonyi Nigeria and Kilimanjaro where it was 95% and other studies observed a much lower level of knowledge(12,14) The teaching medical center has staffs that provide PMTCT service adequately and new information is available first hand unlike other centers in the periphery, this could be the reason for the higher level of knowledge observed among the participants

5.0 CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Non-adherence to ART among participants was low with knowledge on PMTCT being high for majority of participants.

Participants' Age, education, pregnancy status and knowledge on PMTCT were directly related to and predicted the level of adherence in this study.

5.2 Recommendations

Adherence counseling focusing to improve knowledge on PMTCT could be more intensified for the young clients paying closer attention to non-pregnant RCH attendees and with less than secondary school education.

5.3 Limitations

Recall bias could have occurred for some questions involving ability of participant to remember aspects like partner support

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APPENDECIES

Appendix1: Consent Form – English Version

Introduction: Greetings! My name is _____. I am representing Dr. Sebastian Uvetie from Muhimbili University of Health and Allied Sciences. I invite you to participate in a study titled: factors associated with non-adherence to antiretroviral therapy among hiv infected women utilizing reproductive and child health services at Bugando hospital Mwanza,.

Aim: To assess the factors associated with non-adherence to antiretroviral therapy among hiv infected women utilizing reproductive and child health services at Bugando hospital Mwanza,.

Participation: I am going to ask you some questions to enquire your awareness and and utilization of PMTCT services especially on adherence to ART.

Benefits and risks: By participating in this study you will contribute to the advancement of our knowledge on the subject.. There is no direct health or economic risk that can happen to you because of joining in this study.

Confidentiality: The information that you will provide during the study will be kept confidential. Only the researcher will have access to the filled questionnaires your identity or name will not appear anywhere in the study report or publication.

Right to withdrawal: Your participation in this study is voluntary. You have the right to withdraw from the study anytime if you change your mind even after you have signed the consent form. You will not lose your health or social rights of which you are entitled even if you decide not participate.

In case of injury: No harm on you or your family that is expected as a result of participating in this study.

Who to contact: In case you have questions about this study, you should contact the following: Dr. Sebastian Uvetie (Principal Investigator) School of Public Health, Muhimbili University of Health and Allied Sciences, P. O. Box 65015, Dar es Salaam, mobile phone: 0768403407

In case of questions about your rights as a participant, you may contact Dr Bruno Sunguya, Chairperson of the Senate Research and Publications Committee, Muhimbili University of Health and Allied Sciences, P. O. Box 65001, Dar es Salaam. Tel: 2150302-6.

II: CONSENT

I have read the above information (has been read for me). I have asked (had opportunity to ask) questions and have been answered. I have understood the aim of the study. I understand the benefits, risks and my rights to withdrawal from the study. I hereby consent voluntarily to participate in this study.

Participant's Signature	(DD/MM/YY)
_____	_____
Researcher's Signature	(DD/MM/YY)
_____	_____
Witness' Signature	(DD/MM/YY)
_____	_____

Appendix1I: Consent Form – Kiswahili Version

FORM YA IDHINI YA KUSHIRIKI

I: TAARIFA

Utangulizi: Salamu! Kwa majina naitwa_____. Ninamwakilisha Dr. Sebastian Uvetie wa Chuo Kikuu cha Afya na Sayansi shirikishi Muhimbili. Ninakualika kushiriki katika utafiti unaohusu mambo yanayo changia umezaji wa chinin ya kiwango wa dawa za kurefusha maisha yaani ARV .

Dhumuni: Kutambua kiwango cha umezaji dawa za kurefusha maisha na sababu zinazopelekea umezaji huo kuwa chini ya kiwango katika hospitali ya rufaa ya Bugando Mwanza.

Ushiriki: Nitakuuliza maswali kuhusu uelewa wako na mambo yanahusika na umezaji wa za kurefusha maisha

Faida na hatari: Kwa kushiriki kwako katika utafiti huu utasaidia katika kukuza na kuongeza maarifa na uelewa katika mada tajwa.Utatusaidia sisi kuelewa sababu zinazo husianna na umezaji wa chini ya kiwango wa zawa za kurefusha maisha. Aidha utasaidia katika jitihada za kupambana na madhara yatokanayo na umezaji wa chini ya kiwango wa dawa hizi katika hospitali hii na taifa kwa ujumla. Hakuna hatari yoyote ya kiafya au kiuchumi itaweza kukutokea kwa kushiriki katika uatafiti huu.

Usiri: Taarifa utakazotoa katika utafiti huu ni siri. Mtafiti pekee ndiye atakayeweza kuziona taarifa hizi. Hata katika utoaji wa taarifa au uchapishaji wa taarifa za utafiti jina lako halitatajwa sehemu yoyote.

Haki ya kujitoa: Ushiriki wako katika utafiti huu ni hiari. Una haki ya kujitoa wakati wowote ukibadili mawazo hata kama ulisaini fomu ya idhini ya kushiriki. Hautopoteza haki yako yoyote ya kiafya au ya kijamii hata pale utakapoamua kujitoa kushiriki katika utafiti huu.

Endapo utapata madhara: Hakuna madhara yoyote kwako au familia yako yanaweza kutokea kutokana na ushiriki wako katika utafiti huu.

Kwa mawasiliano: Endapo utakua na swali lolote linalohusu utafiti huu, wasiliana na wafuatao: Dr. Sebastian Uvetie (Mtafiti mkuu) Shule ya Afya ya Jamii, Chuo kikuu cha Afya na sayansi shirikishi Muhimbili, S. L. P 65001, Dares Salaam. Simu 0768403407.

Kwa maswali kuhusu haki zako kama mshiriki, unaweza kuwasiliana na Dr Bruno Sunguya, Mwenyekiti wa kitengo cha utafiti, Chuo cha Afya na sayansi shirikishi Muhimbili, S. L. P 65001, Dar es salaam. Simu: 2150302-6.

II: IDHINI YA KUSHIRIKI

Nimesoma (nimesomewa) taarifa hii kama ilivyoelezwa hapo juu. Nimeuliza (endapo ulipata nafasi ya kuuliza) maswali na nimejibiwa. Nimeelewa dhumuni la utafiti huu. Nimeelewa faida, athari na haki yangu ya kujitoa katika utafiti wakati wowote. Ninakubali kwa hiari yangu kushiriki katika utafiti huu.

Sahihi ya mshiriki Tarehe

_____ _____

Sahihi ya mtafiti Tarehe

_____ _____

Sahihi ya shahidi Tarehe

_____ _____

Appendix III: Questionnaire – English Version

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES (MUHAS)

QUESTIONNAIRE ON: "FACTORS ASSOCIATED WITH ADHERENCE TO ANTIRETROVIRAL THERAPY AMONG HIV INFECTED WOMEN UTILIZING REPRODUCTIVE AND CHILD HEALTH SERVICES AT BUGANDO HOSPITAL MWANZA TANZANIA"

SN	QUESTIONS	RESPONSE
1	Age in years	
2	Marital status	Single Married Divorced Widow
3	Obstetric history	When is the LNMP?……..(USE ANC CARD) Document gestation age……. Document the gravidity…… Document parity…… How many days post-partum.....
4	Education of the respondent	1.Unable to read and write 2. Able to read and write 3. Primary education 4. Secondary education 5. College or University level
5	Educational status of your husband	1.Unable to read and write 2. Able to read and write 3. Primary education 4. Secondary education 5. College or University level
6	Occupation of the respondent	1. Student 2. Private business 3. Government employee 4. Nongovernment employee 5. House wife 6. Daily laborer

SN	QUESTIONS	RESPONSE
7	Occupation of husband	1. Student 2. Private business 3. Government employee 4. Nongovernment employee 5. Daily laborer
8	Date started ART	
9	How many times have you attended the antenatal clinic up to now?	
10	Did you miss any of your ARV medication in the last three days If yes, reasons why you may have missed taking any medications within the past three days (CIRLCE YOUR ANSWER/S)	YES …….. NO …….. 1.Forgetfulness 2. Feeling of good health 3. To avoid side effect 4. Religious influence 5. Avoid to be known as HIV positive 6. Being busy doing other things 7.Too many pills 8. I lost hope
11	Have you previously been informed on PMTCT	YES …….. NO ……..
12	Did your health care provider tell you how to take the medications?	YES …….. NO ……..
13	A. Did the health care provider counsel you the common side effects of ARV drugs? B. If yes what type of side effects did the provider counseled you?	YES …….. NO …….. I FORGOT …….. ……..... ……
14	Have you disclosed your HIV status to your sexual partner?	YES …….. NO ……..
15	If yes to question 14 when did you disclose your HIV positive status to your sexual partner? (CIRLE ONE OPTION)	1.Before starting PMTCT drugs 2.After initiating PMTCT drug
	Do you think disclosing your HIV status would improve your adherence to ART?	YES …….. NO ……..
	Do you know the HIV status of your spouse / partner	YES …….. NO ……..
18	After knowing that your HIV positive to whom you can disclose your HIV status?	1. No one… 4.friends/relatives…. 2. Partner….. 5. Parents…… 3. Brother and sister 6.others…
19	Do you know the HIV status of your spouse / partner	Yes No

SN	QUESTION	RESPONSE		
	Knowledge on MTCT(PMTCT) True False Not sure	**TRUE**	**FALSE**	**NOT SURE**
20	Condom use during sex with an HIV infected partner can prevent HIV transmission			
21	Seropositive women can transmit HIV to their babies during pregnancy			
22	HIV-positive women can reduce the risk of HIV transmission to their babies if they take PMTCT drugs			
23	Omitting to take some of the PMTCT drugs has no effect on			
24	the effectiveness of PMTCT care and support			
25	Adhering to ARV drugs can reduce the risk of opportunistic infections The support of male partner during PMTCT care does not have any effect on mothers adhering to PMTCT drugs			
26	Type of support a) Do you get support from your partner? b) Accompanies you to the ANC c) Knows ANC appointment			
	d) Discusses ANC interventions			
	e) Support ANC visits financially			
	f) Knows how you take your PMTC drugs			
	g) Brings ARV drugs from health center			
	h) Sought permission to use a condom currently			
	i) Accompanies you to the clinic			

PART B: ADHERENCE STATUS

SN	SELF REPORT METHOD	YES	NO
27	Do you sometime find it difficult to remember to take your medication?		
28	When you feel better, do you sometime take a break from your medication?		
29	Many patients have troubles in taking their ARV doses as prescribed; did you miss any ARV doses in the last 3 days?		
30	Sometimes if you feel worse when you take the medicine, do you stop taking it?		

(A women was considered to have good adherence if she responded' No' to all the four of the questions. However, if she responded 'Yes to at least one question, she was considered to have poor adherence)

QN. 31 Percentage Adherence = Total number of drugs taken /Total number of drugs prescribed ×100

Appendix IV: Questionnaire – Kiswahili Version

Maswali/Dodoso

SN	Maswali	Majibu
1	Umri katika miaka	
2	Hali ya ndoa	Sijaolea Nimeolewa Nimeachika Mjane
3	Hali ya uzazi	Mara mwisho ni lini kuona siku zako za hedhi??……. Umri wa mimba……. Mimba ya ngapi?..... Umejifungua mara ngapi?....
4	Elimu ya muhusika(mteja)	1.Hawezi kusoma na kuandika 2. Anaweza kusoma na kuandika 3. Elimu ya msingi 4. Elimu ya secondari 5. Elimu ya chu
5	Elimu ya Mume?	1.Hawezi kusoma na kuandika 2. Anaweza kusoma na kuandika 3. Elimu ya msingi 4. Elimu ya secondary 5. Elimu ya chuo
6	Kazi ya Muhusika(Mteja)	1.Mwanafunzi 2. Mfanya biashara 3. Muajiriwa wa serikali 4. Muajiriwa wa shirika lisilo la serikali 5. Mama wa nyumbani 6. Mfanya kazi za vibarua

SN	SWALI	JIBU
7	Kazi ya mume	1.Mwanafunzi 2. Mfanya biashara 3. Muajiriwa wa serikali 4. Muajiriwa wa shirika lisilo la serikali 5. Mfanya kazi za vibarua
8	Tarehe uliyo anza dawa?	
9	Ni mara ngapi umehudhuria kliniki hadi sasa?	
10	Je,katika siku tatu zilizo pita kuna siku hukuweza kunywa dawa zako za kuongeka kinga? Kama jibu ndio,sababu ni nini?	Jibu ni Ndio Hapana Sababu ni 1.Nilisahau 2.Niliona naendela vizuri, nimepona 3. Niliogopa madhara ya dawa 4. Dini yangu hairuhusu 5. Naogopa kufahamika kama muathirika wa ukimwi 6. Nilikuwa na shughuli nyingi 7. Dawa nyingi 9. Nilikosa tumaini 8. Mengineyo……
11	Je hapo awali ulikwisha elimishwa kuhusu kuzuia maambuki kutoka kwa mama kwenda kwa mtoto?	Ndio Hapana
12	Je mtoa huduma wa afya amekuelekeza jinsi ya kunywa dawa	Ndio Hapana
13	Je mtoa huduma ya afya alikupa nasaha kuhusu madhara yaliyo mengi ya dawa hizi za kuongeza kinga na kuzuia maambuki kwenda kwa mtoto?Kama ndio ni madhara gani mtoa huduma alitoa nasaha ?	Ndio Hapana
14	Ushamwambia mwenza wako kuhusu hali yako ya UIKMWI	Ndio Hapana
15	Kama ndio (swali no.15),Ni lini ulimwambia mwenza wako	Kabla ya kuanza dawa…. Baada ya kuanza dawa…
16	Kama hujamwambia mwenza wako hadi sasa,Je una mpango wa kumuambia	Ndio Hapana
17	Kama ndio(swali 17),lini umepanga kumwambia mwenza wako?	1. leo… 2. Baada ya mwezi… 3. Ndani ya mwezi… 4. sitamwambia kamwe

18	Baada ya kujua umeadhirika na Ukimwi,Je ni nani ungeweza kumwambia majibu yako/hali yako?	1.Hakuna mtu… 2.mpenzi/mume… 3.kaka na dada… 4.rafiki/ndugu…. 5wazazi…… 6.wengineo……
19	Je unajua hali ya kiafya (ukimwi) ya Mume/rafiki yako	1.ndio(anamaambukizi)…. 2.Hapana au hana maambukizi…

SN	SWALI	JIBU		
	Knowledge on MTCT(PMTCT) True False Not sure	**KWELI**	**SIO KWELI**	**SINA UHAKIKA**
20	Matumizi ya kondomu yanaweza kuzuia maambukizi ya UKIMWI wakati wa tendo la ndoa na mweza aliye adhirika?			
21	Mama mmjamzito aliye adhirika na UKIMWI anaweza muadhiri mtoto kwa virusi ya UKIMWI kabla ya kujifungua?			
22	Mama mwenye UKIMWI anaweza punguza maambuki ya virusi kwenda kwa mtoto endapo atakunywa dawa za kuzuia maambukizi toka kwa mama kwenda kwa mtoto?			
23	Kuacha kunywa badhi ya dawa za kuzuia maambuki kwenda kwa mtoto haina madhara katika ufanisi wa kuzuia maambukizi kwenda kwa mtoto?			
24	Kunywa dawa ipasavyo inasaidia kupunguza magonjwa nyemelezi			
25	Msaada wa mwenza katika jitihada za kuzuia maambuki ya mama kwenda kwa mtoto haumsaidii mama kunywa dawa ipasavyo?			
26	a) Je unapata msaada kutoka kwa mwenza wako b) Anahudhuria kliniki pamoja nawe? c) Anafaham tarehe yako ya kuhudhuria kliniki?			
	d) Anaongelea kuhusu huduma na mipango ya kliniki			
	e) Anatoa msaada wa kifedha kwa ajili ya mahudhurio ya kliniki			
	f) Anajua ni jinsi gani inatakiwa unywe dawa zako			
	g) Anakuletea dawa toka kituo cha Afya			
	h) Anaomba ruhusa kutumia kinga ya mpira siku hizi			
	i) Anahudhuria kliniki pamoja na wewe			

SEHEMU B: HALI YA UNYWAJI WA DAWA

SN		NDIO	HAPANA
27	Kuna muda unapata shida kukumbuka kumeza dawa?		
28	Unapokuwa unajikia vizuri,kuna muda unaacha kutumia dawa?		
29	Wagonjwa wengi hupata shida kunywa dawa zao kama ilivo elekezwa,Je kuna siku hujanywa dawa ndani ya siku hizi tatu		
30	Kuna muda unapo jisikia vibaya wakati unakunywa dawa,unaacha ktumia dawa?		

Mwanamke(muhusika) atahesabika kama anakunywa dawa kwa kuzingatia endapo atajibu HAPANA kwa maswali yote ma nne,Hata hivyo kama yeye atajibu NDIO kwa angalau swali moja atahesabika kama hazingatii dawa ipasavyo)

31. Asilimia ya Ufuasi wa dawa za kupunguza makali (ART) = (JUMLA YA VIDONGE VILIVYOMEZWA / JUMLA YA VILIVYOTAKIWA KUMEZWA) X 100