FACTORS ASSOCIATED WITH UNINTENDED PREGNANCY AMONG HIV POSITIVE WOMEN ON ANTI RETROVIRAL THERAPY IN GULU DISTRICT

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DECLARATION

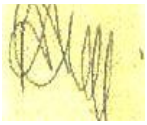
I declare that a study titled ‘factors associated with **unintended pregnancy among HIV positive women on anti-retroviral therapy (ART) in Gulu District’** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references and that this work has not been submitted before for any other master at any other institution.

_____ _____

DR AMONGI PASCAH REBECCA **DATE**

APPROVAL

This is to declare that the study titled 'factors associated with unintended pregnancy among hiv positive women on anti-retroviral therapy in Gulu district' was conducted under my supervision and has met the standard of Clarke International University (Formerly International Health Sciences University).



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SUPERVISOR **DATE**

DR ANGUZU RONALD

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LIST OF ACRONYMS

AIDS	Acquired Immuno Deficiency Syndrome
ART	Anti-Retroviral Therapy
ARV	Anti-Retroviral (Drugs)
BTL	Bilateral Tubal Ligation
FP	Family Planning
FPA	Family Planning Association of Uganda
HCG	Human Chorionic Gonadotrophine
HIV	Human Immuno-Deficiency Virus
IHSU	International Health Sciences University
IUCD	Intra Uterine Contraceptive Device
JCRC	Joint Clinical Research Centre
LNMP	Last Normal Menstrual Period
MOH	Ministry of Health
MTCT	Mother to Child Transmission
NNRTIs	Non-Nucleoside Reverse Transcriptase Inhibitors
NRTIs	Nucleoside Reverse Transcriptase Inhibitors
PEPFAR	Presidential Emergency Program For AIDS Relief
PIs	Protease Inhibitors
PLHIV	People Living With HIV
PMTCT	Prevention of Mother to Child Transmission
TASO	The AIDS Support Organization
TB	Tuberculosis
WHO	World Health Organization

OPERATIONAL DEFINITIONS

Contraceptive failure: Occurrence of pregnancy despite typical use of a family planning method.

Dual Family Planning: Use of two methods of contraception at the same time. For example, use of a condom concurrently with implants, injectable or pills to reduce the risk of unintended pregnancy due to reduced efficacy of hormonal methods by drugs like ARVs causing failure of contraception.

Family Planning: Process of having children when ready, the right number and with the right spacing and at the right time.

Family Planning Utilization: The use of any method of contraception to prevent unintended pregnancy, space children or stop child birth where and when necessary.

Modern Family Planning: Western methods of contraception; barrier (condom, diaphragm), pills, inject plan, implant, intra-uterine contraceptive device, BTL, Vasectomy.

Traditional Family Planning: Natural contraceptive methods; calendar method, bids, body temperature, vaginal fluid method, coitus interuptus.

ABSTRACT

Introduction: Unintended pregnancy among HIV positive women remains a significant public health and in particular reproductive health concern. The health effects and drug interaction among the women on ART could have significant influence on unintended pregnancy.

Objective: To investigate factors associated with unintended pregnancy among HIV positive women on anti-retroviral therapy in Gulu District.

Methods: The study used facility based analytical cross sectional study design. Sample size was determined using Kish Leslie's formula (1967) Data was collected using questionnaires among 200 women on ART from 4 ART clinics. Three research assistants were recruited and trained to collect data. The women on ART were sampled using Stratified sampling and purposive techniques. Consent was obtained before data collection. Data were entered into MS Excel 2010 for cleaning and exported into SPSS version 20 for statistical analysis at 95% Confidence Interval. Numerical data were computed and categorical data were analyzed and presented in pie-chart and tables**.** Overall, data were analyzed at Univariate, bivariate and multivariate levels. At Bivariate level, chi-square was used but Fisher's exact test was used each time a cell (s) has value (s) less than 5. For all independent variables with significant difference with dependent variable, simple logistic was performed (Unadjusted Odds Ratios). Thereafter, multivariate logistic regression analysis (Adjusted Odds Ratios) was conducted and stepwise backward elimination modeling was undertaken to remove confounders during repeated analysis.

Results: Overall 200 HIV positive women on ART were studied. Mean age was 33 ±5.8 years; the median age was 33 years. Nearly half 94(47%) were aged 32-38 years, 136(68%) were married, 108(54%) completed primary education and 134(67%) had less or four children. Prevalence of unintended pregnancy was 43% (n=86 N=200 CI: 0.36-50.17). Bivariate results showed that occupation (p=0.001), level of education (p<0.001), income class (p<0.001), number of children (p<0.001), having polygamous partner (p=0.003), history of abortion (p=0.038), using hormonal contraceptives before pregnancy realization (p=0.002), duration without contraceptive before current pregnancy (p=0.002), contraceptive use before current pregnancy (p=0.036), specific types of contraceptive used (p<0.001), receiving FP and ARVs in single facility (p<0.001), transport cost to facility (p=0.003), duration on ART(P<0.001) had statistically significant difference with unintended pregnancy. On adjusting for confounders using multivariate logistic regression, business women (AOR=0.018, CI: 0.04-0.74, p=0.017) and employed women (AOR=0.06, CI:0.01-0.29, p=0.001), secondary education (AOR=0.01 CI:0.00-0.13, p=0.001), duration without contraceptive use (AOR=0.07 CI:0.02-0.31, p=0.001), Not receiving FP methods and ART from same facility (AOR=11.1, CI:3.78-32.59, p<0.001) and duration on ART 2-5 years (AOR=3.61, CI:1.75-37.44, p<0.001) and >5 years (AOR=12.91, CI: 4.45-37.44, p<0.001) had significant association with unintended pregnancy among women on ART.

Conclusion: Prevalence of unintended pregnancy was unacceptable at 43%. Business occupation, attaining secondary education, duration without contraceptive had reduced likelihood of unintended pregnancy. On the other hand, not receiving FP and ART from same facility, duration on ART significantly increased prevalence of unintended pregnancy. Health care providers should encourage girl child education and productivity through business training and practice and using at least two contraceptives by women on ART. Women should be encouraged to seek FP and ART in a single facility to facilitate detailed monitoring and studies to focus on reducing effect related to duration of being on ART among women on contraceptives.

CHAPTER ONE: INTRODUCTION

1.1. Introduction

An unintended pregnancy is a pregnancy that is reported to have been either unwanted or mistimed. It is also key concept used to comprehend the fertility of populations and the unmet need for contraception and family planning. Unintended pregnancy primarily arises from not using contraception, or inconsistent or incorrect use of effective contraceptive methods (CDC, 2015).

Globally, there are an estimated 33.4 million people living with HIV/AIDS today and the majority of these are in Africa with 67.1% being in Sub-Saharan Africa (*UNAID/WHO 2009*).

In Africa, including Uganda, HIV/AIDS has been found to be more common among women and men of reproductive age, with various contributing factors like high levels of poverty, high fertility rates, inadequate medical /health services and poor utilization of family planning (*UNAIDS/WHO 2009*). In Uganda, according to the Uganda AIDS Indicative Survey, 2011, the

The Uganda Population-Based HIV Impact Assessment (UPHIA) indicated that the prevalence of HIV among adults aged 15 to 64 in Uganda is 6.2% and this accounted for 7.6% among females and 4.7% among males and 7.2% in Mid-north where Gulu district is inclusive (*MoH-GoU, 2017*) and prevalence of contraceptive use among HIV positive women in Gulu Regional Referral was at 36% (*Bongomin et al, 2018*).

In Uganda, Annual Health Sector Performance Report 2016/17 showed that HIV+ pregnant women not on HAART receiving ARVs for eMTCT during pregnancy, labour, delivery and postpartum accounted for 90% in 2016/2017 68.3% in 2015/15 and above Health Sector Development Plan target of 87% (*MoH, 2018*). In effort to reduce mother to child transmission of HIV, integration of family planning services in the HIV services where women on ART can have access to the modern contraceptives so as to reduce on unintended pregnancies.

1.2. Background

Globally, unintended pregnancy has been very high accounting for 27% of maternal deaths. A number of studies indicated that nearly half of HIV-infected women who gave unintended birth were using family planning methods prior to their unintended pregnancy. This implies that contraceptive failure contributes to unintended pregnancy (*Gelagay et al, 2018*).

In 2007, World Health Organization (WHO) recommends a comprehensive PMTCT strategy that includes; primary prevention of HIV infection among women of childbearing age, FP for preventing unintended pregnancies among HIV-infected women, preventing HIV transmission from HIV-infected women to their infants and treatment, care and support of HIV-infected women and their children. However in Africa, unintended pregnancy is widespread among HIV positive women and about 90% of the pregnancies are related to non-utilisation of effective family planning methods. Overall, women aged 15-49 years make up more than 60% of people with HIV and many nations have more than 60% unmet need for modern family planning methods (*Clayden,2018*).

Sedgh et al (2014) estimated that 40 percent of all pregnancies globally and 35 percent of the pregnancies in Africa are unplanned. According to Kikuchi et al (2011) and *Warren et al (2013*) noted that 35-65 percent of pregnancies among HIV positive women across Sub Saharan Africa may be unplanned. In South Africa alone, two-thirds of HIV positive women reported unplanned pregnancies (*Schwartz et al, 2012 and Credé et al, 2012*).

According to *Cleland (2016*), unintended pregnancies take place predominantly due to unmet need for contraception including reliance on less effective, user dependent, short acting methods. Sub-Saharan Africa has high contraceptive unmet need surpassing 30% in other nations.

Furthermore, it is recognized that challenges with contraception adherence are compounded in limited resource countries where economic and infrastructure barriers, such as transportation costs or clinic supply chain interruptions, are hurdles to the repeat clinic visits required for adherence to shorter-acting methods (*Gribble and Clifton, 2010; Nalwadda et al, 2011*).

According to *Cleland et al (2006*) one third of unintended pregnancies occur among women due to use of short-term methods that require daily adherence or on quarterly basis hence poor patterns of use contributed significantly to unintended pregnancy in sub-Saharan Africa (*Hubacher et al 2008)* as well as their failures (McCoy et al 2014) leading to 14 million unintended pregnancies annually in SSA (*Hubacher, 2008*).

UBOS (2016) reported that women in Uganda have the highest fertility rates in the world at 5.4 births per woman and national HIV prevalence of 7.3% (Sustain Uganda, 2017) have significant unmet family planning needs. Over 30% of unmarried, sexually-active Ugandan women report unmet family planning needs (*UBOS, 2016*), and 44% of pregnancies in Uganda are reported as unintended (UBOS, 2011). Modern contraceptive use among Ugandan women has remained low; reported rates primarily range between 40% and 45%, though isolated studies have reported higher rates of up to 74% (*Kabami et al, 2014; Niewves et al 2015*) with common unintended pregnancy (Bunell et al 2008) . Better integration and access to comprehensive family planning services could achieve HIV prevention and treatment goals (*Crankshaw et al, 2016*). However, it was reported that even with scale up of antiretroviral based PMTCT, unwanted pregnancy among women with HIV might account for almost a quarter of all HIV positive infants (Jordan et al 2009) however there is scarce information on determinants of unintended pregnancy among women who were on ART and family planning methods. This study investigated the factors associated with unintended pregnancy among HIV positive women on ART in Gulu district.

1.3. Problem statement

The prevalence of unintended pregnancy among HIV positive women on ART as well as family planning options in Gulu district is unknown. According *MoH-GoU, (2017*), the prevalence of HIV 7.2% and prevalence of contraceptive use among HIV positive women in Gulu Regional Referral was at 36% higher than national prevalence of 35% (UBOS, 2017), in addition, the prevalence of injectable and implants were as low as 24% in the North region and yet the risk of unintended pregnancy is increasing. It was observed that HIV positive individuals tend to reduce their child bearing intentions (*Taulo et al 2009; Yeatman, 2009*) hence it is reasonable to suppose that in such circumstances, births to HIV positive women are likely unintended. According to *Obare et al (2012*), increased availability of ART was found to have positive impact on future fertility intentions of HIV positive individuals. Although among HIV positive women on ART and earlier on contraceptive methods fully intend not to get pregnancy, implying other factors could play.

Despite family planning can reduce unintended pregnancies among HIV positive women as well as reduce the number of HIV infected infants as much as the use of ART prophylaxis for eMTCT (*Reynolds, et al 2005*), reduce the likely number of children who may become orphaned and vulnerability of women and infants to morbidity and mortality related to pregnancy and lactation (*Rutenberg and Baek, 2005; Halperin et al 2009)* but modern contraceptive use among HIV positive women remains low in Gulu as well as in Uganda at large.

This study investigated the factors associated with unintended pregnancy among HIV positive women on concurrent use of anti-retroviral therapy (ART) and hormonal family planning in Gulu district.

1.4. Research Questions

i. What is the prevalence of unintended pregnancy among HIV positive women on ART in Gulu district?
ii. What are the individual factors associated with unintended pregnancy among HIV positive women on ART in Gulu district?
iii. What are the contraceptive factors associated with unintended pregnancy among HIV positive women on ART in Gulu district?
iv. What health systems related factors are associated with unintended pregnancy among HIV positive women in Gulu district?

1.5. Study objectives

1.5.1. General objective

To investigate factors associated with unintended pregnancy among HIV positive women on anti-retroviral therapy in Gulu District.

1.5.2. Specific Objectives

i. To determine the prevalence of unintended pregnancy among HIV positive women on ART in Gulu district.
ii. To ascertain individual factors associated with unintended pregnancy among HIV positive women on ART in Gulu district.
iii. To establish contraceptive factors associated with unintended pregnancy among HIV positive women on ART in Gulu district.
iv. To determine health systems related factors associated with unintended pregnancy among HIV positive women in Gulu district.

1.6. Scope of the Study

The study was conducted in 5 HFs, 3 Sub counties, including municipal and the Regional Referral Hospital. The data was collected covered all the information required for the four specific objectives.

1.7. Study Justification

MOH currently directs that women of reproductive age including those living with HIV should use dual FP methods to prevent unwanted pregnancies, space children and stop child birth where need be and that family planning (FP) services must be integrated into the daily HIV/AIDS care services, and this is being practiced all over Uganda (MoH, 2013). All the HIV/AIDS care sites have the different methods of FP usually except the long term for which mothers are referred elsewhere like Marie Stops, Reproductive Health Uganda, and FPAU.

The dual method is to ensure that all women who wish to use family planning for different reasons actually succeed in achieving their goal of FP, putting it into account that there are reports about failure of hormonal methods. In 2005, MOH reported that FP utilization was at only 23% and therefore there was need to scale it up to at least 40% by 2010. This was not possible; however it was raised up to the current level of 36% country wide and 24% in the North. The results of this study, may enable medical personnel provide better education about the failures and the need to use dual method so as to reduce the prevalence of unintended pregnancy. Secondly, this study determined the factors associated with integration of FP and HIV/AIDS care services in Gulu. The study was the first of its kind to be undertaken in the district.

1.8. Conceptual frame work

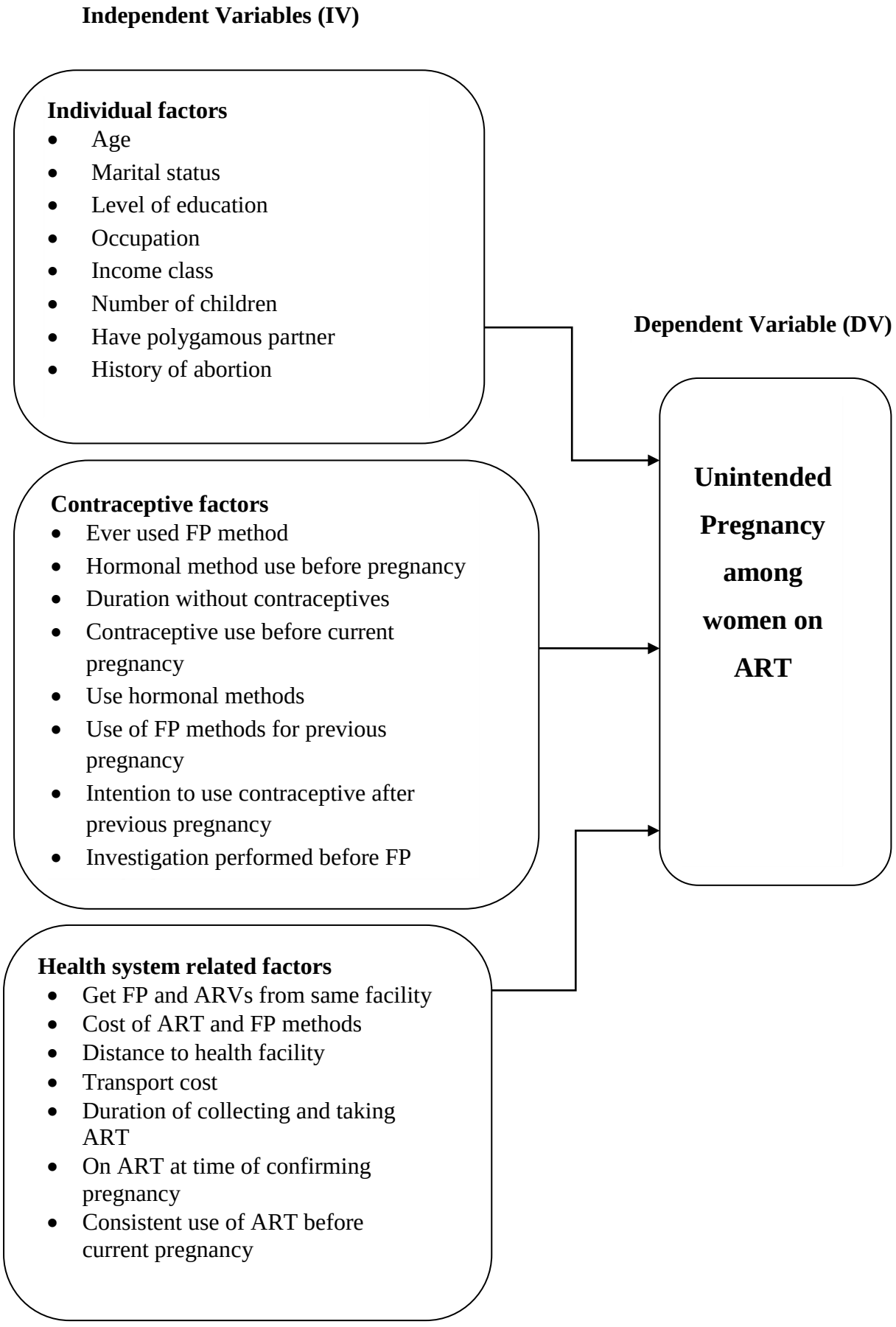


Figure 1: Conceptual Framework

1.9. Description of the Conceptual Framework

The above figure 1 shows that the outcome of interest in the study was unintended pregnancy among HIV positive and lactating women on ART. The figure illustrates that unintended pregnancy among the study population may be associated to the age, marital status, polygamous partner, level of education of the women/mothers, occupation, income, number of live children, history of abortion and having polygamous partner.

Secondly, unintended pregnancy may also be associated with past use of family planning method, Hormonal method use before pregnancy, Duration without contraceptives, Contraceptive use before current pregnancy, Use hormonal methods, Use of FP methods for previous pregnancy and Investigation performed before beginning contraceptive use**.** In this study the common contraceptive methods used were oral pills and implant and non-hormonal methods included condom, spermicide, diaphragm, withdrawal (Coitus Interuptus) and moon beads.

Thirdly, it was also conceptualized that unintended pregnancy among the study population may be associated getting family planning methods and ARVs from the same health facility, distance to the health facility, transport cost to the health facilities, duration of collecting and taking ART, being on ART at time of confirming pregnancy, consistent use of ART before current pregnancy.

Furthermore, in Uganda, free HIV/AIDS treatment for the general public started in 2004 with the coming of donation from the American people initiated by President Bush Jr through PEPFAR and Global Fund. The treatment added to the already existing family planning that a few women were using in form of Natural family planning and Modern family planning including the hormonal methods like injections and implants among others.

Reports about getting pregnant while on family planning started coming up and this seemed to be more common among the mothers on ARVs, but at the time there was nothing known about the interaction between ARVs and family planning and therefore not much attention was given to such issues. In fact the only reasons were that the family planning drug could have been expired at the time of use or probably the mother was already pregnant, only that HCG was not done at the time of provision of the family planning.

Later, the problem became even more significant with more women reporting pregnancy while on ART and family planning and seen among those on Efavirenz based regimens, while the woman is on injections or implants.

This outcome of ART interacting with Hormonal family planning methods causing unwanted pregnancies has led to a lot of discouragement, anger and frustration for both the service provider and the mother/couple. It has made the women and communities begin to think family planning actually doesn't work which is now a misconception that may worsen the utilization level.

Apart from the major reason of interaction, there could also be other reasons causing pregnancies in these same group of women; the drug could have stayed in storage for a long time and it is believed that implants lose their potency as years go by; it also could be that the drug was expired at the time of use but the health care service provider missed to realize it; there could have been a poor history taking that did not pick out the last normal menstrual periods of the woman and so the method is provided when the mother is already pregnant; another weakness on the side of the health worker could be due to failure to do urine HCG to detect pregnancy; could also be that the client is breastfeeding and has never seen her periods so the method is provided when she is pregnant already; the mother can actually give the health worker a wrong LNMP date that misguides and the health worker provides the method yet the mother could already be pregnant.

CHAPTER TWO: LITERATURE REVIEW

2.0. Introduction

This chapter involves the review of literature for studies conducted before and is arranged according to the specific objectives namely; the prevalence of unintended pregnancy among HIV positive women on ART, individual, contraceptive and health system factors associated with unintended pregnancy among HIV positive women on ART. As a result of scarcity of literature in relation to the population under study, some literature in some related studies is not necessary among HIV positive women but factors associated with unintended pregnancy among women. The sources include journals, policy briefs, reports and books.

2.1. Prevalence of unintended pregnancy among HIV positive women on ART

According to *Credé et al (2012*), the prevalence of unplanned pregnancy remains high despite high uptake of contraceptives in South Africa at 62% (both HIV positive and HIV negative women amidst high contraceptive uptake of 89%. A study found that the prevalence of unplanned pregnancy was still high and disproportionally high among women aged below 21 years and have done three to five abortions (*Adeniyi et al, 2018*).
According to the UBOS (2011), the prevalence of unintended pregnancies in Uganda was 44%.

The large number of unintended pregnancies among HIV-infected individuals in Uganda and elsewhere has also been reported by other studies (*Rochat et al 2006; Homsy et al, 2009*). The unintended pregnancies in the above studies were related to also use of less effective contraceptive methods like condoms, coitus interuptus, lactational amenorrhea and rhythm whereas effective use of contraceptive methods like implants for women and male sterilization was very low.
In United States, the prevalence of unplanned pregnancy was at 68% and 85% and this trend was also found among HIV positive women (*Smits et al 1999; Sutton et al, 2014).* In South Africa despite the remarkable progress in the PMTCT of HIV, the prevalence of unplanned pregnancy in HIV positive women remains a significant concern.
In a study by *Fite et al (2018*), the prevalence of unintended pregnancy was 41.5% close to that of the present study. However, the above study did not study only HIV positive women but both.
The prevalence of the unintended pregnancy was found to be higher than study in Hosana whose prevalence was 34% (*Hamdela et al 2012*) and 26% in Welkaite (*Abayu et al, 2015*), 24% in Kenya (*Ikamari et al, 2013*), 14.3% in Senegal (Faye et al, 2013), 38.2% in Pakistan (*Habib et al, 2017*) and 27% in Canada (*Oulman et al, 2015*).

In study by *Teshome et al (2014*) found prevalence of unintended pregnancy at 35.5% and the prevalence was higher than that found by *Kassa et al* (*2012*) in Kersa Eastern Ethiopia which was 27.9%. It was argued that the differences in the above studies could be due diverse tradition, cultural and religious denominations that of from this study. The present study however found higher prevalence of unintended pregnancy at 43%.

In another study in Ethiopia, a little more than a quarter, 26%, of women reported their recent pregnancy as unintended and 13.7% of women wanted a child if it had been after two years and 12.3% reported that they did not want their recent pregnancies at all (*Gebreamlak, 2014*).
In another study by *Nigatu & Tadele* (*2011*) in Damote Gale district, South Ethiopia, the prevalence of unintended pregnancy was at 42.4%. This result from was close the present prevalence in Gulu where the prevalence was 43%. Ramesh *et al* (2009) in their study found the prevalence of unintended pregnancy at 41.2% and Isabel and MiguelSan found that in Ecuado at 36.3% lower than the prevalence of the present study among HIV positive women on ART.

In a study conducted by *McCoy et al,* (*2014*) among 8,797 women, with a mean age of 26.7 years, 35.1% reported unintended births. Of those that had unintended births, 47.8% were on contraception at the time they got pregnant, while 52.2% were not on any family planning at the time of conception. 12% of the women in the group were HIV positive at the time of the survey. Of those who got unintended pregnancies, 44.9% of the women were HIV positive, and 33.8% had unintended pregnancies yet HIV negative In conclusion, the women who got pregnant while HIV positive were more than those who got unintended pregnancies while HIV negative.

2.2. Individual factors associated with unintended pregnancy among HIV positive women on ART

Level of education

In another study by *Ikamari et al (2013*), formal education was not significantly associated with pregnancy intendedness which was contrary to the expected results. The study however found that regarding trend, reduced unintended pregnancy increased with level of education was found other studies (*Omane-adjepong et al 2012 & Calvert et al, 2013*). Low level of education (Not beyond high school) was associated with increased odds of an unplanned pregnancy (Warren et al 2013; *Mayondi et al, 2016).*

Level of education is related to the capacity of acquiring more knowledge and skills as well as improved access to information. Studies showed that higher educational status was found to be associated with lower likelihood of experiencing unintended pregnancies (*Williams, 1991; Islam and Rashid, 2005*). Furthermore, some studies actually found no significant association between level of education and unintended pregnancy (*Goto et al 2002; Che et al 2004; Adhikari et al 2009*). On the other hand, some earlier studies showed significant association with unintended pregnancy (National Institute of Population Studies, 1992 and Stephenson et al 2008).

Age of women

In another study in Botswana and Swaziland, the result indicated that younger women of less than 20 years had increased odds of unplanned pregnancy (*Warren et al 2013; Mayondi et al, 2016*).

In a study by *Iyun et al (2017)*, younger age, increasing parity were associated with increased likelihood of experiencing unintended pregnancy (*Kikuchi et al 2011; Oulman et al 2015*; *Mayondi et al, 2016*). Ali et al (2016) found women with an advancing age had a positive association with unintended pregnancy.

This implies that when women get older, they become not interested in any more children but due to unmet need for contraceptive methods, they subsequently experience unintended pregnancies (*Iranfar et al, 2009; Calverton, 2014*).

In the present study where women on ART were studied, women were even expected to highly and effective use contraceptive methods which means there should be no challenges in accessing them.

Marital status

Loutfy et al (2012) and *Gazmararian et al (1995*) found that unmarried women were four times more likely to report an unplanned pregnancy compared to married women. In addition, *Adeniyi et al (2012)* in their study also found similar finding. In a study by *Iyun et al (2017*), married women and those who had discussed family planning with their partners before conception and HIV-positive women who had disclosed their HIV status to their partners were less likely to have an unplanned pregnancy. This implies that disclosure of HIV status may likely predispose the couples to use of dual family planning methods.

In a study in Nigeria on unintended pregnancy among 180 HIV positive pregnant women in Enugu, Southeast Nigeria found that married or cohabiting women (regular) partners had significantly higher odds of experiencing unintended pregnancy than women with unstable partners ($p=0.029$). The same study however found that age, parity, educational level, and being on ART showed no significant association with the prevalence of unintended pregnancy.

They concluded that modern family planning methods should be made available and accessible to HIV positive women in order to contribute in elimination of mother-child-transmission of HOV and subsequent new pediatric HIV infection (*Ezugwu et al, 2016*). According to *Haffejee et al* (*2017*), across the globe, a large proportion of pregnancies are unintended though there are no available reports from South Africa indicating the prevalence of unintended pregnancies.

This study therefore explored and looked at the prevalence of unintended pregnancies among South African women attending a public primary health care clinic in Kwazulu-Natal, South Africa. Results showed that participants were mainly single-89.9%-267, unemployed-70.8%-222, with a monthly income of less than R 1500 per month -63.8%.

Two thirds of the women under study-64.3%-211 had unintended pregnancies, and there was clear relationship between marital status and unintended pregnancies. Women who were married or cohabiting with their partners were more likely to have planned their pregnancies as compared to those who were not married or were divorced. Unemployment was also indicated to be related to unintended pregnancies among this group of women in the study. In conclusion, they said that this population of South African women with a low education level and low income status, the prevalence of unintended pregnancies is high as well as with single or unmarried women.

Parity

In a study in rural Ghana, high parity was significantly associated with unintended pregnancy. In a normal circumstance, it is expected that the level of unintended pregnancy would be lower where parity is high (*Eliason et al, 2014*). A study conducted by *Kikuchi et al* (*2011)* on high rate of unintended pregnancies after knowing of HIV Infection among HIV positive women on ART in Kigali, Rwanda found that significant association between unintended pregnancies and having two or more children. Regarding parity, *Mohammed et al (2016*) also found that parity was significantly with unintended pregnancy. It emerged women with parity of 3 and above had increased likelihood of experiencing unintended pregnancy than those with less than two.

This was in conformity with another study in Ethiopia by *Wado et al (2013*). They noted that women with high parity could be already having adequate children and tend to practice sex for enjoyment unlike to have children.

Mohammed et al (2016) in their study found marital status was significantly associated with unintended pregnancy whereby single and divorced/widowed women were at higher risk of unintended pregnancy than the married women. It also emerged that the above study was in agreement with studies conducted in Kenya (*Ikamari et al, 2013) and Tanzania (Exavery et al 2014).*

It was noted that the single and widowed/divorced women had higher likelihood of getting involved in sexual activities for pleasure, motivation, social status or other exchanges rather than for child bearing. In addition, some people are known in their communities in regards to their marital status hence may be less likely to access and use contraceptives because they may feel ashamed of their sexual activities. This scenario was found in a study conducted in Ethiopia by Levinson *et al* (2014). The difference with this study and the present study is that the above study did not focus on HIV positive women on ART.

Income class of women

Finer and Henshaw (2006) found that women with low income had higher likelihood of unintended pregnancies than those from higher income class. This result could be related to the fact that women in low income class may be using contraceptives infrequently and experiencing higher rates of contraceptive failures. In contrary, the present study looked at women who were on contraceptives before their current or recent pregnancy as well as among HIV positive women on ART.

Past studies showed that low income class with the same geographic region revealed that women have challenges in negotiating condom use with their partners (*Ports et al 2015; Haffejee et al 2016*). In addition, *Ali et al (2016*) reviewed literature by retrieving articles from various data bases in developing countries on unintended pregnancies and found that in regards to socioeconomic status of woman, low-income women are more likely to experience unintended pregnancy, as compared to those with higher income.

2.3. Contraceptive factors associated with unintended pregnancy among HIV positive women on ART

Utilization of contraceptive methods is very important in preventing unintended pregnancies. *Ali et al (2016*) found significant association with unintended pregnancy. Studies have also found a strong positive association between users of modern contraceptives and unintended pregnancy (*Besculides and Laraque, 2004; Islam and Rashid, 2005*). It was noted that such women have high expectations about pregnancy prevention hence are more likely to view their pregnancy as unintended.

In a study by *Wanyanze et al* (*2011*), on uptake of family planning methods and unplanned pregnancies among HIV positive people, the majority 958 (87%) reported to have ever used family planning methods. The most commonly used FP method was male condoms 530 (48%) whereby 62% of the men and 39% of the women were using male condoms.

In addition, *Wanyanze et al (2011*) found that no significant association between unintended pregnancy and being on ARVs and duration on treatment.

In Sub Saharan Africa, the rate of new HIV infections remains high (*Joint United Nations Programme on HIV/AIDS, 2013*) including unintended pregnancies which continue to occur (Hubacher et al 2008). In study by Curtis et al (2016), they noted that although contraceptive efficacy of HIV positive women, access to and use of the family planning methods remain low. In SSA, the prevalence of contraception is the lowest (United Nations Department of Economic and Social Affairs, 2011) whereby the estimated unmet need for family planning among women in reproductive age (15-49 years) (*UNAID, 2012*). In a study by *Bankole et al (2011*), the contraceptive use at time of conception was higher among HIV positive women than those not infected. Studies in SSA revealed that HIV positive women may have limited access to contraceptive methods due to barrier in accessing the contraceptives ,methods as well as fear of stigma from the health care providers (*Wanyenze et al 2013; Jhangri et a; 2011*).

According to studies by *Kaida et al (2011) and McCoy et al 2014*), both contraceptive failure and unmet need for family planning may have contributed to the high levels of unintended pregnancies among women both HIV positive and not which findings were similar to some of the studies conducted in Sub Saharan Africa.

Myer et al (2010) in their study indicated that rapid expansion of ART services in SSA led to recognition of the significance of fertility and child bearing among HIV positive women with very limited data showing influence of ART initiation on pregnancy rates. The study also found that ART was significantly associated with higher pregnancy rate among HIV positive women in Sub-Saharan Africa. This implies that it is important to plan pregnancy and management as a critical but this had been neglected in the component of HIV care and treatment services. *Myer et al (2010)* also found high incidence of pregnancies and significant association between use of ART and increased incidence of pregnancy. They also noted that in 4 years of follow-up, one-third of women who initiated ART experienced a pregnancy, highlighting the urgent need to make pregnancy-related services a central component of HIV care and ART programs.

Sharma and Walmsley (2015) affirmed that women aged 15-49 years represent a large proportion of world population living with HIV/AIDS and with the reduction in morbidity and mortality due to combination of ART, contraception and pregnancy planning are increasingly becoming significant agenda for HIV positive women.

Jarolimova et al (*2018)* studied contraception use among women living with HIV in Uganda by conducting a retrospective study analysis of data from a longitudinal cohort of individuals initiating antiretroviral therapy restricted to women with pregnancy confirmed between 2011 and 2013. In their study, intended and unintended pregnancies were their outcomes of interest. It emerged that out of 455 women studied, 110 had incident pregnancy with 50 pregnancies being unintended while 60 were intended.

Looking at postpartum women, the finding revealed that 64% of the unintended pregnancies and 51% of the intended pregnancies among women using modern contraceptives. In conclusion, almost half the incident pregnancies among women living with HIV that were analyzed had unintended pregnancies.

According to *McCarty (2011*), since introduction of Implanon in 1999, it remained the preferred contraceptive method among women due to its effectiveness and its long term effect of from three to five years. It contains certain hepatic enzyme-inducing drugs that may reduce its efficacy. Emma J McCarty also presented a case of an HIV positive woman in an ART clinic in 2010, who was on ART with Efavirenze in the regimen, having tubal pregnancies on two different occasions while on implanon as the contraceptive method of choice. *Melvin* (*2012)* picked interest in *McCarty's (2011*) results in order to bring out more information about hormonal contraception and ART. He noted that it seemed not uncommon for the interaction between the progestogen-only implant and enzyme-inducing drugs to be underestimated or overlooked despite warnings in product information. Based on the results it was suggested that more cautious approach in advising all women on long term treatment with an enzyme inducing drug to change to an un affected method like the progestogen only injectable, copper or levenonorgestrel-releasing intra-uterine methods. An increased dose of the combined oral contraceptive pill may be an alternative long-term option.

Melvin (*2012*) also reported that a 34 year old HIV positive woman on HAART regimen of Zidovudin, Lamivudine and Efavirenz was treated for a ruptured ectopic pregnancy 28 months after insertion of an etonogestrel contraceptive implant. Interestingly this patient did not have her implanon removed and was treated for a subsequent ectopic pregnancy on the contralateral side nine months later that was three years after the initial placement of the implanon. It emerged that as these women were on ARV regimens containing Efavirenz and implanon as method of contraception at the time of conception.

In another study conducted among HIV positive women using contraceptives and Efavirenz based or Nevirapine based ART in Kenya by *Patel et al* (*2015*), found that HIV positive women using implants and Efavirenze based ART had a three times higher risk of contraceptive failure than did those using Nevirapine based ART. These women still had lower contraceptive failure rates than did those receiving all other contraceptive methods except for intrauterine devices and permanent methods.

Poor patterns of short-term hormonal contraceptive use contributed significantly to unintended pregnancy in sub-Saharan Africa (*Hubacher et al 2008*). A study conducted in Zimbabwe noted that, among HIV positive women who had unintended pregnancy, about 47.8 % was due to contraceptive failure *McCoy et al 2014*).

2.4. Health system related factors associated with unintended pregnancy among HIV positive women on ART

According to *USAID* (*2012*), more than 222 million women who want to delay or prevent pregnancy but not using any modern contraceptives involve HIV-infected women as well as those at risk of HIV. It is therefore significant to determine the number, timing, and spacing of children is a right of every women and couples irrespective of their HIV status. In addition, *USAID* (*2012*) noted that clients of HIV counselling and testing may be at risk for unintended pregnancy.
It is important to ensure women on ART access family planning services in the same health facility which lessens the problems associated with follow up of women. *Kanniappan et al*, (*2018*) *and Salamander (2014*) noted that access to ART and comprehensive program to eliminate perinatal transmission of HIV up to date information on HIV, contraception, safer conception, pregnancy are important programmatic factors shaping fertility desires and reproductive choices for HIV positive women.

Tweya et al (2018) in their study in Malawi acknowledged that provision of HIV care including (ART services) and family planning may have addressed some problems HIV positive women face in accessing their choice of contraceptive methods. The delivery of the services in the same facility also minimizes transport costs and waiting times that could be incurred during multiple clinic visits. They concluded that knowing the high contraceptive uptake among women receiving ART, it is necessary to integrate comprehensive family planning services so as to effectively reduce unintended pregnancies. It emerged that ccontraceptive use among all women receiving ART increased from 28% in 2012 to 62% in 2016 ($p<0.001$).

According to *Ali et al* (*2016, p.519*), geographic accessibility is defined as the "extend to which family planning delivery and supply points are located so that a larger population can reach them with an acceptable level of effort. Study results from Colombia, Dominican Republic, Ecuador, Egypt, Guatemala, Thailand, Togo, Tunisia, Zimbabwe and Uganda revealed that distance from family planning services is inversely proportional to contraceptive prevalence rate. *Bongaarts and Bruce* (*1995*) noted that as distance from the family planning clinics increases, the contraceptive prevalence rate reduces among the married women in rural areas. In a study by Adhikari et al (2009) in Nepal, women found to be living near family planning services in minimal travel time of less than thirty (<30) minutes were likely to have experienced lower unintended pregnancies compared to those who in location that take more than an hour to access the health facility for family planning services.

2.3 Summary

Robinson et al (*2012*) in their study on contraceptive options for the HIV positive woman, which was to investigate the interactions between Hormonal contraception and anti-retroviral therapy found intriguing results with the implant. It emerged that all contraceptive implants failure reviewed occurred in HIV positive women taking Efavirenz as a component of their HAART regimens.

They noted that based on the available information, it appeared that all pregnancies occurred in the latter half of the three years for which implanon is licensed. Similarly, other studies conducted among HIV positive women also showed the same results in regards to Efavirenz's interaction with most contraceptives (*Vieira et al, 2014; Landolt et al, 2014*).

CHAPTER THREE: METHODOLOGY

3.0. Introduction

This chapter exhaustively explained the methods used to determine the proportion of unintended pregnancy among HIV positive and lactating women on ART in Gulu district. The chapter particularly explains the study design, study population, the study area, sample size determination, sampling technique and procedure, study variables, selection criteria, data collection methods and tools, quality control measures, ethical consideration, limitations of the study and dissemination of results.

3.1. Study Design

The study used facility based analytical cross sectional study design. The data for this study were collected at the ART clinics in Gulu district. The study design allowed the determination of unintended pregnancy among the women at a point in time.

3.2. Study Area

This study was conducted in Gulu district in the northern region of Uganda. The district is bordered by Omoro district in the South, Pader district in the East, Lamwo district in the North East, Nwoya district in the west with Amuru and Adjumani districts in the North West. The district headquarters are approximately 337 kilometres North of Kampala district, the administrative capital of Uganda. Gulu district was created by the colonial authority and has only one county (Aswa) and a municipality: The 2012, national population census estimated its population to be 443,733 people.

The study was conducted in Gulu district at four different selected sites or ART clinics; TASO Gulu, GRRH ART clinic, Lalogi HCIV and Awach HC IV ART clinic. TASO Gulu was an HIV/AIDS centre located in the municipal and was one of the eleven TASO Uganda Limited centres located in different Districts in the country.

TASO is an NGO dealing with HIV/AIDS patients. Gulu centre had a total of 8500 active clients, with 7600 being on ART. 65% (5525 women) of the clients were women of which 75% were in reproductive age.

GRRH ART clinic had approximately 4500 active clients of which 60% were women and 70% were in reproductive age.

Awach HC 1V had approximately 2000 clients and the trend was the same as that for TASO and GRRH. The HC was located in Awach sub-county in Aswa County, approximately 30kms from Gulu Town. All the three sites offered HIV/AIDS services, Family Planning and Reproductive Health services. The FP services included all the different modern FP methods that any woman wished to use at any moment.

3.3. Study population

The study population was women of reproductive age from 18 to 45 years, who were receiving HIV/AIDS, care from any of the list; (GRRH, TASO Gulu, Awach HC IV, Lalogi HC IV and Bobi HC III). This study targeted pregnant women, lactating mothers. The assessed women were currently taking anti-retroviral drugs and on a family planning method when pregnancy occurred.

3.4. Sample size estimation

The sample size was determined using Kish Leslie's formula (1967). *Jarolimova et al (2018*) studied contraception use among women living with HIV in Uganda by conducting a retrospective study analysis of data from a longitudinal cohort of individuals initiating antiretroviral therapy restricted to women with pregnancy confirmed between 2011 and 2013. The prevalence of unintended pregnancy was 10.99% (50) in 455 women studied.

From $n= \dfrac{z^2\, p\, q}{d^2}$

Where, n= required sample size

z= 19.6 score corresponding to 95% Confidence Interval

p= proportion of unintended pregnancy

q (p-1)= is the proportion of intended pregnancy

Therefore, $n = \dfrac{1.96^2 * 0.11 * 0.89}{0.05^2}$

$n = 150.44$

The fact that this study focused on HIV positive women, the expected non-response rate was high. As a result, 35% was considered to cater for non-response and final sample size of 203 was obtained. However, the actual sample size obtained in the study was 200 HIV positive women on ART.

3.5. Sampling techniques and procedure

During the data collection, a technique of stratified sampling was employed to pick out the different categories of respondents who were in groups called strata; strata A comprised of pregnant and lactating women with exposure to ARVs and FP from the PMTCT clinics, whereas strata B comprised of women with the same exposure but not pregnant and were from the general ART clinic.

Thereafter, simple random sampling technique was used to sample pregnant women and lactating from each stratum to have the sample size of 200 women in the study.

3.6. Study variable

3.6.1. Dependent variable

The dependent variable of the study was unintended pregnancy among HIV positive and lactating women on ART in Gulu district. It was measured using the question that asked whether during their current pregnancy they actually wanted to get pregnant later or another time in future. This was coded 1=Yes, for those who those who wanted to get pregnant at a later time and No=2 for those who actually wanted to get pregnant no at a later time.

3.6.2. Independent variables

This study considered three main independent variables namely Individual factors which include; Age, Marital status, Polygamous partner, Level of education, Occupation, Income, Parity, History of abortion, Visits to FP clinic, Visits to HIV clinic.

Family planning practices which include recent use of hormonal methods before current pregnancy, use of non-hormonal methods before the current pregnancy, use of FP methods for previous pregnancy and use of intention to use contraceptive after previous pregnancy.

Lastly, the health system factors include the variables of; distance to health facility, cost of ART and FP methods, contraceptive side effects, time of HIV test and time of Antiretroviral Therapy (ART) debut.

3.7. Selection criteria

These criteria allowed the researcher to validly include and exclude women to participate or not participate in the study.

3.7.1. Inclusion criteria

i. HIV positive women on ART and used family planning methods before the current pregnancy.
ii. HIV positive women on ART and used family planning methods who consented to participate in the study.
iii. HIV positive women on ART within Gulu district.
iv. HIV positive women on ART and used family planning methods before the current pregnancy and were aged 15-45 years.

3.7.2. Exclusion criteria

i. HIV positive women on ART who were too sick to participate in the study.
ii. HIV positive women whose disability status could not allow them to participate in the study.

3.8. Data collection Methods

This study used questionnaires as method of data collection among the HIV positive and lactating women on ART from the selected ART and Family planning clinics in Gulu district.

3.9. Data collection instruments

The study used researcher administered structured questionnaires to collect quantitative data among the HIV positive women in Gulu district.

The questionnaire was designed to gather data about the individual characteristics of the HIV positive and lactating women, unintended pregnancy, family planning practices, health system related factors among HIV positive and lactating women. The structured questionnaire was designed with the introductory section that re-highlighted to the participants the purpose prior to questions.

3.10. Quality Control Measures

The researcher recruited and trained three research assistants with nursing background for the data collection. The training focused on the contents of the tool, data collection techniques and research ethics. In order to guarantee the quality of the data collected, the two research assistants knowledgeable in both English and Luo were selected. The two research assistants also practiced administering and recording of the responses among themselves before field pre-test.

Thereafter, the structured questionnaires were pretested to for validity and reliability at nearby health facility to determine whether the instruments could generate the required responses hence validity. This included checking whether correct translations to the questions was been made. The tool was repeatedly administered to 10 respondents to determine whether responses were within the range expected and hence the reliability. The tool was also checked for other grammatical and numbering errors. The time taken to complete the tools was also observed to ensure the questionnaires did not take long time to complete.

The data entrants were trained on how to handle the data collection tools ethical consideration and the data entry screens was also checked to ensure they enter the data correctly. The lessons learnt from the pre-test were used to redesign the tools to suite the actual field work.

After securing the respondent consent, the tools were administered to them. While in the field, the area leaders was informed of the research activity in the area and concluded by a field debrief in the evening before the departure and in the morning before departing to the field to check for completeness and examine the changes made on the research instruments. The team comprised of seven team members and these were three data collectors, 3 data clerks and a team leader.

3.11. Data analysis

The collected data underwent the process of reviewing, cleaning and thereafter data was exported into SPSS version 20 for statistical analysis.

Continuous numerical like age, income were first analysed into the central tendencies of mean and median. Standard deviation was obtained to describe for dispersion of the data around the mean.

Univariate analysis for categorical data was conducted and their subsequent frequencies and percentages were presented into tables and pie-chart.

Bivariate analysis was conducted using Chi-square test to establish existence of statistical significant difference between independent and dependent variables or existence of significant relationship.

Chi-square value and degree of freedom values were reported including the probability values (p-value). On the other hand, cell (s) with value (s) of less than five (5) had Fisher's exact test used hence values (If generated) recorded as well as the probability values. In all analysis at this level, probability values of less than 0.05 were considered to have statistically significant difference. Simple logistic regression was also performed for independent variables that showed statistically significant difference at Chi-square or Fisher's exact test.

Thereafter, multivariate logistic regression analysis was performed where all independent variables that showed significant difference were added into the model and stepwise backward elimination approach was used to control for confounders. This also involved removing in each repeated analysis independent variables with large probability values (p-values). The process was repeated after removing such variables until only one variable was left in the middle. The output adjusted Odds Ratios, 95% Confidence Intervals and p-values were recorded. In all the analysis output, results with probability value of less than 0.05 were considered to have statistically significant association.

3.12. Ethical considerations

The research proposal on approval by the supervisor was submitted to the faculty of Public Health and Management of Clarke International University (Formerly International Health Sciences University) and introduction letter was obtained to introduce the study's approval for permission to be granted at the health facilities.

Prior to submission of the final research proposal the staff and management of TASO Research and Quality Committee reviewed the book and their recommendations were corrected before submission.

The introduction letter obtained from Clarke International University was presented to the selected TASO ART clinics and permission to conduct the study was obtained from each centre on the presentation of the letter.

Upon all sites had accepted to have the study done, the participants accessed had the purpose of the study clearly explained to them. They were informed that participation in the study had no direct benefit and also their participation in the study had no associated risks. However, the study findings were meant to collect data among them on their individual characteristics, contraceptive factors and health system related factors. Prior to data collection, the consent of the women were sought both orally and in written where they were tasked to declare their willingness to participate in the study or not.

The women were also explained that their participation in the study was voluntary and had the liberty to discontinue or not to answer some questions of their choice if they wish. The right of each participant to confidentiality was seriously observed and all information about the participant documented or kept as top secret.

1.13. Limitations of the Study

The research predicted some limitations that would have potential impact on the quality of the findings and the capacity to effectively answer the research questions. The anticipated limitations included financing of the research, choice of inclusion criteria, logistical difficulties in assessing study population, limited understanding of FP methods by study population, ethical issues, sensitivity on part of respondents, validity of and reliability of data owing to descriptive study, mistrust over researcher's identity, and research fatigue on the part of the respondents. The study could also be exposed to interviewer biasness which is difficult to determine and as such distorts the results.

CHAPTER FOUR: RESULTS

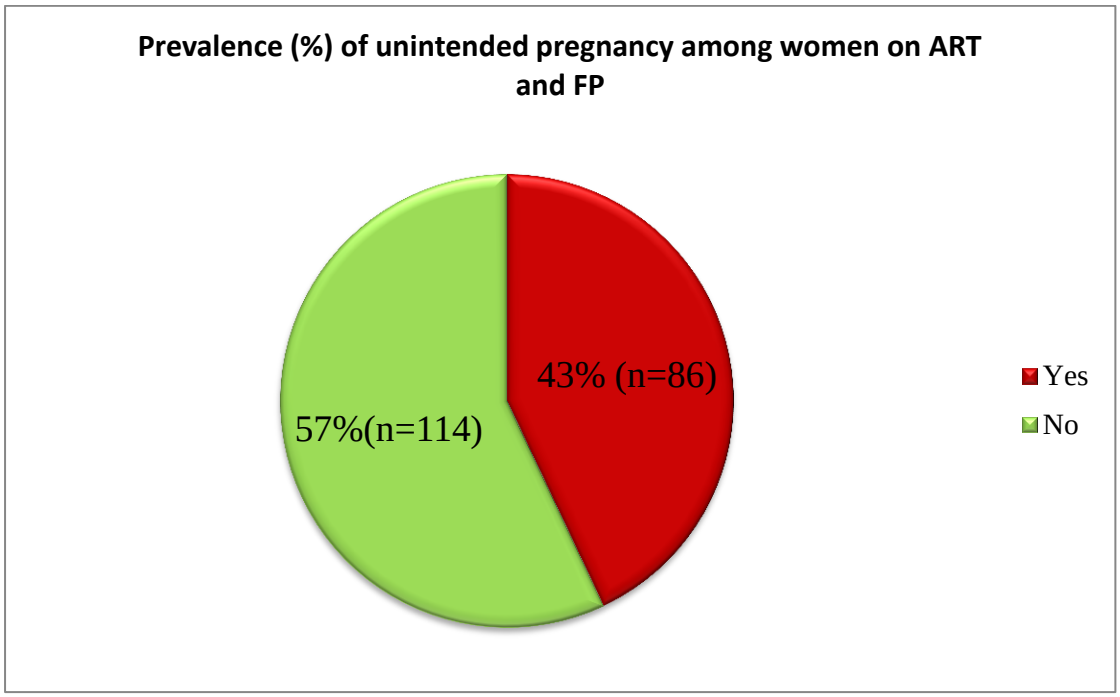
4.0. Introduction

This chapter presents results of the study according to the the prevalence of unintended pregnancy among HIV positive women on ART, individual, contraceptive and health systems related factors associated with unintended pregnancy among HIV positive women in Gulu district.

4.1. Prevalence of unintended pregnancy among HIV positive women on ART

The study found the prevalence of unintended pregnancy at 43% (n=86 95%CI: 0.36-50.17) among HIV positive women on ART. These women confessed that they actually wanted to get pregnant at a later time. The women were also asked whether for the current pregnancy they really wanted to get pregnant and 118(59%) wanted whereas 82(41%) never wanted.

Figure 2: Prevalence of unintended pregnancy among HIV positive women on ART



4.2. Individual factors associated with unintended pregnancy among HIV positive women on ART

4.2.1. Univariate analysis of individual factors

The mean age of the women was about 33 ±5.8 years, the median age was 33 years and the youngest woman was 18 years and eldest being 45 years. The mean and the median age were nearly the same hence the ages were normally distributed around the mean.

The age category showed that nearly half 94(47%) of the HIV positive women were aged 32-38 years followed by those aged 25-31 years accounting for 58(29%). The more than half 136(68%) of the women were married and nearly equal numbers were followed among the single 28(14%) and those cohabiting (24(12%). Less than half 71(35.5%) of the women were farmers followed by those in business accounting for 62 (31%) and the least being those employed 28(14%).

Looking at level of education, the more than half 108(54%) of the women completed primary level of education followed by those who attained secondary education 82(41%).

Regarding number of children, nearly three-quarter 134(67%) of the women had less or four children whereas 66(33%) had more than four children. The study also found that the majority 132(78.6%) of the women reported that that their partners were not polygamous.

In terms of abortion, most 194(97%) of the women did not do abortion except 6 (3%) of the HIV positive women on ART and family planning methods.

Table 1: Univariate analysis of Individual factors

Variable	**Frequency (n)**	**Percentage (%)**
Age category		
18-24	16	8.0
25-31	58	29.0
32-38	94	47.0
39-45	32	16.0
Total	**200**	**100**
Marital status		
Single	28	14.0
Cohabiting	24	12.0
Married	136	68.0
Separated/divorced	12	6.0
Total	**200**	**100**
Occupation		
Housewife	39	19.5
Business	62	31.0
Farmer	71	35.5
Employed	28	14.0
Total	**200**	**100**
Income category		
Low income	144	74.2
Middle income	48	24.7
High income	2	1.0
Total	**194**	**100**

Level of education		
Primary	**108**	**54**
Secondary	**82**	**41**
No formal education	**10**	**5.0**
Total	**200**	**100**
Number of children		
≥ Four children	134	67.0
> Four children	66	33.0
Total	**200**	**100**
Have polygamous partner		
Yes	36	21.4
No	132	78.6
Total	**168**	**100**
Had abortion		
Yes	6	3.0
No	194	97.0
Total	**200**	**100**

4.2.2. Bivariate analysis between individual factors and unintended pregnancy among HIV positive women on ART

The study indicates among women aged 32-38 years, 40(42.6%) in 94 of them had unintended pregnancy followed by those aged 25-31 years accounting for 32(55.2%) in 58 of those within the age group. Overall, the prevalence of unintended pregnancy among women aged 32-38 years was at 20%. This study however found no statistically significant difference between the age and unintended pregnancy among HIV positive women on ART ($p>0.05$).

Regarding marital status, the higher number of unintended pregnancy was among married women accounting for 32% in 200 women while 64(47.1%) in 136 among the married. Generally, this study still established no statistically significant difference between marital status and unintended pregnancy among the women ($p>0.05$).

In terms of occupation, the prevalence of unintended pregnancy among business women was 16% (32/300) and 32(51.6%) in 62 of the business women. In addition, 28(39.5%) in 71 of the farmers had unintended pregnancy. This result however showed that unintended pregnancy among employed was the highest accounting for 22(78.6%) in 28 employed women. This study further showed statistically significant difference between occupation and unintended pregnancy ($\chi^2=33.76$ df=3 $p=0.001$). Simple logistic (binary) shows that business women (UOR=0.11

95%CI: 0.034-0.338 p<0.001), farmers (p=0.003), and employed women (p<0.001) had significantly lower odds of encountering unintended pregnancy compared to the housewives.

Regarding level of education, women who attained secondary level of education were significantly less likely to have unintended pregnancy compared to those completed primary education (UOR=0.27 95%CI: 0.15-0.49 p<0.001).

The finding on income shows that the majority 144(74.2%) had low income and 52 (36.1%) in 144 of the women had unintended pregnancy. There were only two women in high income class and none of them had unintended pregnancy.

Overall, there was statistically significant difference between income class of the women and prevalence of unintended pregnancy among HIV positive women on ART (Fisher's value=14.7, p<0.001). The result further showed that women who were in middle income class had lower odds of having unintended pregnancy compared to those in low income class and this was statistically significant (UOR=0.28 95%CI: 0.14-0.56 p<0.001).

In relation to number of children, the prevalence of unintended pregnancy among the women with less or four children was 38% while 76(56.7%) in 134 women with less or four children had unintended pregnancy. In addition, there was statistically significant difference between number of children and unintended pregnancy (χ^2=31.17, df=1 p>0.001). Via simple logistic regression, HIV positive women with more than four children were about 7 times more likely to have experience unintended pregnancy compared to those with less or four children (UOR=7.34 95%CI: 3.45-15.61, p<0.001).

This study found that few 8(22.2%) in 36 of the women to polygamous partners actually had unintended pregnancy. Surprisingly, out of 132 women not in polygamous relationship had half 66 (50%) of the women who were victims of unintended pregnancy. In addition, statistically significant difference was found between polygamous status of partner and unintended pregnancy (χ^2=8.86 df=1 p=0.003). The binary logistic regression analysis revealed that women who whose partners were not involved in polygamous affairs were less likely to experience unintended pregnancy compared to the reference group (UOR=0.27 95%CI: 0.12-0.67 p=0.004).

This study also found out of the six women who had abortion, none of them had unintended pregnancy and there was statistically significant difference between abortion done and unintended pregnancy (Fisher's p=0.038).

Table 2: Bivariate analysis between individual factors and unintended pregnancy among HIV positive women on ART

Variable	**Unintended Pregnancy among women on ART**		**Total**	**Chi-square χ^2 (df)/Fishers exact test**	**p-value**
	Yes	**No**			
Age category				7.43(3)	0.059
18-24	4(25.0)	12(75.0)	16		
25-31	32(55.2)	26(44.8)	58		
32-38	40(42.6)	54(57.4)	94		
39-45	10(31.2)	22(68.8)	32		
Total			**200**		
Marital status				5.13	0.160
Single	12(42.9)	16(57.1)	28		
Cohabiting	8(33.3)	16(66.7)	24		
Married	64(47.1)	72(52.9)	136		
Separated/divorced	2(16.7)	10(83.3)	12		
Total			**200**		
Occupation				33.76(3)	**0.001***
Housewife	4(10.3)	35(89.7)	39	**1**	
Business	32(51.6)	30(48.4)	62	0.11(0.03-0.34)	**0.000***
Farmer	28(39.4)	43(60.6)	71	0.18(0.056-0.548)	**0.003***
Employed	22(78.6)	6(21.4)	28	0.031(0.008-0.123)	**0.000***
Total			**200**		
Level of education				27.33(2)	**0.000***
Primary	34(31.5)	74(68.5)	108	**1**	
Secondary	52(63.4)	30(36.6)	82	0.27(0.15-0.49)	**0.000**
No formal education	0(0.0)	10(100.0)	10	74222(0.00)	0.999
Total			**200**		
Income category				14.70	**0.000***
Low income	52(36.1)	92(63.9)	144	**1**	
Middle income	32(66.7)	16(33.3)	48	0.28(0.14-0.56)	**0.000**
High income	0(0.0)	2(100.0)	2	913094(0.000)	**0.999**
Total	84	110	**194**		
Number of children				31.17(1)	**0.000***
≥ Four children	76(56.7)	58(43.3)	134	**1**	
> Four children	10(15.2)	56(84.8)	66	7.34(3.45-15.61)	**0.000*"**

Total			**200**		
Have polygamous partner				8.86(1)	**0.003***
Yes	8(22.2)	28(77.8)	36	**1**	
No	66(50.0)	66(50.0)	132	0.27(0.12-0.67)	**0.004***
Total			**168**		
Had abortion					**0.038***
Yes	0(0)	6(100.0)	6	**1**	
No	86(44.3)	108(55.7)	194	0.000(0.000)	**0.999**
Total	**86**	**114**	**200**		

4.3. Contraceptive factors associated with unintended pregnancy among HIV positive women on ART

4.3.1. Univariate analysis of contraceptive factors

This study shows that the majority 188(94%) of the HIV positive women ever used family planning methods in the past unlike only 12 (6%). Regarding use of hormonal method, more than a quarter of the women reported that they used hormonal methods (oral pills and implant) before they realized they were pregnant while the others did not.

The women were also asked about the duration of living without contraceptive before the current pregnancy. It emerged that more than half 124(69.7%) of them took 1-2 months/years without contraceptive and nearly equal numbers for those who took 3-4 months and 5-6 months.

Regarding the current pregnancy, the majority 150(76.5%) of the women were using contraceptive and 46(23.5%). More than half of these women used hormonal methods while less than half 70(46.7%) used non-hormonal methods. In terms of the specific contraceptive methods used, less than half 60(40%) of the women used oral pills followed by implant (21.3%) and equal number of women used diaphragm (13.3%) and withdrawal methods (13.3%). The least contraceptive methods used during the periods were moon bead and male condoms (1.3%).

The study indicates that the majority 162 (83.5%) of the women used contraceptive before getting pregnant for previous pregnancy. In terms of the contraceptive method used, less than a quarter 38 (23.5%) used hormonal methods.

The study also showed that before the women began using their contraceptives, investigation was performed among less than a quarter 31(16.1%) of the women unlike the majority 161(83.9%).

Table 3: Univariate analysis of contraceptive factors

Variable	Frequency (n)	Percentage (%)
Ever used Family planning method before		
Yes	188	94
No	12	6
Total	**200**	**100**
Used Hormonal method before pregnancy realisation		
Yes	52	26.0
No	148	74.0
Total	**200**	**100**
Duration without Contraceptive before current pregnancy		
1-2 months	124	69.7
3-4 months	26	14.6
5-6 months	28	15.7
Total	**178**	**100**
Used contraceptive before the current pregnancy		
Yes	150	76.5
No	46	23.5
Total	**196**	**100**
Used Hormonal contraceptive		
Yes	80	53.3
No	70	46.7
Specific contraceptive used		
Oral pills	60	40
Male Condoms	2	1.3
Spermicide	10	6.7
Implant	32	21.3
Diaphragm	20	13.3
Withdrawal	20	13.3
Moon beads	6	4.0
Total	**150**	**100**
Used Contraceptive before getting pregnant for previous pregnancy		
Yes	162	83.5
No	32	16.5
Total	**194**	**100**
Used Hormonal method		
Yes	38	23.5
No	124	76.5
Total	**162**	**100**
Investigation performed to rule out pregnancy before contraceptive use		
Yes	31	16.1
No	161	83.9
Total	**192**	**100**

4.3.2. Bivariate analysis between contraceptive factors and unintended pregnancy among HIV positive women on ART

The majority 188 (94%) of the women ever used family planning methods before and 82(43.6%) had unintended pregnancy. However, there was no statistically significant difference between previous use of family planning methods and recent unintended pregnancy (Fishers' p=0.560).

This study also found that 56 (26%) of the women generally used hormonal contraceptive method whereby 32(61.5%) in 52 had unintended pregnancy and 54 (36.5%) in 148 also had unintended pregnancy. There was statistically significant difference between use of either hormonal or non-hormonal contraceptive methods before realization of the current pregnancy and unintended pregnancy. The result further indicates that HIV positive women who used non-hormonal methods were 2.79 times more likely to have unintended pregnancy compared to those who used hormonal method (UOR=2.79 95%CI: 1.45-5.34 p=0.002).

Regarding the duration without use of contraceptives, the study revealed that women who missed to use contraceptives from 3-4 months were significantly less likely to have unintended pregnancy compared to those who missed for 1-2 months (UOR=0.19 95%CI: 0.07-0.51 p=0.001). In longer periods of missing contraceptives in 5-6 months was also related to lower odds of having unintended pregnancy (UOR=0.63 95%CI: 0.28-1.44 p=0.275).

The study result indicates that 72 (48%) in 150 of the women on ART were using contraceptive before the current pregnancy. Overall, there was statistically significant difference between using contraceptive before the current pregnancy and unintended pregnancy (χ^2=4.41 df=1 p=0.036).

Women who did not use contraceptive before the current pregnancy were about 2 times more likely to have unintended pregnancy compared to those who had (UOR=2.11 95%CI: 1.04-4.27, p=0.038). The study showed that using hormonal or non-hormonal had no significant difference (χ^2=1.39 df=1 p=0.238).

Looking at the specific contraceptives, this study revealed statistically significant difference (Fisher's p<0.001). Women who used implant were significantly less likely to have unintended pregnancy (UOR=0.38 95%CI: 0.15-3.15 p=0.046), similarly, those using moon bead were less likely to have unintended pregnancy (p=0.360) compared to those using oral pills. On the other hand, significant association was found between use of withdrawal method and unintended pregnancy with higher odds (UOR=10.29 95%CI: 2.19-48.29 p=0.003). The study further showed that women who used diaphragm also had higher odds of having unintended pregnancy compared to those who used pills (UOR=1.14 95%CI: 0.42-3.15 p=0.796).

The study found that previous use of contraceptive for previous pregnancy (p=0.942) and type of contraceptive used (p=0.281) and performance of investigation to rule out pregnancy before contraceptive use (p=0.255) showed no statistically significant difference with unintended pregnancy.

Table 4: Bivariate analysis between contraceptive factors and unintended pregnancy among HIV positive women on ART

Variable	Unintended Pregnancy among women on ART		Total	Chi-square/Fisher's tests χ^2 (df)	p-value
	Yes	No			
Ever used Family planning method before					0.560
Yes	82(43.6)	106(56.4)	188		
No	4(33.3)	8(66.7)	12		
Total	**86**	**114**	**200**		
Used Hormonal method before pregnancy realisation				9.853(1)	**0.002****
Yes	32(61.5)	20(38.5)	52	**1**	
No	54(36.5)	94(63.5)	148	2.79(1.45-5.34)	**0.002***
Total	**86**	**114**	**200**		
Duration without Contraceptive before current pregnancy				12.84(2)	**0.002***
1-2 months	48(38.7)	76(61.3)	124	**1**	
3-4 months	20(76.9)	6(23.1)	26	0.19(0.07-0.51)	**0.001***
5-6 months	14(50.0)	14(50.0)	28	0.63(0.28-1.44)	0.275
Total	**82**	**96**	**178**		
Used contraceptive before the current pregnancy				4.41(1)	**0.036***
Yes	72(48.0)	78(52.0)	150	**1**	
No	14(30.4)	32(69.6)	46	2.11(1.04-4.27)	**0.038***
Total	**86**	**110**	**196**		
Used Hormonal contraceptive				1.39(1)	0.238
Yes	42(52.5)	38(47.5)	80		
No	30(42.9)	40(57.1)	70		
Total	**72**	**78**	**150**		
Specific contraceptive used				35.35	**0.000***
Oral pills	32(53.3)	28(46.7)	60	1	
Condoms	0(0.0)	2(100.0)	2	0.00(0.00)	0.999

Spermicide	0(0.0)	10(100.0)	10	0.00(0.00)	0.999
Implant	24(75)	8(25)	32	0.38(0.15-0.98)	**0.046***
Diaphragm	10(50)	10(50)	20	1.14(0.42-3.15)	0.796
Withdrawal	2(10)	18(90)	20	10.29(2.19-48.29)	**0.003***
Moon bead	4(66.7)	2(33.3)	6	0.57(0.01-3.36)	0.36
Total	**72**	**78**	**150**		
Used Contraceptive before getting pregnant for previous pregnancy				0.005(1)	0.942
Yes	72(44.4)	90(55.6)	162		
No	14(43.8)	18(56.2)	32		
Total	**86**	**108**	**194**		
Used Hormonal method				1.16(1)	0.281
Yes	14(36.8)	24(63.2)	38		
No	58(46.8)	66(53.2)	124		
Total	**72**	**90**	**162**		
Investigation performed to rule out pregnancy before contraceptive use				1.30(1)	0.255
Yes	11(35.5)	20(64.5)	31		
No	75(46.6)	86(53.4)	161		
Total	**86**	**106**	**192**		

4.4. Health system related factors associated with unintended pregnancy among HIV positive women on ART

4.4.1. Univariate analysis for health system related factors

This found that the majority 154(78.2%) of the women received family planning methods and ARVs from the same health facility. In terms of distance to the health facility, nearly three-quarter of the women reported that it was 1-19 minutes travel followed by those who mentioned 20-39 minutes.

Regarding transport cost to the health facility, nearly three-quarter of the women reported that they spent from 2,000 to 10,000 Uganda Shillings. Women were also asked about the duration they have been on ART from the support of the facilities. The result shows that less than half 87(44.6%) of them took less than two (2) years by the time of data collection and 59(30.3%) took the drugs for 2-5 years.

The study found that nearly a quarter 48(24.5%) of the women were on ART at the time of confirming their pregnancy status while more the majority 148(75.5%) of them were not. In addition, most of the women reported that their ART regimens were not changed from the time they started swallowing them.

Looking at adherence to the ART provided from the facilities, interestingly the majority 158(83.2%) of the women reported that they have been taking their medication consistently by the time they realized they were pregnant.

Table 5: Univariate analysis for health system related factors

Variable	Frequency (n)	Percentage (%)
Received family planning methods and ARVs from same facility		
Yes	154	78.2
No	43	21.8
Total		
Distance to health facility		
1-19	138	69.0
20-39	42	21
40-59	20	10
Total		
Transport cost to the health facility		
2000-10,000	133	68.9
11,000-30,000	52	26.9
31,000-100,000	8	4.1
Total		
Duration of providing and taking ART before recent pregnancy		
Less than 2 years ago	87	44.6
2-5 years	59	30.3
More than 5 years	49	25.1
Total		
On ART at time of confirming pregnancy		
Yes	48	24.5
No	148	75.5
Total		
ART Regimen ever changed		
Yes	14	7.3
No	179	92.7
Total		
Adhering to ART by the time of realizing pregnancy as instructed		
Yes	158	83.2
No	32	16.8
Total		

4.4.2. Bivariate analysis between health system factors and unintended pregnancy among HIV positive women on ART

This study shows that 82 (53.2%) in 154 of the women who received family planning methods and ARVs from the same facility had unintended pregnancy and significant difference was found between the two variables (Fisher's $p<0.001$).

In addition, simple logistic regression analysis also shows that who reported to have not received the FP methods and ARVs from the same facility were about 11 times more likely to have unintended pregnancy (UOR=11.10 95%CI:3.78-32.59 $p<0.001$).

Regarding the distance to the health facility, no significant difference was found ($p=0.314$) meaning the distance did not matter. However, the cost of the transport to the health facility showed statistically significant difference with unintended pregnancy (Fisher's 11.29, $p=0.003$). Using simple logistic regression analysis, women who reported paying from 11,000-30,000 Uganda Shillings to access the health facility were 1.98 times more likely to have unintended pregnancy (UOR=1.98 95%CI: 1.02-3.84, $p=0.045$).

In terms of duration of providing and taking ART from the facility before the recent pregnancy, statistically significant difference was found between the duration and unintended pregnancy among women on ART ($\chi^2=44$ df=1 $p<0.001$). Via simple logistic regression, the result revealed that women who had taken their medication for 2-5 years were about 3.4 times more likely to have unintended pregnancy compared to the those of less than two (2) years (UOR=3.36 95%CI: 1.69-6.71 $p=0.001$). Similarly, those who took for more than five (5) years were about 18 times more likely to have unintended pregnancy compared to the reference group (UOR=17.6 95%CI: 6.30-49.14 $p<0.001$). This study found that being on ART at time of confirming pregnancy ($p=0.090$), whether ART regimen had ever been changed (0.325) and adherence to ART by the time of realizing pregnancy ($p=0.836$) showed no statistically significant difference with unintended pregnancy.

Table 6: Bivariate analysis between health system factors and unintended pregnancy among HIV positive women on ART

Variable	Unintended Pregnancy among women on ART		Total	Chi-square/Fisher's tests χ^2 (df) and Unadjusted OR 95%CI	p-value
	Yes	No			
Receive family planning methods and ARVs from same facility					**0.000***
Yes	82(53.2)	72(46.8)	154	**1**	
No	4(9.3)	39(90.7)	43	11.10(3.78-32.59	**0.000***
Total	**86**	**110**	197		
Distance to health facility				2.32(2)	0.314
1-19	64(46.4)	74(53.6)	138		
20-39	14(33.3)	28(66.7)	42		
40-59	8(40.0)	12(60.0)	20		
Total	86(43.0)	114(57.0)	200		
Transport cost to the health facility				11.29	**0.003***
2000-10,000	68(51.1)	65(48.9)	133	**1**	
11,000-30,000	18(34.6)	34(65.4)	52	1.98(1.02-3.84)	**0.045***
31,000-100,000	**0**(0.0)	8(100.0)	8	0.000(0.000)	**0.999**
Total	86(44.6)	107(55.4)	193		
Duration of providing and taking ART before recent pregnancy				44.01(2)	**0.000***
Less than 2 years ago	58(66.7)	29(33.3)	87	**1**	
2-5 years	22(37.3)	37(62.7)	59	3.36(1.69-6.71)	**0.001***
More than 5 years	5(10.2)	44(89.8)	49	17.60(6.30-49.14)	**0.000***
Total	85(43.6)	110(56.4)	195		
On ART at time of confirming pregnancy				2.87(1)	0.090
Yes	16(33.3)	32(66.7)	48		
No	70(47.3)	78(52.7)	148		
Total	86(43.9)	110(56.1)	196		
ART Regimen ever changed				0.968(1)	0.325
Yes	8(57.1)	6(42.9)	14		
No	78(43.6)	101(56.4)	179		
Total	86(44.6)	107(55.4)	193		
Adhering to ART by the time of realizing pregnancy as instructed				0.043(1)	0.836
Yes	66(41.8)	92(58.2)	158		
No	14(43.8)	18(56.2)	32		
Total	80(42.1)	110(57.9)	190		

4.5. Multivariate analysis of significant independent variables at bivariate level with unintended pregnancy

This study still showed that business women were significant less likely to have unintended pregnancy compared to housewives (AOR=0.18, 95%CI: 0.04-0.74 p=0.017). Although farmers were less likely to have unintended pregnancy, there was no statistically significant association (AOR=0.45 95%CI: 0.11-1.89 p=0.277).

The results on level of education showed that women who had attained secondary education had significantly lower odds of having unintended pregnancy compared to those with primary level of education (AOR=0.01 95%CI: 0.00-0.13, p=0.001).

Finding on income indicates that women in middle income class were still 23.7 times more likely to have unintended pregnancy compared to the reference group (AOR=23.73 95%CI: 0.09-5986.66, p=0.262).

Regarding number of children, women with more than four children consistently continue to have higher odds of having unintended pregnancy. However, there was no statistically significant association between the two variables (AOR=2.88 95%CI: 0.94-8.86 p=0.065).

Women whose partners were not polygamous were 12.23 times more likely to encounter unintended pregnancy compared to those whose partners have other wives, however, no significant association was established (AOR=12.23 95%CI: 0.63-237.18 p=0.098).

The multivariate analysis still showed that women who did not use hormonal contraceptive method before pregnancy realization were 1.63 times more likely to have unintended pregnancy compared to those who used. However, there was statistically significant association (AOR=1.63 95%CI: 0.67-3.99 p=0.282).

Mothers who lived without contraceptive before current pregnancy foe 3-4 months were significantly less likely to have unintended pregnancy compared to the reference group (AOR=0.07 95%CI: 0.02-0.31 p=0.001). It emerged that women who took 5-6 months were actually 2.78 times more likely to have unintended pregnancy compared to the reference group , however the association was not significant (AOR=2.78 95%CI: 0.67-11.57 p=0.159.

Mothers who did not receive FP and ARV from the same health facility were 11 times likely to have unintended pregnancy compared to those who got from the same facility. This association between the two variables was statistically significant (AOR= 11.1, 95%CI: 3.78-32.59, p>0.001).

The adjusted analysis consistently shows that women who had been collecting and taking their medication for 2-5 years were 3.6 times more likely to have unintended pregnancy compared to those who tool less than two (2) years ago (AOR=3.61, 95%CI: 1.75-7.47, p=0.001). Similarly, women who had been on the drug for more than five (5) years were 12.9 times more likely to be victims of unintended pregnancy compared to the reference group (AOR=12.91, 95%CI: 4.45-37.44 p<0.001). This result indicates that increase in duration of being on ART also increases the odds of having unintended pregnancy among women on ART and family planning methods.

Table 7: Multivariate analysis of significant independent variables at bivariate level with unintended pregnancy

Variables	**Unintended Pregnancy**		**Total**	**Adjusted OR 95%CI**	**p-value**
	Yes	**No**			
Occupation					
Housewife	4(10.3)	35(89.7)	39	1	
Business	32(51.6)	30(48.4)	62	0.18(0.04-0.74)	**0.017***
Farmer	28(39.4)	43(60.6)	71	0.45(0.11-1.89)	0.277
Employed	22(78.6)	6(21.4)	28	0.06(0.01-0.29)	**0.001***
Total	**86**	**114**	**200**		
Level of education					
Primary	34(31.5)	74(68.5)	108	1	
Secondary	52(63.4)	30(36.6)	82	0.01(0.00-0.13)	**0.001***
No formal education	**0**(0.0)	10(100.0)	10	2941+E(0.00)	1.000
Total			**200**		
Income category					
Low income	52(36.1)	92(63.9)	144	1	
Middle income	32(66.7)	16(33.3)	48	23.73(0.09-5986.66)	0.262
High income	**0**(0.0)	2(100.0)	2	1209+E(0.00)	1.000
Total	84	110	**194**		
Number of children					
≥ Four children	76(56.7)	58(43.3)	134	1	
> Four children	10(15.2)	56(84.8)	66	2.88(0.94-8.86)	0.065
Total			**200**		
Have polygamous partner					
Yes	8(22.2)	28(77.8)	36	1	
No	66(50.0)	66(50.0)	132	12.23(0.63-237.18)	0.098
Total			**168**		
Had abortion					
Yes	0(0)	6(100.0)	6	1	

No	86(44.3)	108(55.7)	194	0.00(0.00)	0.999
Total	**86**	**114**	**200**		
Used Hormonal method before pregnancy realisation					
Yes	32(61.5)	20(38.5)	52	1	
No	54(36.5)	94(63.5)	148	1.63(0.67-3.99)	0.282
Total	**86**	**114**	**200**		
Duration without Contraceptive before current pregnancy					
1-2 months	48(38.7)	76(61.3)	124	1	
3-4 months	20(76.9)	6(23.1)	26	0.07(0.02-0.31)	**0.001***
5-6 months	**14(50.0)**	**14(50.0)**	28	2.78(0.67-11.57)	0.159
Total			**178**		
Used contraceptive before the current pregnancy					
Yes	72(48.0)	78(52.0)	150	1	
No	14(30.4)	32(69.6)	46	0.76(0.25-2.33)	0.635
Total	**86**	**110**	**196**		
Specific contraceptive used					
Oral pills	32(53.3)	28(46.7)	60	1	
Condoms	0(0.0)	2(100.0)	2	0.002(0.000)	1.000
Spermicide	0(0.0)	10(100.0)	10	0.043(0.00)	1.000
Implant	24(75)	8(25)	32	0.00(0.00)	0.999
Diaphragm	10(50)	10(50)	20	3.05E+17(0.00)	0.998
Withdrawal	2(10)	18(90)	20	0.00(0.00)	1.000
Moon bead	4(66.7)	2(33.3)	6		
Receive family planning methods and ARVs from same facility					
Yes	82(53.2)	72(46.8)	154	1	
No	4(9.3)	39(90.7)	43	11.10(3.78-32.59)	**0.000***
Total	**86**	**110**	197		
Transport cost to the health facility					
2000-10,000	68(51.1)	65(48.9)	133	1	
11,000-30,000	18(34.6)	34(65.4)	52	0.07(0.001-7.47)	0.259
31,000-100,000	0(0.0)	8(100.0)	8	0.000(0.00)	1.000
Total	86(44.6)	107(55.4)	193		
Duration of collecting and taking ART before recent pregnancy					
Less than 2 years ago	58(66.7)	29(33.3)	87	1	
2-5 years	22(37.3)	37(62.7)	59	3.61(1.75-7.47)	**0.001***

More than 5 years	5(10.2)	44(89.8)	49	12.91(4.45-37.44)	**0.000***
Total	85(43.6)	110(56.4)	195		

Summary of Key Results

- The study found the prevalence of unintended pregnancy at 43% (n=86 95%CI: 0.36-50.17) among HIV positive women on ART
- The mean age of the women was about 33 ±5.8 years and the median age was 33 years, meaning the age distribution was normal around the mean.
- Nearly half 94(47%) of the HIV positive women were aged 32-38 years.
- Business women on ART were significant less likely to have unintended pregnancy compared to housewives (AOR=0.18, 95%CI: 0.04-0.74 p=0.017)
- Women educated to secondary level had significantly lower odds of having unintended pregnancy compared to those with primary level of education (AOR=0.01 95%CI: 0.00-0.13, p=0.001).
- Mothers who lived without contraceptive before current pregnancy foe 3-4 months were significantly less likely to have unintended pregnancy compared to the reference group (AOR=0.07 95%CI: 0.02-0.31 p=0.001).
- Mothers who did not receive FP and ARV from the same health facility were 11 times likely to have unintended pregnancy compared to those who got from the same facility (AOR= 11.1, 95%CI: 3.78-32.59, p>0.001).
- Women who had been collecting and taking their medication for 2-5 years were 3.6 times more likely to have unintended pregnancy compared to those who tool less than two (2) years ago (AOR=3.61, 95%CI: 1.75-7.47, p=0.001).

  In addition women on ART for more than five (5) years were 12.9 times more likely to be victims of unintended pregnancy compared to the reference group (AOR=12.91, 95%CI: 4.45-37.44 p<0.001).
- Mothers who did not receive FP and ARV from the same health facility were 11 times likely to have unintended pregnancy (AOR= 11.1, 95%CI: 3.78-32.59, p>0.001).

CHAPTER FIVE: DISCUSSION

5.0 Introduction

This chapter discusses the factors associated with unintended pregnancy among HIV positive women on ART. The key results were arranged and discussed according to the specific objectives of the study. The results were generated after performing multivariate logistic regression analysis in order to determine the true predictors of unintended pregnancy in the study population.

5.1. Prevalence of unintended pregnancy among women on ART

In the present study, the prevalence of unintended pregnancy was at 43% (n=86 95%CI: 0.36-50.17) among HIV positive women on ART. This prevalence is high based on the sample size of 200 women. In Uganda, there was larger number of unintended pregnancies among HIV infected women and other studies also reported this. According to the *UBOS* (*2011*), the prevalence of unintended pregnancies in Uganda was 44% which was close to the current prevalence among women on ART in Gulu. Another study that had close findings with the current study was that by Fite *et al* (2018), whose prevalence of unintended pregnancy was 41.5% close to that of the present study. However, they focused on both HIV positive and negative women unlike the present study. There were a number of other studies that also had close prevalence of unintended pregnancy. This included study by *Nigatu & Tadele (2011*) in Damote Gale district, South Ethiopia, the prevalence of unintended pregnancy was at 42.4%. *Ramesh et al (2009*) in their study found the prevalence of unintended pregnancy at 41.2% and Isabel and MiguelSan found that in Ecuado at 36.3% lower than the prevalence of the present study among HIV positive women on ART.

The large number of unintended pregnancies among HIV-infected individuals in Uganda and elsewhere has also been reported by other studies (*Rochat et al 2006; Homsy et al, 2009*). The unintended pregnancies in the above studies could be related to also use of less effective contraceptive methods like condoms, coitus interuptus, lactational amenorrhea and rhythm whereas effective use of contraceptive methods like implants for women and male sterilization was very low. In the present study, the higher number of women on ART were on oral contraceptives accounting for 60 (40%) followed by most effective method implant (21.3%) and equal use of diaphragm (13.3%) and withdrawal methods (13.3%) were also used.

Similarly on average, most of the women were also using less effective contraceptive method as found in the above studies.

In terms of the specific contraceptive methods used, less than half 60(40%) of the women used oral pills followed by implant (21.3%) and equal number of women used diaphragm (13.3%) and withdrawal methods (13.3%). The least contraceptive methods used during the periods were moon bead and male condoms (1.3%).

In United States, the prevalence of unplanned pregnancy was at 68% and 85% and this trend was also found among HIV positive women (*Smits et al 1999; Sutton et al, 2014*). In South Africa despite the remarkable progress in the PMTCT of HIV, the prevalence of unplanned pregnancy in HIV positive women remains a significant concern. This implies that comprehensive integration of family planning services be implemented in all the public and private health facilities.

The prevalence of the unintended pregnancy was found to be higher than study in Hosana whose prevalence was 34% (*Hamdela et al 2012*) and 26% in *Welkaite (Abayu et al, 2015*), 24% in Kenya (Ikamari *et al*, 2013), 14.3% in Senegal (Faye et al, 2013), 38.2% in Pakistan (*Habib et al, 2017*) and 27% in Canada (*Oulman et al, 2015*).

In study by *Teshome et al (2014*) found prevalence of unintended pregnancy at 35.5% and the prevalence was higher than that found by *Kassa et al (2012*) in Kersa Eastern Ethiopia which was 27.9%. In another study in Ethiopia, a little more than a quarter, 26%, of women reported their recent pregnancy as unintended and 13.7% of women wanted a child if it had been after two years and 12.3% reported that they did not want their recent pregnancies at all (*Gebreamlak, 2014).*

It was argued that the differences in the above studies could be due diverse tradition, cultural and religious denominations that of from this study. The present study however found higher prevalence of unintended pregnancy at 43%.

5.2. Individual factors associated with unintended pregnancy among women on ART

In the present study, the individual factors that had significant difference with unintended pregnancy at bivariate analysis level only include; income category or class, number of children/parity, having polygamous partner and history of abortion.

In a study by Finer and *Henshaw (2006*) women with low income had higher likelihood of unintended pregnancies than those from higher income class. This implies that women with low income have limited access to regular family planning services as well as ART especially when the distant to become from home to health facility is far and cost of transport too is high. In recent time as well, similar results were found in other studies (*Ports et al 2015; Haffejee et al, 2016).*

In a study in rural Ghana, high parity was significantly associated with unintended pregnancy. In a normal circumstance, it is expected that the level of unintended pregnancy would be lower where parity is high (*Eliason et al, 2014*). A study in Rwanda by *Kikuchi et al* (*2011*) found having two or more children was found that significant association between unintended pregnancies and having two or more children. In this case, those with two may still intend more children but those with more than two could be related to unmet need for contraceptives. Other studies were also in agreement with the above findings (*Mohammed et al, 2016; Wado et al, 2013*).

On the other hand, age of the women and marital status showed no significant difference with unintended pregnancy. However a study in Botswana and Swaziland, found younger women of less than 20 years had increased odds of unplanned pregnancy (*Warren et al 2013; Mayondi et al, 2016*). The above studies are in conformity with other studies (*Kikuchi et al 2011; Oulman et al 2015; Mayondi et al, 2016; Ali et al (2016; Iyun et al (2017*).

On the contrary, studies conducted in Nepal, Indonesia and Bangladesh indicated that the higher the age of the mother, the higher the likelihood of experiencing an unintended pregnancy. This means women who are aged could be having nearly adequate number of children and could be having sex for pleasure or enjoyment hence with irregular use of contraceptives, unintended pregnancy can occur.

Whereas at multivariable logistic regression, occupation mainly business women and level of education (secondary education) indicated less likelihood of experiencing unintended pregnancy.

Business women on ART were significant less likely to have unintended pregnancy compared to housewives (p=0.017). Women actively involved in business are likely to have some disposable money that enables them to access health care services including family planning services as well as ART. In addition, this implies that such women may not be in low income class. *Finer and Henshaw (2006*) found that women with low income had higher likelihood of unintended pregnancies than those from higher income class. In addition, women with who earn including from business may have better negotiation capacity unlike to with low income or socioeconomic status. This was supported by past studies that showed low income class with the same geographic region revealed that women have challenges in negotiating condom use with their partners (*Ports et al 2015; Haffejee et al 2016*). In addition, *Ali et al (2016*) found that various studies in developing countries on unintended pregnancies revealed that women of low had higher likelihood of experiencing unintended pregnancy, as compared to those with higher income.

Regarding level of education, women educated to secondary level had significantly lower odds of having unintended pregnancy compared to those with primary level of education (AOR=0.01 95%CI: 0.00-0.13, p=0.001). This finding implies that the more a women is educated, the low the likelihood of unintended pregnancy. This finding is in agreement by a study conducted by *Gebreamlak et al* (*2014*) who found that illiterate women were three times more likely to experience unintended pregnancy compared to the literate.

Gebreamlak et al (*2014*) noted that education could be having the universal impacts on married women's pregnancy intention since it empowers women with knowledge and practice of family planning methods that leads to reduction of the likelihood for discontinuity of contraceptive utilization.

In another study in Nigeria, less educated women had higher likelihood rate of unintended pregnancy compared to those with higher education (*Izugbara, 2013*). Similar findings were found by other scholars (*Omane-adjepong et al 2012; Calvert et al, 2013; Warren et al 2013; Mayondi et al, 2016; Williams, 1991; Islam and Rashid, 2005*).

On the other hand, some studies did not find any significant association with level of education (*Ikamari et al 2013; Goto et al 2002; Che et al 2004; Adhikari et al 2009*). These differences could as a result of the variations in the study population, geographical location and age groups of the distinct studies.

5.3. Contraceptive factors associated with unintended pregnancy among women on ART

This study found significant difference between use of hormonal contraceptive methods, duration without contraceptive method use, contraceptive use before current pregnancy, use of hormonal contraceptives before previous pregnancy. On the other hand, ever using contraceptive methods and whether investigations were conducted to rule out pregnancy before begin to take contraceptives had no significant difference with unintended pregnancy.

Mothers who lived without contraceptive before current pregnancy for 3-4 months were significantly less likely to have unintended pregnancy compared to the reference group (AOR=0.07 95%CI: 0.02-0.31 p=0.001). This finding appears to contradicting because not using any contraceptive method predisposes women to increased likelihood of experiencing unintended pregnancy unless they abstain or strictly follow other natural methods which also remained less effective.

In a study by *Gelagay et al,* (*2018*), HIV positive women who were using long acting and permanent contraceptive methods had very low rate of unintended pregnancies. They also noted that the finding is nearly same for both in typical and perfect users of the methods. This implies that when HIV positive or negative women miss to use contraceptives, they stand an increased chance of experiencing unintended pregnancy.

In the present study, women who have been collecting and taking their medication for 2-5 years and those on ART for more than five years all had increased likelihood of experiencing unintended pregnancy. In a study by *Jarolimova et al* (*2018*) in Uganda among 455 HIV positive women between 2011 and 2013, 50 pregnancies were found to be unintended while 60 were intended. Looking at postpartum women, the finding revealed that 64% of the unintended pregnancies and 51% of the intended pregnancies among women using modern contraceptives.

In conclusion, almost half the incident pregnancies among women living with HIV that were analyzed had unintended pregnancies.

5.4. Health system factors associated with unintended pregnancy among women on ART

It is important to ensure women on ART access family planning services in the same health facility which lessens the problems associated with follow up of women. *Kanniappan et al, 2018) and Salamander (2014*) noted that access to ART and comprehensive program to eliminate perinatal transmission of HIV up to date information on HIV, contraception, desired conception, pregnancy are significant in shaping fertility desires and reproductive choices for HIV positive women.

In the present study, women who did not receive family planning methods and ARVs from the same facility had higher likelihood of experiencing unintended pregnancy. This implies that receiving services from multiple clinics could be associated with increased transport cost hence they become predisposed to unintended pregnancies. *Tweya et al,* (*2018*) in their study found that integrating family planning services into HIV care led to an increase in utilization of contraceptives from 28% in 2012 to 62% in 2016 among women receiving ART and subsequently, the pregnancy rates reduced by 66%. This implies that is significant to integrate comprehensive family planning services so as to effectively reduce unintended pregnancies.

It was further recognised that provision of family planning services within HIV clinical care offers an opportunity to address unmet contraceptive needs and reduce the risk of unintended pregnancy among HIV positive women (*WHO, 2010; Wilcher, 2010*). In contrast, some studies in Africa also reported higher rates of pregnancy among women on ART in Sub Saharan Africa (*Karim et al 2011; Patel et al 2015*).

Furthermore, *Myer et al (2010*) also reported that rapid expansion of ART services in Sub Saharan Africa actually resulted to the recognition of the importance of fertility and child bearing among HIV positive women but limited data demonstrating the influence of ART initiation on pregnancy rates. They found that ART was significantly associated with higher pregnancy rate among HIV positive women in Sub-Saharan Africa. The fact that other the above finding was not in conformity with other study results, such distinction between the results may be due to differences in the availability of family planning services or the level of integration family planning services into HIV services, in addition a number of steps are to be ensured in order to have successful integration of the two services.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.0. Introduction

This study investigated the factors associated with unintended pregnancy among HIV positive women on ART in Gulu district. This was accomplished using primary data collected among 200 respondents.

6.1. Conclusion

Prevalence of unintended pregnancy among women on ART

- The study found the prevalence of unintended pregnancy at 43% (n=86 95%CI: 0.36-50.17) among HIV positive women on ART

Individual factors associated with unintended pregnancy among women on ART

i. The study found that being a business woman was associated with reduction of unintended pregnancy among the women on ART (AOR=0.18, 95%CI: 0.04-0.74 p=0.017).

ii. Secondary level of education of the women was associated with reduced unintended pregnancy compared with women educated to only primary level (AOR=0.01 95%CI: 0.00-0.13, p=0.001).

Contraceptive factors associated with unintended pregnancy among women on ART

i. Mothers who lived without contraceptive before current pregnancy for 3-4 months were significantly less likely to have unintended pregnancy compared to the reference group (AOR=0.07 95%CI: 0.02-0.31 p=0.001).

ii. Receiving FP and ARVs from different health facilities increased the likelihood of having unintended pregnancy (AOR= 11.1, 95%CI: 3.78-32.59, p>0.001).

Health system factors associated with unintended pregnancy among women on ART

i. Consistent collection of ARVs and taking for 2-5 years significantly increased prevalence of unintended pregnancy among women on ART and family planning methods (AOR=3.61, 95%CI: 1.75-7.47, p=0.001).

ii. Women who had been on ART for more than five (5) years also consistently increased the prevalence of unintended pregnancy (AOR=12.91, 95%CI: 4.45-37.44 p<0.001).

6.2. Recommendations

Individual factors associated with unintended pregnancy among women on ART

i. There is need for development programmes to build capacity of women who dropped out of school on sustainable entrepreneurial skills so that they at all times make informed decisions on family planning.

ii. There is need for various parents and stakeholders in education institution to strengthen learning system so that girl child remains in school to acquire education beyond primary and secondary levels so that they gain knowledge and skills which they use to make informed decisions in their lives.

iii. Individual women should have good adherence to the family planning methods administered to them so as to avoid failure of the method in relation to late refills or forgetting time to swallow pills.

iv. Women of reproductive age especially from the rural communities should listen and follow the health education and counselling sessions about side effects and desist from the community talks about myths which make them stop or not use family planning at all.

v. Clients on family planning should report any new changes and effects occurring after receiving family planning to the health worker before personally making a decision to stop the method so that the problem is dealt with and the utilization of the method continues to support her prevent unintended pregnancies.

Contraceptive factors associated with unintended pregnancy among women on ART

i. Health care providers should encourage HIV positive women on ART to either abstain from sex or consistently use appropriate contraceptive methods with their spouses. Although none contraceptive use before current pregnancy for 3-4 months significantly reduced unintended pregnancy, the methods should be used unless one is abstaining (AOR=0.07 95%CI: 0.02-0.31 p=0.001).

ii. HIV positive women on ART should be provided family planning services including the contraceptive methods in the same health facility. This will facilitate concurrent monitoring and follow up of the women by the healthcare providers (AOR= 11.1, 95%CI: 3.78-32.59, p>0.001).

iii. HIV positive women on ART should be provided with family planning methods that do not interact with the ARVs they are using so as to prevent drug to drug interactions that reduce the efficacy of the family planning methods and cause unintended pregnancies.

iv. Family planning methods with a short expiry date and shelf life should not be personally bought and used by the women or administered by health workers because they have reduced efficacy and can cause unintended pregnancies especially among HIV positive women on ART.

Health system factors associated with unintended pregnancy among women on ART

i. There is need for health scientist to conduct further research to validate whether taking ARVs from 2-5 years increased unintended pregnancy among HIV positive women on family planning

ii. There is need to ensure women on ART use long acting reversible contraceptives and other methods in order to prevent the chances of getting unintended pregnancy in due course of being on long life ART (AOR=12.91, 95%CI: 4.45-37.44 $p<0.001$).

iii. The health workers should provide continuous health education and community sensitization on utilization of family planning so as to increase awareness and reduce the community talks about myths which discourage women from using family planning.

iv. The health workers need to endeavour to provide adequate counselling about different types of family planning and their side effects so that the women are aware of the occurrence and how the effects can be treated.

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APPENDICES

APPENDIX 1: CONSENT FORM

I----------, freely accept to participate in this study being carried out at

---------- concerning ARVs and FP use.

I acknowledge that the study has been fully explained to me, confidentiality has been guaranteed, and I therefore wish to contribute to its success.

In the event that I change my mind not to continue with the study, I will be free to drop out.

I therefore:

Agree to take part in the study

Signature…… Date:……

Disagree to take part in the study

Signature……. Date:…….

APPENDIX II: PROPOSED ACTIVITIES AND TIME FRAME

Month	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**
Proposal writing								
Literature review								
Proposal defense								
Pretest of questionnaires								
Data collection								
Data entry								
Data analysis								
Report writing								
Peer review								
Draft submission								
Final submission								

APPENDIX III: STUDY BUDGET

Activity	**No .of units**	**Unit cost(Shs.)**	**Total UGX(Shs.)**
Fuel	3	200,000	600,000
Air time for Co-ordination	5	50000	250,000
Printing and Stationary Cost	1	200,000	300,000
Researchers Assistants' Stipend	4	400,000	1,600,000
Miscellaneous			350,000
TOTAL			**3,100,000**

APPENDIX IV: QUESTIONNAIRES

Part A

Demographic Characteristics

1	How old are you?	_____ (years)
2	What is your marital status?	Single, Cohabiting, Married Separated, Divorced
3	Does your partner have other wives?	Yes No Don't know
4	What is your highest level of formal education achieved?	Primary Secondary Tertiary Never attended school
5	What is your level of income?	_____ Ug. Shs per month
6	What is your occupation?	House wife Farmer Business employed
7	How many children have you delivered?	None _____ child(ren)
8	Have you ever had an abortion? *(whether spontaneous or induced)*	Yes No
9	If yes;	
10	How many abortions have you ever had?	
11	How much did you pay for the abortion?	
12	How far is the health facility from your home?	_____ km OR _____ miles
13	How many visits have you made to the FP clinic in 1 year?	_____ visits
14	How many visits have you made to the HIV clinic in 1 year?	_____ visits

Part B, FP Methods Assessment

1	Have you ever used FP before?	Yes No
	If yes, at what age did you start using it?	_____ (years)
2	What method were you using just before you realized you were pregnant?	Oral Pills IUD Condoms Spermicides Injectables Implant Diaphragm Withdrawal Rhythm Moon Bead BTL
	If yes to above, how many years was it meant to be?	_____ (months/years)
3	In which year of use did you conceive?	
4	How long had you stayed without contraception when you realized you were pregnant?	_____ months/years

	If no, What was your reason for missing the contraceptive?	

Current or past pregnancy

1	During your current pregnancy, were you using any contraceptive before getting pregnant?	Yes No
	If yes, which contraceptive?	Oral Pills, IUD, Condoms, Spermicides Injectables, Implant, Diaphragm Withdrawal /Rhythm , Moon Bead, BTL
2	During this pregnancy, did you think of using any contraceptive method after birth of the baby to delay or stop having children?	Yes No
	If yes, what method?	Oral Pills IUD Condoms Spermicides Injectables, Implant, Diaphragm , Withdrawal / Rhythm, Moon Bead, BTL
3	During your current pregnancy, did you want to get pregnant at that time?	Yes No
4	During your current pregnancy, did you want to get pregnant later / another time?	Yes No
5	During your previous pregnancy, were you using any contraceptive before getting pregnant?	Yes No
	If yes, which contraceptive?	Oral Pills IUD Condoms Spermicides InjectablesImplant Diaphragm Withdrawal Rhythm Moon Bead BTL
6	Were some investigations done on you to rule out pregnancy before you were provided with the family planning method?	Yes No
	If YES, what test	HCT Uterine sounding Abdominal Ultra sound Other_ _ _ _
7	During your previous pregnancy, did you think of using any contraceptive method after birth of the baby to delay or stop having children?	Yes No
	If yes, what method?	Oral Pills IUD Condoms Spermicides InjectablesImplant Diaphragm Withdrawal Rhythm Moon Bead BTL
8	Were some investigations done on you to rule out pregnancy before you were provided with the family planning method?	Yes No
	If Yes, what test	HCG, Uterine sounding, Abdominal Ultra sound Other_ _ _ _
9	During your previous pregnancy, did you want to get pregnant at that time?	Yes No
10	During your previous pregnancy, did you want to get pregnant later / another time?	Yes No

Costs

1	Do you receive both family planning and ARVs from the same facility?	Yes No
2	Do you spend any money for the following services	

	received?	
i	Family planning	Yes No
ii	HIV services/ART	Yes No
3	How much money do you pay to:	
I	Travel to the health facility?	None _____ (Ugx. Shs)
Ii	Buy a contraceptive(s)?	None _____ (Ugx. Shs)
Iii	Removing a contraceptive	None _____ (Ugx. Shs)
Iv	Treat side effect of contraceptive?	YES NO

ARV HISTORY OF THE CLIENT

1	When did you test yourself for HIV and found you were positive?	1. Less than 2 years 2. to 5 years 3. More than 5 years
2	After how long did you get registered for chronic HIV/AIDS care following the positive test?	1. Less than 2 years 2. to 5 years 3. More than 5 years
3	Were you on ARVs at the time you realized you were pregnant?	1. YES **2.** NO
4	If YES, What regimen were you on?	Note-You can verify from the client's book or file.
5	How long were you on that regimen before you got pregnant?	1. Less than 2 years 2. to 5 years **3.** More than 5 years
6	Has your ARV regimen been changed since you started swallowing them?	1. Yes 2. No If **YES**, from which to which one?
7	Were you using your ARVs consistently without missing, by the time you realized you were pregnant?	1. Yes 2. No If NO, why

THE END

THANK YOU FOR ACCEPTING TO TAKE PART IN THIS STUDY

APPENDIX V: INTRODUCTORY LETTER

IHSU INTERNATIONAL HEALTH SCIENCES UNIVERSITY
sanitas per scientiam
PART OF INTERNATIONAL MEDICAL GROUP

making a difference to health care

e-Learning Department

Kampala, On the of 5th, December -2016

The
.....
.....
.....

Dear Sir/Madam,

Re: Assistance for Research

Greetings from International Health Sciences University.

This is to introduce to you **Amongi Pascah Rebecca,** Reg No: **2013-MPH-RL-AUG-003** a student of this University. As part of the requirements for the award of a Master's Degree of Health Services Management of this University, the student is required to carry out field research for submission of a Research Dissertation. **Irene would** like to carry out research on issues related to:

Unintended Pregnancy among HIV Positive Women on Concurrent Use of Anti-retroviral drugs and Hormonal family planning. A case study of Gulu District

I kindly request you to render this student any assistance necessary for her research.

I, and indeed the entire University are thanking you in anticipation for the assistance you will render to the student.

Sincerely Yours,

IHSU INTERNATIONAL HEALTH SCIENCES UNIVERSITY
05 NOV 2016
INSTITUTE OF PUBLIC HEALTH AND MANAGEMENT
P. O. Box 7782, Kampala - Uganda

Mr. John Bosco ALEGE
Dean, IPHM

The International Health Sciences University
P.O. Box 7782 Kampala – Uganda
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web: www.ihsu.ac.ug

APPENDIX VI: CORRESPONDENCE LETTER

IHSU INTERNATIONAL HEALTH SCIENCES UNIVERSITY
services per scientiam
PART OF INTERNATIONAL MEDICAL GROUP

making a difference to health care

e-Learning Department

Kampala, On the of 5th, December -2016

Recommended Please inform my office on the outcome of the study
20th/Dec/2016

DISTRICT HEALTH OFFICER
OMORO DISTRICT

The District Health Officer
Omoro District

Dear Sir/Madam,

Re: Assistance for Research

Greetings from International Health Sciences University.

This is to introduce to you **Amongi Pascah Rebecca,** Reg No: **2013-MPH-RL-AUG-003** a student of this University. As part of the requirements for the award of a Master's Degree of Health Services Management of this University, the student is required to carry out field research for submission of a Research Dissertation. **Irene would** like to carry out research on issues related to:

Unintended Pregnancy among HIV Positive Women on Concurrent Use of Anti-retroviral drugs and Hormonal family planning. A case study of Gulu District

I kindly request you to render this student any assistance necessary for her research.

I, and indeed the entire University are thanking you in anticipation for the assistance you will render to the student.

Sincerely Yours,

Mr. John Bosco ALEGE
Dean, IPHM

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