ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF NURSING AND MIDWIFERY
POSTGRADUATE PROGRAM

RATE OF HIV SERO-CONVERSION AMONG SERO-NEGATIVE MALE PARTNERS LIVING WITH HIV POSITIVE WOMEN IN ADDIS ABABA, ETHIOPIA, 2019.

INVESTIGATOR: KEREBIH ABERE (BSC)

A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES, SCHOOL OF NURSING AND MIDWIFERY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER IN MATERNITY AND REPRODUCTIVE HEALTH NURSING.

JUNE 2019
ADDIS ABABA, ETHIOPIA

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ADDS ABABA UNIVERSITY

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SCHOOL OF NURSING AND MIDWIFERY

POST GRADUATE PROGRAM, APPROVAL SHEET

I, the undersigned MSc student, declare that I have submitted my original work on a title: Rate of HIV sero-conversion among sero-negative male partners living with HIV positive women in Addis Ababa, Ethiopia, 2019 for the examination.

Submitted by:

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This thesis work has been submitted for examination with my approval as an advisor.

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APPROVAL BY THE BOARD OF EXAMINATION

This thesis by **Kerebih Abere** is accepted in its present form by the board of examiners as satisfying thesis requirement for the degree of masters in Maternity and Reproductive health nursing.

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LIST OF ABBREVIATIONS AND ACRONYMS

AHR- Adjusted Hazard Ratio

AIDS- Acquired immune deficiency syndrome

AOR- Adjusted Odd Ratio

ART- Antiretroviral Treatment

CI- Confidence Interval

CHR-Crude Hazard Ratio

DSC- Discordant Couple

EDHS- Ethiopian Demographic Health Survey

FMOH- Federal Ministry of Health

HAART- Highly Active Antiretroviral Therapy

HIV- Human Immune-Deficiency Virus

NGOs- Non-Governmental Organizations

OI- Opportunistic Infection

PMTCT- Prevention of Mother to Child Transmission

RR- Relative Risk

SPSS- Statistical Package for Social Sciences

SSA- Sub-Saharan Africa

STI- Sexually Transmitted Infection

WHO- World Health Organization

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ABSTRACT

Background: HIV AIDS related mortality and morbidity become a challenge for the world. Sub-Saharan Africa including Ethiopia is the most affected region and one of the reasons for new HIV infection is HIV transmissions from the sero-positive partners to their sero-negative partners among discordant couples. Despite, high risk of HIV transmission from positive partner to negative partner among discordant couples, research, and follow up intervention are minimal in Ethiopia.

Objective: This study aimed to assess rate of HIV sero-conversion and predictors among sero-negative male partners living with HIV positive women in Addis Ababa, Ethiopia, 2019.

Method: Institutional based retrospective cohort supplemented by in-depth interview (Convergent parallel mixed method) was used to conduct the study. All eligible two hundred twenty seven (227) sample medical records used for the quantitative study. Thirteen purposively selected male partners were involved in the in-depth interview. Epi-data version 4.2 and SPSS version 25 were used for data entry and analysis, respectively. Cox regression was used to identify predictor variables. The in-depth interview analyzed thematically through ATLAS-ti7 software.

Result: In this study, 227 sero-negative male partners living with HIV positive women were followed for a total of 60 months and 38(16.7%) sero-conversion were observed. The overall sero-conversion rate in the cohort during the 7156 person-years of observation (PYO) was 6.4 per 100 (95% CI: 0.0038639- 0.0072979) person-year follow up. Time of ART initiation, CD4 count, condom use, and desire of pregnancy were identified significant predictor of sero-conversion. Sero-negative male partners living with HIV positive women experienced challenging life situations because of fertility desire, fear of HIV infection, deciding to continue with their relationship, lack of special support method, fear of discrimination, hopelessness and lose confidence.

Conclusion and recommendation: Risk of HIV transmission from positive partner to their sero-negative partner was poorly controlled discordant couples. Therefore, consistent condom use and early ART treatment initiation should get emphasis among discordant couples. Desire of fertility should be considered under medical advice to minimize the risk and sero-negative partners should get improved counseling and support method.

Key words: HIV discordant couple, sero-conversion, rate

1. INTRODUCTION

1.1. Background

Worldwide, about 36.9 million people were living with HIV by the end of 2017. Among them, 19.6 million people were living in eastern and southern Africa and 1.8 million people were newly infected. In 2017, around 940,000 people died with AIDS- related illnesses globally(1). The burden of HIV/AIDS related problems become significant in Africa especially in sub-Saharan Africa including Ethiopia.

In Ethiopia, HIV/AIDS becomes the key challenge for the countries overall socio-economic development. According to Ethiopian demographic health survey (EDHS), the national HIV prevalence is 1.2% and it is high in adults (2). In HIV testing and counseling, ‘‘sero-discordant couple is a couple in which one partner is HIV positive and one partner is HIV negative’’ (3). In Africa, among discordant couples, women and men accounts 47% and 53% to be HIV index partner, respectively (4). HIV Index case in discordant couple indicates, the partner who is HIV positive or HIV infected (5). Currently, the prevalence of HIV discordance in Africa is about one-half to two-third among cohabitating couples of HIV patient (6). In Ethiopia, the prevalence of HIV/AIDS among couples is about 1.1%; of which around 0.8% are sero-discordant couples. In Ethiopia, most of HIV infection is gained through heterosexual intercourse. Even though HIV testing awareness increases from time to time, in Ethiopia about 60% of women and 57% of men have never been tested for HIV(2).

Couple test and counseling of HIV has various benefits including HIV prevention, early initiation of anti-retroviral treatment (ART), safe conception, improved ART adherence, reduced discordancy and generally reduced AIDS related morbidity and mortality. ‘‘Receiving test result together, informed decision and partner notification in couple testing and counseling have very significant outcome to reduce new HIV infection and discordant result(6).

‘‘Sero-conversion in discordant couple is considered when a sufficient quantity of HIV antibodies is produced by an individual to become detectable on a given HIV antibody and/or antigen assay ’’in previously negative partner of a discordant couple (7).

Prevention of HIV sero-conversion among discordant couples requires a combination of a strategic approach. The strategy includes intensive counseling on: consistent condom use, risky sexual behavior, fertility desire, initiation and adherence of ART, life style, health improvement of index partner, the way to continue in a stable relationship and other factors that increase risk of HIV transmission (8, 9). From a study, early initiation of ART (CD4 count between 350 -500) and consistent condom use decrease HIV transmission by 96% (10).

Due to high risk of HIV transmission in discordant couple, from HIV positive partner to HIV negative partner, World health organization (WHO) developed new guidance on couple HIV testing and counseling. WHO focuses on reduction of HIV seroconversion by enhancing couple and partner voluntary HIV testing, early initiation of ART and consistent condom use in every sexual intercourse and this has a numerous advantage for both partners(3). The risk of HIV seroconversion, transmission of HIV from HIV positive partner to their sero- negative partners among discordant couples increases the incidence of HIV infection and it further increases the prevalence of HIV infection. The risk of HIV sero-conversion is very high among discordant couples who don't take protective measures. Therefore, only few couples can remain as discordant for a long period, even over ten years (11).

1.2. Statement of the Problem

Globally, HIV /AIDS epidemic become one of the greatest development challenge that the world had ever faced (12). Sub-Saharan Africa is the most HIV affected region and the annual HIV transmission from the infected partner to negative partner is high; this is mainly due to the high prevalence of discordant couple (13). In Ethiopia HIV /AIDS is the leading cause of death for productive age population, estimated as 34% of all deaths in age between 15 -24 years, and 66% of all death in reproductive age groups (14).

The prevalence of HIV discordant result is high in Africa, HIV-1 discordant result ranges from 36-85% in eastern and western Africa (15). A cross-sectional study done in Dilla and Dessie, Ethiopia shows a high prevalence of HIV discordant result, 5.9% and 9.8% respectively, among participant couples and it is more prevalent in productive age groups (16, 17).

A study in China shows an annual sero-conversion rate of 2.6% among HIV discordant couples, but a treatment follow-up cohort shows 26% comparative decline in HIV transmission in discordant couples (18). HIV seroconversion from HIV infected index partner to negative partner among stable discordant couple accounts 50% of new HIV infection in Africa (8). In sub-Saharan Africa (SSA), the contribution of externally acquired HIV infections were less than 10% and the majority of negative partner gain HIV virus from their positive partner (19). In sub-Saharan Africa, the risk of HIV transmission and the rate of seroconversion vary according to the countries HIV and discordant prevalence; countries with high HIV prevalence have a higher rate of HIV sero-conversion (20). Poor couple testing and counseling service, inconsistent condom use, high viral load, not start ART, having genital ulcer/STI and being young age are associated factors for HIV seroconversion among discordant couples (21, 22).

HIV seroconversion in discordant couple increases the prevalence of new HIV infection and this have multidimensional psycho-social impacts like: discrimination at work place, loss of employment, fear of discrimination with children in school, bad marital relationship, lack of social support, hopelessness and depression(23). Maternal HIV infection is one cause for poor growth and development of children in addition to other socioeconomic impacts. Since, being discordant increases the number of new maternal HIV infection via seroconversion from positive partner to negative partner (24). In many studies, the rate of HIV seroconversion is

more prevalent in young age and this has enormous socio-economic impact in a country, since youths are an asset and backbone of a country in all socio-economic aspect (25). A study in Ethiopia indicates 11.4% mother-to-child transmission of HIV and this burden on newborn significantly contributed by seroconversion in discordant couple (26). Seroconversion in discordant couple increases maternal death by HIV/AIDS infection and this intern increase number of orphan children, it has a negative impact on socio-economy of the community.

HIV/AIDS epidemic highly contributed by seroconversion in discordant couple and this challenges the country development by reduce income of a family, decreasing productivity, reducing labor-hours, and reducing the amount of land cultivated (27). Up to 95% of new HIV infections in Rwanda and Zambia are the result of seroconversion in stable couples living together (28). The cost of ART and opportunistic infection treatment requires high health expenditure, which shares a countries annual budget. At the end of 2017, low- and middle-income countries consider 21.3 billion US$ for the HIV/AIDS response (1). In observational follow up study of china, HIV seroconversion was 6.3%, but after prevention intervention sero-conversion reduced to 0.6% among discordant couples (21).

The lived experience of discordant couple in sexuality, condom use, safe sex practice, life style, maintaining relationship, and desire of fertility are different in couples and individuals. The lived experience of discordant couple, either increases or decreases the chance of HIV transmission from HIV infected partner to negative partner, has negative or positive influence on predictor of HIV seroconversion (29). In discordant couple, desire of fertility and maintaining relationship leads the couple to risky behavior such as unsafe sex and pregnancy(un published)(30). Despite, high risk of HIV transmission among discordant couples, research, and follow up interventions are minimal. Therefore, this study aimed to assess rate of HIV sero-conversion and predictors among sero-negative male partners living with HIV positive women in Addis Ababa, Ethiopia, 2019.

1.3. Significance of the Study

This study assessed the rate of HIV sero-conversion and predictors among sero-negative male partners living with HIV positive women in Addis Ababa, Ethiopia. The study will be important for different stakeholders, nurses, and other professionals working on ART adherence office, ART clinic, and PMTICT especially on management of discordant couples.

- Findings from this study will provide important information for stakeholders and policymakers to develop prevention strategies and guidelines on management of HIV discordant couples, especially management of sero-negative partners.
- This study will guide nurses and other health professionals to work on major predictors of sero-conversion and to reduce new HIV incidence. Identifying and working on major risk factor of HIV sero-conversion play a great role to lengthen survival time of sero-negative partners.
- The findings of this study will be help full to design training for PMTCT and ART clinician towards the management of sero-negative partner of a discordant couple.
- Furthermore, this study will provide intuition for health workers to support and maintain relationship through overriding major challenges and dilemmatic issues that sero-negative partner of discordant couple experienced.
- Lastly, this paper will provide an insight for further researchers towards the management of sero-negative partners living with sero-positive partners.

2. LITERATURE REVIEW

2.1. Introduction

In couple HIV testing and counseling, test result can be concordant or discordant. Among cohabitate or married couples, one partner may be HIV positive but other partner may be HIV negative and this condition is termed as discordant result. The concept of HIV sero-conversion in discordant couple shows the transmission of HIV from positive partner to their sero-negative partners and the presence of adequate amount of HIV antibodies to detect the virus. The risk of HIV sero-conversion can be increased or decreased due to influence of various predictors. A study done in east Africa indicates, only less than 10% of index partners know their partners status and only 20% of the discordant couple know as they are living in a discordant relationship (31). Most of HIV infection occurs within couples who live in a stable relationship and new HIV infections were acquired from discordant couples. To overcome this problem, couple-centered voluntary counseling and testing (VCT) initiative were first developed during the 1990s (32).

This literature tries to review different evidences about sero-conversion rate of HIV, risk of HIV transmission from the infected partner to negative partner and predisposing factors for sero-conversion among discordant couples who live together with in a stable relationship. The review includes rate of HIV sero-conversion among discordant couples and predictors of HIV sero-conversion like socio-demographic characteristics, treatment of index partner, health condition of index partner, and personal behavior related factors.

2.2. Rate of HIV Sero-conversion among discordant couples

In HIV discordant couples, rate of HIV sero-conversion shows the number of sero- negative partner infected by the virus from their positive partner within a specified time. In a retrospective study in Liuzhou, China on HIV transmission and related risk factors among sero-discordant couples, 125 HIV seroconversion were observed among 1854 discordant couples, 2.52/ 100 person-years seroconversion (33). The average contribution of being HIV discordant couple to the overall new HIV incidence was 30.4%. Twenty-nine point seven (29.7%) of this was from seroconversion in couples and 40.2 incidence occurs in couples who had no stable relationship, one partner gain HIV infection from other external sources (34).

A five year follow-up observational study in china shows 6.3% and 40.14% annual and total sero-conversion rate, respectively in five years (35). Other cohort study in Guangxi, southern China also indicates 63.7/100 person per year (PPY) HIV seroconversion in the six month follow-up and 33.2 per100PY in a 12 month follow up among HIV discordant couples (36). Similar retrospective cohort study in Hunan province, China indicates 5.87% seroconversion rate per year before initiation of ART, but the rate of HIV seroconversion decreased to 0.43/100 per-year after the index partner had started ART (37). Among 4813 sero-discordant couples, 127 HIV seroconversion spouses were identified, with a total seroconversion rate of 0.63 per 100 person-years (38).

In Africa, relatively eastern and western Africa had a high prevalence of HIV discordancy and the risk of HIV transmission from infected partner to negative partner were high, However, there were a great disparity between countries. The mean annual risk of HIV transmission from positive partner to negative partner was 9.4% per year (13). In sub-Saharan Africa the median risk of HIV transmission from the infected partner to uninfected partner varies in relative to their HIV prevalence, 7.5% and 19.5% per year in low HIV prevalence countries(<5%) and high HIV prevalence countries(>5%), respectively. Risks of HIV transmission in discordant couples were high in high HIV prevalence countries (20). A two year follow- up cohort study in Masaka, Uganda found new HIV incidence rate of 4.3% per year among discordant couples(39). Other similar follow up study done in Lusaka, Zambia indicates, 17.96% seroconversion with in a two year follow up among two thousand three hundred eighty eight discordant couples (25).

In a retrospective observational cohort study in China, the rate of HIV transmission were high in the first year of follow up time and rate of transmission decreases as follow- up time increases. There were 2.3, 1.3 and (0.4- 0.7) per 100 person- year rate of seroconversion in <1 year, 1-2 year and 6-9 year of follow up time, respectively (18). Other study in Liuzhou, China also shows, risk of HIV transmission were high in early follow up time and rate of transmission decreases as follow- up time increases. Rate of HIV transmission were 3.8, 2.6, and 2.0 per 100 person in ≤2, 3-5, ≥6 year of follow up time, respectively, but the differences were not observed in multivariate analysis (33).

A grounded theory study on sexual life and fertility desire in long-term HIV serodiscordant couples was done in Addis Ababa, Ethiopia. From the study, mismatch of wish to have a child, maintaining relationship, and controversy on safe sex against need to have a child were the most dilemmatic issue among discordant couples. These dalmatic issues influence the behavior of couple and increase the risk of HIV transmission from infected partner to sero-negative partners (40).

2.3. Predictor of HIV Sero-conversion

2.3.1. Socio-demographic predictors

The prevalence of HIV discordant result is higher in urban than rural and it is more prevalent in young age than old age couples (41). From facility based cross-sectional survey done in Dilla, Ethiopia 4.6% and 1.3% of a discordant were female and male respectively and 44.4% of a discordant couple were in age group of 21-25. In relation to residency, urban were 3.79 more likely discordant than rural areas (16). HIV seroconversion significantly associated with age, risk of seroconversion was high in young age, in age 18–24 (aRR=6.2; 95% CI: 2.2–17.3) and in age 25–34 (aRR=2.3; 95% CI: 1.1–5.0) (39). Among discordant couples, the risk of HIV transmission from woman to men was 2.3 times higher than the risk of transmission from men to a woman at twelve month follow- up period (36).

From observational cohort study in china, irrespective of treatment status, women were more likely to transmit the virus to their sero-negative partner (18). Four point three (4.3%) and 4.4% per year HIV sero-conversion were observed in men and women, respectively among discordant couples from a study in Masaka, Uganda (39). A systematic review on prospective studies of discordant couple displays, risk of HIV seroconversion were higher in low income than high income population, but there was no clear direction on transmission of HIV in terms of sex (42). Regarding to educational level, sero-negative partners with a lower educational level were at higher risk of HIV seroconversion than the educated one (RR=1.50,95% CI:1.02-2.21, P=0.04) (38).

2.3.2. Index partners treatment related predictors

Index partner treatment related predictor indicates the treatment that the infected partner used to control the virus and condom use to prevent HIV transmission to the negative partners. From a retrospective study in Liuzhou, China, inconsistent condom use was 7.6 times more likely to transmit HIV to their partners , and index partner who do not start ART were at high

risk to transmit the virus to their negative partner among discordant couples (33). In China national study, rate of HIV transmission were 1.3 and 2.6 per 100 person- year in ART treated cohort and not treated cohort respectively (AHR 0·74, 95% CI 0·65–0·84) (18). Other observational cohort study in China shows, HIV viral load, initiation of ART and condom use were factors associated with HIV seroconversion among discordant couples (35).

From systematic review and meta-analysis, study was done in china; Consistent use of ART and condom had a significant association with HIV sero-conversion among discordant couples, by reducing the risk of transmission from positive to negative partner. HIV sero-conversion incidence rate were 0.92 and 2.45/ 100 person per year among discordant couples with ART treated and untreated index partners, respectively. In case of condom use, the pooled HIV sero-conversion incidence rate was 0.16% and 9.01% per year in consistent condom user and inconsistent condom user discordant couples, respectively (43).

Among discordant couples, the risk of HIV heterosexual transmission was minimal after the HIV-positive partner had full viral suppression by ART therapy and condom use. From a study in China, there were 29% reduction in risk of seroconversion among sero-discordant couples with initiation of ART (AOR: 0.71; 95% CI, 0.52-0.97) (37, 44). When we consider HIV transmission in discordant couples, consistent condom use and effective antiretroviral treatment reduce the rate of HIV seroconversion significantly (45). The rate of HIV transmission from men to the woman and woman to men were 5.2 and 1.3/100 person per years, respectively among one hundred forty sero-discordant couples who were not on ART (46). Observational cohort study done in Rakai, Uganda shows, a 9.2% rate of sero-conversion before ART initiation but the rate of sero-conversion reduces significantly after initiation of ART(47).

Index spouses not received ART and last recorded CD4+ cell counts ＜200 cells/ μl were at increased risk for HIV sero-conversion from index partners to their sero-negative partners (RR=2.11,95% CI:1.40-3.19,P＜0.01) (38). A prospective cohort study shows a greater reduction of HIV sero-conversion by early initiation of ART, but low CD4 count (<200 cells/mm3) with high viral load increases risk of HIV transmission from the infected to an uninfected partner (48).

Incidence of HIV transmission from HIV- positive partners to their sero- negative partners were 0.2% and 3.6% per year in ART initiated and not treated discordant couples,

respectively, 91% risk reduction was identified from a systematic review study on prospective studies of discordant couples (42). A qualitative study through in-depth interview and key informant interview explored that, most of discordant couple's encountered difficulty to use condom consistently. Wish for child, refusal of the spouse, perception as they are naturally immunized, and considering as they are already infected even though not identified so far were the commonest reason for inconsistent condom use (29). In other qualitative study, the most common reason explored from the participant to practice unsafe sex was desire to have child(40).

2.3.3. Index partners health status related predictors

Index partners health status related predictor indicates the health status of HIV infected partner like CD4 count, viral load, WHO HIV stage, STI, and opportunistic infection. A study done in China, on HIV transmission and related risk factors among sero-discordant couples, identifies a significant association between sero-conversion and CD4 count. HIV-positive partner with CD4 level of ≥ 350cells/ul were 54% less likely to transmit HIV virus to their partner compared with those whose CD4 level were ≤ 200 cells/ul (AHR=0.46, 95% CI: 0.27–0.81, P<0.01) (33).

A longitudinal cohort study on risk of heterosexual HIV transmission because of sexually transmitted infections and non-specific genital inflammation in Zambian discordant couple directs that, genital infection increase the risk of HIV transmission by 7.5% and 5.3% per–year in woman and men, respectively. Genital ulceration, sexually transmitted infection (STI), non-STI genital inflammation, bilateral inguinal adenopathy, and uncircumcised man were significantly associated with the risk of HIV transmission in discordant couples (22). Other studies also support that having sexually transmitted infection and being uncircumcised in men were significant factors to increase risk of HIV sero-conversion in discordant couples (39). HIV seroconversion in discordant couple also shows a significant association with WHO clinical stage of the HIV. Index partners with advanced WHO clinical HIV stage were more likely to have infected partners (49).

2.3.4. Fertility desire and personal behavior related predictors

A study done in Zambia on risky sex and HIV acquisition among HIV sero-discordant couple showed that, alcohol use increase risk of HIV sero-conversion in discordant couples through practice of risky and condom less sex (50). Men who use alcohol were 1.67 times more likely

to have sex without condom at least once in three month and this increase risk of HIV transmission in discordant couple (51). Other follow up study in Zambia also shows, discordant couple who use alcohol were 1.2 times more likely to have unprotected sex than discordant couples not use alcohol (AHR=1.2) (52). The risk of HIV transmission from infected partner to sero-negative partner was 3 times higher in alcohol users than non-users (39).

The wish to have a child, increase the risk of HIV transmission from infected partner to negative partner through practice of unsafe sex. From a cohort study in Zambia, the intention for pregnancy or fertility desire was a cause for unprotected sex among discordant couples (AHR=1.2–1.4), this increase risk of sero-conversion in negative partners (52). Intention to have a child increases the risk of HIV transmission from the infected partner to sero-negative partners among discordant couples, (RR=1.8 95% (CI) 1.01–3.26; P 0.05). Twenty sero-conversion occurred among couples who had history of pregnancy during their discordant relationship, twelve and eight sero-conversions were occurred in women and men respectively (53).

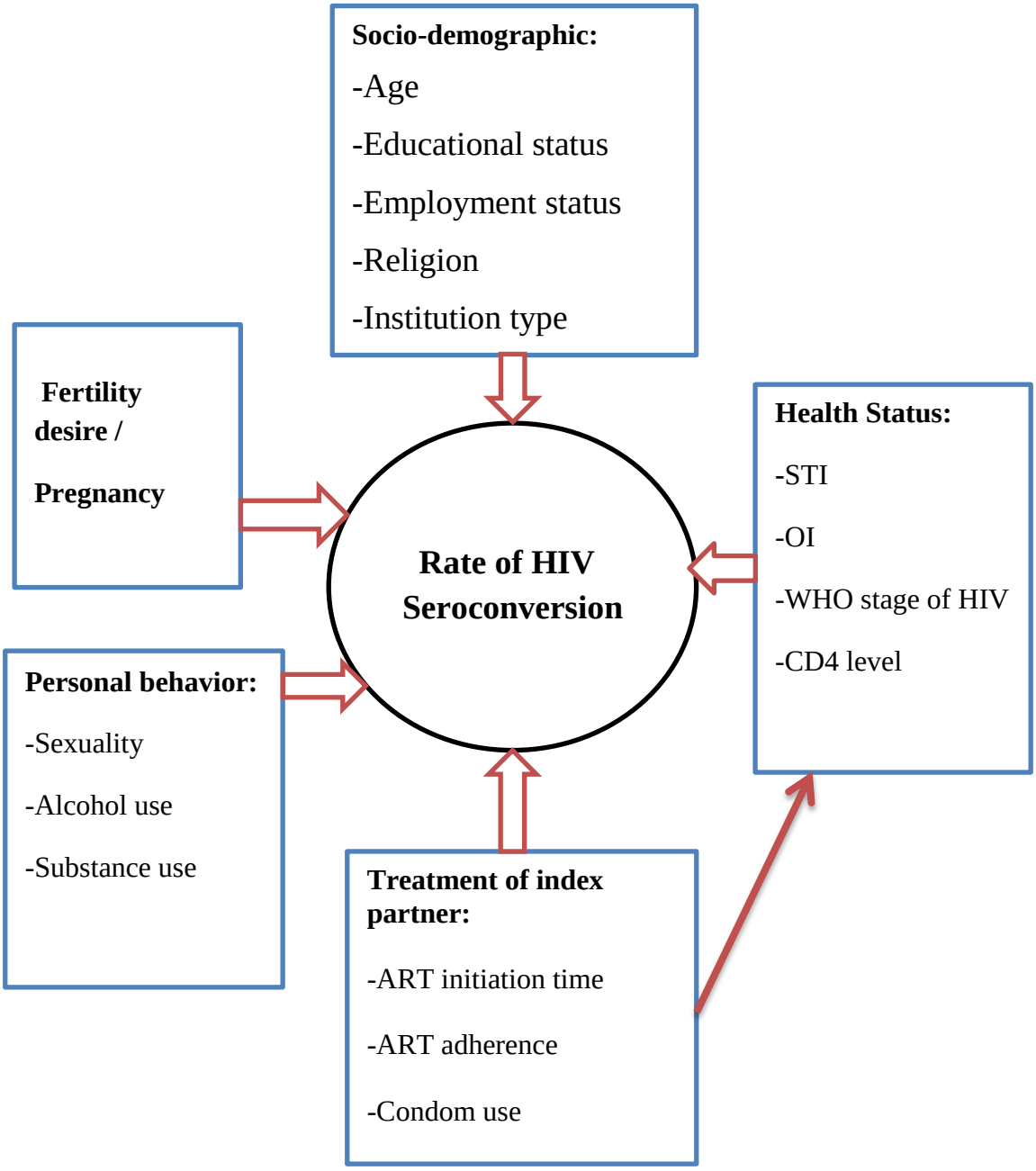
A qualitative study on socio-economic challenges and coping mechanisms of HIV sero-discordant couples in Jimma, Ethiopia explored the challenge of fertility desire in discordant couples. HIV discordant couples encountered dilemmatic issue to have a child or to live without child. In one way, by the partner themselves or by influence of relatives the couple desired to have a child. In the other way, the practice of unsafe sex leads to HIV infection in sero-negative partner, and risk of HIV infection to child.

Some discordant couples engaged in unprotected sex and end up with pregnancy simply to fulfill the interest of their partner (30). After the couples knows there status, discordant couple shows various life changes such as decreased sexual need, fear of virus transmission, reduced frequency of sexual contact in regarding to their sex life and behavioral changes are common changes in life(54). In concern with sexuality, sero-discordant couples report that, they decrease the frequency of sexual intercourse to one per week but they practice unsafe sex. Some discordant couples struggle to maintain their partnership, but others tend to divorce specially by the influence of negative spouse (29). Discordant couples experienced various challenges and dilemmatic issue in their life due to their discordancy status. Difficulty in controlling marital and family relationships, risk of child infection, decreased sexual initiation,

desire of fertility, risk of HIV infection to the negative partner, fear of discrimination and stigma, lack of social support and economic related problem were challenges that discordant couples encountered. Discordant couples faced psychological trauma which leads to hopeless and decreased love (29, 30).

In summary, because of a high prevalence of HIV discordant result, the majority of new HIV infection resulted from sero-conversion of discordant couples. In sub-Saharan Africa the prevalence of discordant result among couples were significantly high and HIV sero-conversion from index partners to their sero-negative partners were high and this increase the prevalence of new HIV infection. The following are identified predictors that associated with the risk of HIV seroconversion in discordant couple. Age, education level, residency, and income level were among socio-demographic characters, and condom use, treatment of index partner and late initiation of ART were index partner treatment-related factors. From health status of index partners: low CD4 count/high viral load, advanced WHO clinical HIV stage and having genital ulcer/STI were factors associated with seroconversion. Fertility desire and l alcohol use were also predictors of sero-conversion. Discordant couples have many overlapping feelings, experiences, and they encountered multiple socio-economic challenges. The lived experiences of discordant couple play a major role for sero-conversion of sero-negative partners. Despite, high prevalence of HIV discordant couple is in Ethiopia, there is no available data on rate of HIV seroconversion and its predictor. Hence, this study aimed to assess rate of HIV seroconversion and predictors, to suggest relevant recommendation to government and stakeholders work on HIV AIDS.

2.4. Conceptual Framework



Key: STI-sexually transmitted infections, OI-opportunistic infections

Substance use: chat, cigarette, and others

Figure 1: Conceptual framework for fate of HIV sero-conversion and predictors among sero-negative male partners living with HIV positive women.

(Organized by the principal investigator after reviewing numerous literatures)

3. OBJECTIVE

3.1. General Objective

To assess rate of HIV sero-conversion and predictors among sero-negative male partners living with HIV positive women in Addis Ababa, Ethiopia, 2019.

3.2. Specific Objectives

- To determine rate of HIV sero-conversion among sero-negative male partners living with HIV positive women, 2019.
- To identify predictors of HIV sero-conversion among sero-negative male partners living with HIV positive women, 2019.
- To explore the lived experience of male partners living with HIV positive women, 2019.

4. METHODS AND MATERIALS

4.1. Study Approach

Convergent parallel mixed method approach was used by collecting both quantitative data from a medical chart of HIV discordant couples tested in PMTCT unit of Addis Ababa health institution and qualitative data from sexual partners of HIV positive women.

Rationale of using a mixed method: rate of HIV seroconversion among discordant couples can be assessed quantitatively through chart review. However, determinant factors cannot be fully understood by only chart review. Therefore, exploring the lived experience of male partners living with HIV positive is supportive to investigate determinant factors.

4.2. Quantitative part

4.2.1. Study area and period

This study was conduct in Addis Ababa, which is the capital city of Ethiopia. Addis Ababa has a population size of 7.178 Million as estimated in 2018 and the city is divided in to 10 sub cities and 117 woredas. There are 6 hospitals and 100 health centers under Addis Ababa health bureau, and 8 hospitals under federal government: five hospitals under a Federal Ministry of Health, and three hospitals under defense force and police. There are also over 34 private hospitals and over 700 private clinics in Addis Ababa city. Among these health institutions, 149 institutions provide ART service currently; within 11 government hospitals, 88 health centers, 22 private hospitals, 12 private clinics, and 16 NGO centers. Among these public health institutions, four hospitals and six health centers were used as a study unit.

This study was conducted in ten public health institutions of Addis Ababa, which have both PMTCT and ART service from February 20 - May 27, 2019.

4.2.2. Study design

A retrospective cohort study was used to examine rate of HIV sero-conversion and predictors among sero-negative male partners living with HIV positive women.

4.2.3. Population

4.2.3.1. Source Population

The source populations were all HIV discordant couples tested and received service in PMTCT unit of Addis Ababa public health institutions from September 1st 2013–September 30, 2018.

4.2.3.2. Study population

The study populations were all eligible medical record of HIV discordant couples tested and received service in PMTCT unit of selected health institutions from September 1st, 2013– September 30, 2018.

4.2.4. Eligibility criteria

4.2.4.1. Inclusion criteria

- All medical record of HIV discordant couples recorded from September 1st, 2013– September 30, 2018.

4.2.4.2. Exclusion criteria

- Medical record of HIV discordant couples with less than 3 months of follow-up, difficult to assess seroconversion, since, window period of HIV is up to three month.
- Medical record of HIV discordant couples who are divorced and have no partner follow up.
- Incomplete recorded chart, chart that lacks major variables(see operational definition)

4.2.5. Sampling method and sampling procedures

4.2.5.1. Sample size determination

All sero-negative male partner of HIV positive woman tested in selected health institutions from September 2013 to September 2018, and fulfill the inclusion was included in the study. A total of 628 discordant couples registered in this period. (Zewditu memorial hospital-107, Tikur Anbesa specialized hospital-58, St Paulo's hospital-58, Alert hospital-40, Saris HC-54, Kotebe HC-89, Kality HC-48, Addis Ketema HC-74, Nifas silk HC-64 and Bole 17 HC-42). Only 227 of them fulfill the inclusion criteria and included in the study, Zewditu memorial hospital-30,Tikur Anbesa specialized hospital-11, St Paulos hospital-24, Alert hospital-15, Saris HC-24, Kotebe HC-35, Kality HC-20, Addis ketema HC-23, Nifas silk HC-25 and Bole 17 HC-20. HC- health center.

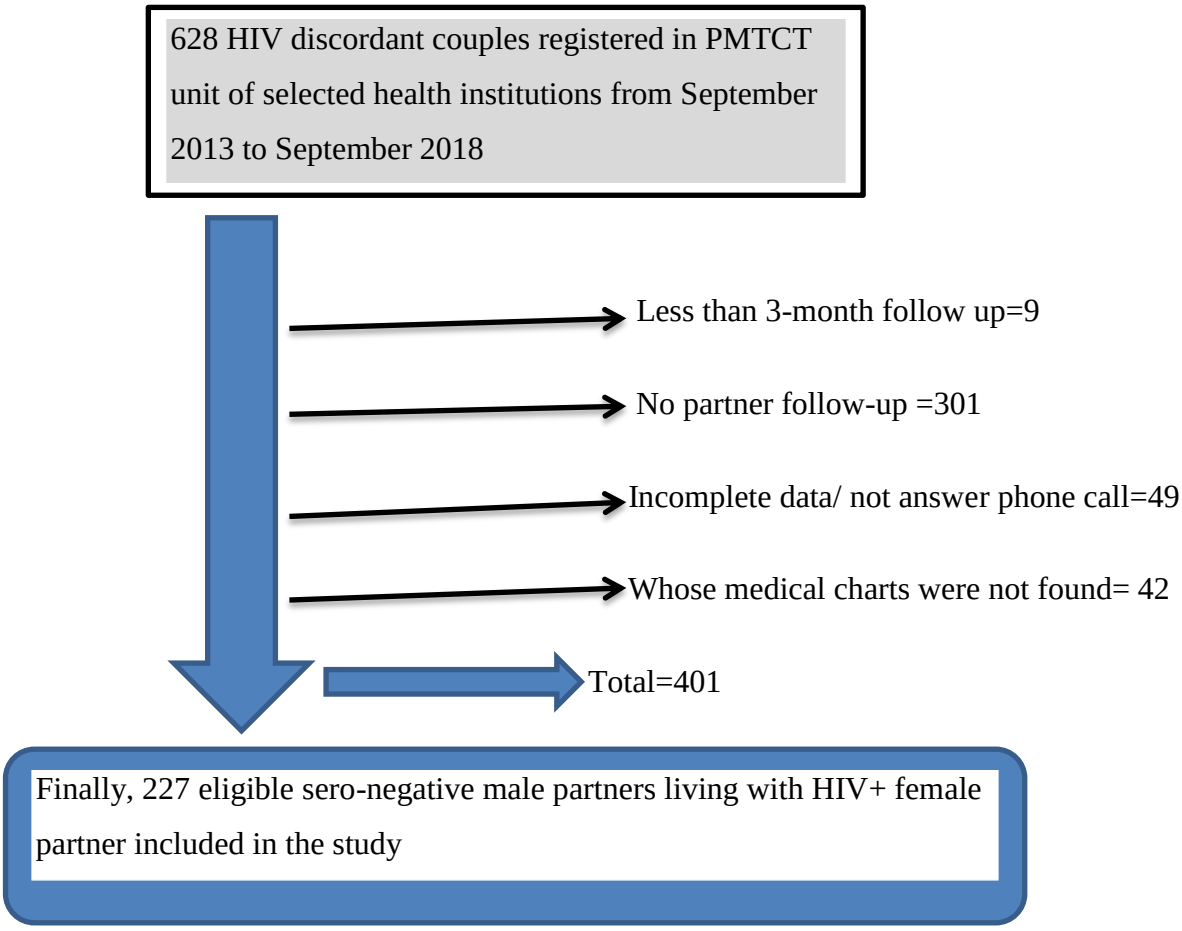


Figure 2: Diagram showing the final sample size included in the study from September 1st 2013 to September 30, 2018.

4.2.5.2. Sampling procedure

In Addis Ababa 99 public health institutions, 88 health centers, and 11 public hospitals provide ART services. This study focused in institutions that have both PMTCT and ART services. Hospitals and health centers were selected purposively based on their HIV patient flow and years when the institution started PMTCT and ART service. In Ethiopia Option B+ PMTCT, registration began in 2013. All medical charts of discordant couples registered from September 1st, 2013 to September 30, 2018 collected in selected health institutions and screened for completeness, partner visit, and duration of follow-up. Finally, all eligible samples were selected, census sampling was used.

4.2.6. Variables

4.2.6.1. Dependent Variable

- Rate of HIV sero-conversion

4.2.6.2. Independent Variables

- Socio-demographic: Age, education status, employment status, and religion
- Treatment of index partner: Time of ART initiation, ART adherence, and condom use
- Health status of index partner: CD4 count, WHO clinical stage of HIV, STI, and OI.
- Personal behavior: Sexuality, alcohol use, substance use
- Fertility desire: the couple's pregnancy desire

4.2.7. Conceptual and Operational definition

Discordant couple: - is a couple in which one partner is HIV-positive and other partner is HIV negative in couple HIV test (2).

Index partner- index partner indicates the HIV-positive partner in discordant couple

Censored: - are those sero-negative male partners of HIV positive women who did not develop the outcome of interest, seroconversion at the end of follow-up period (death, divorced, transferred to other institutions, lost follow up, and HIV-negative partner).

Event: - the occurrence of sero-conversion from follow-up period to the end of the study

HIV seroconversion: - ''Seroconversion in discordant couple is considered when a sufficient quantity of HIV antibodies is produced by an individual to become detectable on a given HIV antibody and/or antigen assay '' and diagnosed as HIV positive.

Time of seroconversion: - the time that the negative partner become HIV+ and diagnosed as HIV positive patient after discordant diagnosis.

Rate of HIV sero-conversion: - number of negative partner who became HIV positive among exposed partners in 100 person-year follow up.

Time of ART initiation: - Early- ART started in CD4 level between 350-500 cells/µl or above and Late-ART started in CD4 count <350 cells/µl (23).

ART treatment adherence: Good adherence -if the adherence is >95% (missing of ≤2 doses in 30 dose or ≤3 doses in 60 doses). Fair: 85- 94% (missing of 3-5 doses in 30 dose or 3-9 doses in in 60 dose), and Poor: < 85% (missing of ≥9 doses in 30 doses or > 9 dose in 60 doses) (50).

Alcohol and substance user: - participants considered as alcohol or substance user if they are recorded as user in the chart. Substance use implies Chat, and/or cigarrate, and /or others.

Incomplete recorded charts:- chart that lacks major variables (time of diagnosis as discordant, time of sero-conversion , partner HIV status, CD count, condom use, history of ART and charts difficult to complete with a phone call).

Index partner CD4 count: last CD4 count-number of CD4 at the end of follow-up. CD4 count at diagnosis- number of CD4 while the couple diagnosed as discordant.

4.2.8. Data Collection Method

4.2.8.1. Data collection tool

English version structured checklist prepared from national ART follow-up chart and similar studies were used to review charts retrospectively (33, 35, 55). The instrument contains 22 structured checklists; 5- socio-demographic, 3-treatment- related, 8-health status related, 4-behavior, and fertility desire related and 2-follow up outcome questions.

4.2.8.2. Data collection procedure

The data was collected from a medical recorded chart of discordant couples. Four BSc nurses and one MSc student supervisor were assigned to collect the data. One day training on the process of data collection was organized for the data collectors and the assigned supervisor. First all medical chart of a discordant couple recorded from September 1st, 2013- September 30, 2018 were collected and only charts that meet the inclusion criteria was selected and reviewed by data collectors. Phone call by adherence office was used to collect complete information (it was used to confirm condom use, duration of follow up, male partner status and presence of pregnancy).

4.2.9. Pre-test study

Pre-test was conducted on one health center and one hospital by considering 5% of the intended sample size. Based on the pre-test finding, all necessary correction was made on chart review checklist, analysis method and over all formats. Variables like residency and viral load were excluded from the checklist. Phone call method and phone call guide short questioners were prepared.

4.2.10. Data quality control

The chart review checklist was adapted from the national ART follow up chart to address all variables and relevant information. Pre-tested was done and correction was made accordingly.

Training was organized for data collectors and supervisor on the procedure of data collection and purpose of the study. On the time of data collection, the data was checked daily for completeness, accuracy and consistency by principal investigator and timely correction was done. The data collection supported by phone call to enhance the quality of data.

4.2.11. Data Analysis method

Data entry and analysis was done by using Epi-data version 4.2 and SPSS version 25, respectively. Descriptive statics was used to summarize the result. Kaplan-Meier procedure and Log-rank test were used to estimate HIV seroconversion time and to test significance of the observed difference of sero-conversion time between predictor variables. Finally, bivariable and multivariable cox regression analysis were computed for predictor variables with time of sero-conversion. Both Crude Hazard Ratio (CHR) and Adjusted Hazard ratio (AHR) were used to determine predictor variables with 95% CI and, p-value < 0.05 was considered as significant. Predictors with a significant level of 0.25 in bivariable regression were included to multivariable cox proportional hazard model.

4.3. Qualitative part

4.3.1. Study area and period

The study area and period were the same and parallel to quantitative part of the study.

4.3.2. Study design

Phenomenological study was conducted.

4.3.3. Population

4.3.3.1. Source population

The source populations were all male partners living with HIV positive women tested and received service in PMTCT unit of Addis Ababa public health institutions from September 1st 2013–September 30, 2018.

4.3.3.2. Study population

The study populations were purposively selected male partners living with HIV positive women tested and received service in PMTCT unit of Addis Ababa public health institutions from September 1st 2013–September 30, 2018.

4.3.4. Eligibility criteria

Inclusion criteria

All volunteer male partners living with HIV positive women tested and received service in PMTCT unit of Addis Ababa public health institutions from September 1st , 2013–September 30, 2018.

Exclusion criteria

- Discordant result with less than 3 months of follow-up, difficult to assess seroconversion, since, window period of HIV is up to 3 months.
- Discordant couples not live together and divorced
- Participants who are not accessible during the study period were excluded from the study.

4.3.5. Sample size

Thirteen (13) male partners living with HIV positive women were interviewed. Three of them experienced sero-conversion after a period of discordant relationship and 11 of them were sero-negative partners. The sample size was determined by its data saturation, when the investigator had no longer hearing or seeing new information from new study participants.

4.3.6. Recruitment of samples

Volunteer and well-reassured participants were selected purposively from study units by communicating with health workers working at PMTICT and ART adherence office. Participants selected purposively by considering maximum variation in age, educational background and duration of diagnosis as discordant from Zewditu hospital, Kotebe health center, Bole health center, and Addis Ketema health center.

4.3.7. Data Collection tool and procedure

Semi-structured interview guide was used to execute the in-depth interview. Amharic version interview guide was used to investigate all necessary lived experience of sexual partners of HIV positive women. An information sheet and informed consent form was delivered to all participants. In-depth interview performed by the principal investigator among participants who meet the inclusion criteria and voluntary to participate. A probe was used throughout the interviews to offer a clarification and inspire elaboration from the participant on specific issues that were a domain of interest to the investigator.

Tape recorder was used to support the data collection. A type note was taken throughout the interview for the purpose of cross validation with the audio recordings and final interview transcripts.

4.3.8. Data Analysis

Data analysis was done alongside with data collection. The principal investigator transcribed the audio record and written field notes verbatim after repeated listening and reading of the interviews. Then, the transcribed interview was translated in to English. The translated data was entered to ATLAS-ti7 software and analyzed by extracting important concepts in to codes, sub-themes, and themes. Finally, identified themes and sub-themes presented with detail description and results discussed side by side in parallel with quantitative result.

4.3.9. Trustworthiness of data

The interview guide was translated from English to Amharic and back to English, and the interview performed by using the Amharic version.

Credibility:

- Type notes were taken throughout the interview for the purpose of cross validation with the audio recordings (triangulation was used).
- Peer debriefing was used, colleagues and advisors reviewed the transcribed document and extracted concepts.
- The interview was supported by probing.

Transferability:

- The data collection and analysis plan well described step by step
- Based on the original transcript, the extracted concepts/codes were described in detail manner.
- All field notes, recorded interviews, and transcripts were checked on each day for errors and correction was given accordingly.

Dependability:

- Inquiry audit was used; colleagues and advisors reviewed the interview guide and the entire plan.
- Related literatures and the actual transcript supported the result.

Confirmability:

- The audio record and typed notes were transcribed verbatim and translated carefully

4.3.10. Ethical Considerations

The proposal was submitted to Addis Ababa University, college of health science, School of nursing and midwifery.

Letter of ethical clearance was taken from Addis Ababa University College of health science and Addis Ababa health bureau. Letters of cooperation was written to selected health institutions and permission for data collection was gotten from selected hospitals and health centers. For quantitative part, as the study conducted through a review of medical records by clearing ethical issues and after getting permission from the medical director of the health institutions, the individual participants were not subjected to any harm. For qualitative part, Informed consent was taken after provision of all necessary information, willingness to participate in the study and permission for audio recording. They assured, as the audio recorded will be deleted at the end of the study period. Before conducting the interview, confidentiality, anonymity, voluntary participation, and freedom to withdraw from the study was assured. The information taken from the participant accessed only by the principal investigator and advisors. It was locked with password and placed in private computer. Coding system was used to maintain confidentiality and anonymity. Post interview reassuring was also performed to debriefing participants.

4.3.11. Dissemination of the study

The result of this study will be submitted to Addis Ababa University College of health science, school of Nursing and Midwifery, Addis Ababa health bureau, FMOH, and different non-governmental organization working on HIV AIDS. This study also will be presented in different workshops and conferences. Finlay, the possible effort will be used to publish the paper in local and international journals.

5. RESULT

5.1. Socio-demographic characteristics of the index partners

Among 227 eligible medical records, 84 (37%) medical records were from four hospitals and the remaining 143 (63%) medical records were from selected six health centers. The mean age of participants at the time of diagnosis as discordant was 26.85 years with (SD± 4.205). More than half of the index partners were in age group between 25-34 years 141 (62.1%). Only 40.9% of sero-positive female partners had an educational level of secondary school and above and 26% had no formal education. Regarding to employment status, around 95 (41.9 %) of the participant were unemployed at the time of diagnosis (Table 1).

Table 1: Socio-demographic characteristics of index partners tested in PMTCT unit of Addis Ababa selected public health institutions, from September 2013 to September 2018 (n=227).

Characteristics	Category	Frequency	Percent (%)
Institution Type	Hospital	84	37
	Health Center	143	63
Age group	18-24	70	30.8
	25-34	141	62.1
	>34	16	7
Educational status	No education	59	26
	Primary	75	33
	Secondary	55	24.2
	Tertiary and above	38	16.7
Religion	Orthodox	120	52.9
	Muslim	52	22.9
	Catholic	24	10.6
	Protestant	31	13.7
Employment Status	Employed	128	56.4
	Un employed	95	41.9

5.2. Treatment related characteristics of the index partners

About 102 (44.9%) of the index partner had late ART initiation. About, 187 (82.4%) of the index partner showed good ART adherence and 7(3.1%) of the participant had poor ART adherence. Regarding to condom use, the number of a discordant couple who had consistent condom use, inconsistent condom use, and not use condom were nearly similar in frequency (Table 2).

Table 2: Treatment related characteristics of index partners tested in PMTCT unit of Addis Ababa selected public health institutions, from September 2013 to September 2018 (n=227).

Covariate	Category	Frequency	Percent (%)
ART initiation	Early	125	55.1
	Late	102	44.9
ART adherence	Good	187	82.4
	Fair	20	8.8
	Poor	7	3.1
Condom use	Consistent	65	28.6
	Inconsistent	55	24.2
	Not use	59	26

5.3. Health status related characteristics of the index partners

Nearly half 118 (52%) of them had CD4 count of ≥350 cells/ul. Regarding to last WHO clinical staging of HIV, more than half 143 (63.0%) of the index partner were WHO stage I. Stage III and Stage IV accounts 16 (7.0%) and 5(2.2%), respectively. A about 21(9.3%) of the index partner had a history of sexually transmitted infection while they are in discordant relationship, though a specific type of STI were not indicated. About 37(16.3%) of sero-positive female partner developed opportunistic infections (Table 3).

Table 3: Health status related characteristics of the index partners tested in PMTCT unit of Addis Ababa selected public health institutions, from September 2013 to September 2018.

Covariate	Category	Frequency	Percent (%)
STI	No	206	90.7
	Yes	21	9.3
OI	No	190	83.7
	Yes	37	16.3
CD4 count at diagnosis	≥350	118	52
	200-350	71	31.3
	≤200	38	16.7
Last CD4 count	≥350	165	72.7
	200-350	37	16.3
	≤200	25	11.0
WHO HIV stage at diagnosis	Stage I	125	55.1
	Stage II	79	34.8
	Stage III	16	7.0
	Stage IV	7	3.1
Last WHO HIV stage	Stage I	143	63.0
	Stage II	63	27.8
	Stage III	16	7.0
	Stage IV	5	2.2

5.4. Fertility desire of HIV discordant couples

Among HIV positive discordant women, nearly one-third 68(30.0%) of them had one or more history of pregnancy while they are in discordant relationship.

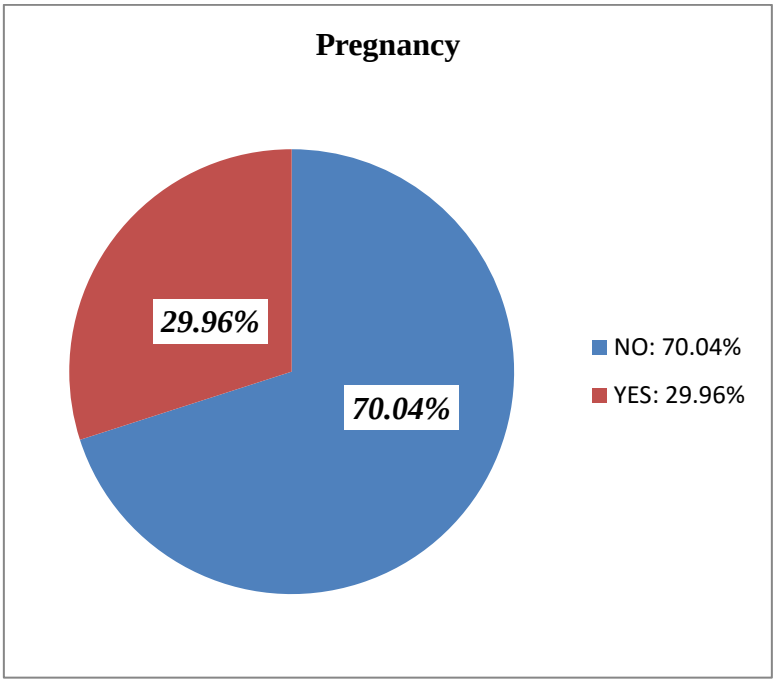


Figure 3: Fertility desire of HIV discordant couples tested in PMTCT unit of Addis Ababa selected public health institutions, from September 2013 to September 2018.

5.5. Male partner personal behavior related characteristics

Partner profile of sero-positive women showed that 21(9.3%) of their sero-negative partners used alcohol. Regarding to substance use 15 (6.6%) of sero-negative partners use substances like chat and/or cigarette (Table 4).

Table 4: Male partner personal behavior related characteristics, from September 2013 to September 2018.

Covariate	Category	Frequency	Percent (%)
Alcohol use	No	198	87.2
	Yes	21	9.3
Substance use	No	211	93.0
	Yes	15	6.6

5.6. Follow up duration of the study participants

Nearly a quarter 57(25.1%) of participants were had follow-up duration of >24-36 months. A minimum number of participants 33(14.5%) and 34(15%) were enter to the study in the first and last year of follow-up time. In the first, second, third, fourth and fifth year of follow-up 10, 11, 7, 5, and, 5 male partners experienced sero-conversion, respectively (Table 5).

Table 5: Follow up duration of sero negative male partner, from September 2013 to September 2018.

Follow up duration	Frequency	Percent (%)	No of sero-conversion
>3-12 months	33	14.5	10
>12-24 months	54	23.8	11
>24-36 months	57	25.1	7
>36-48 months	49	21.6	5
>48-60 months	34	15	5
Total	227	100	38

In the overall five-year cohort 38(16.7%) sero-conversion were observed and most of sero-conversion occur at the first two year of discordant relationship.

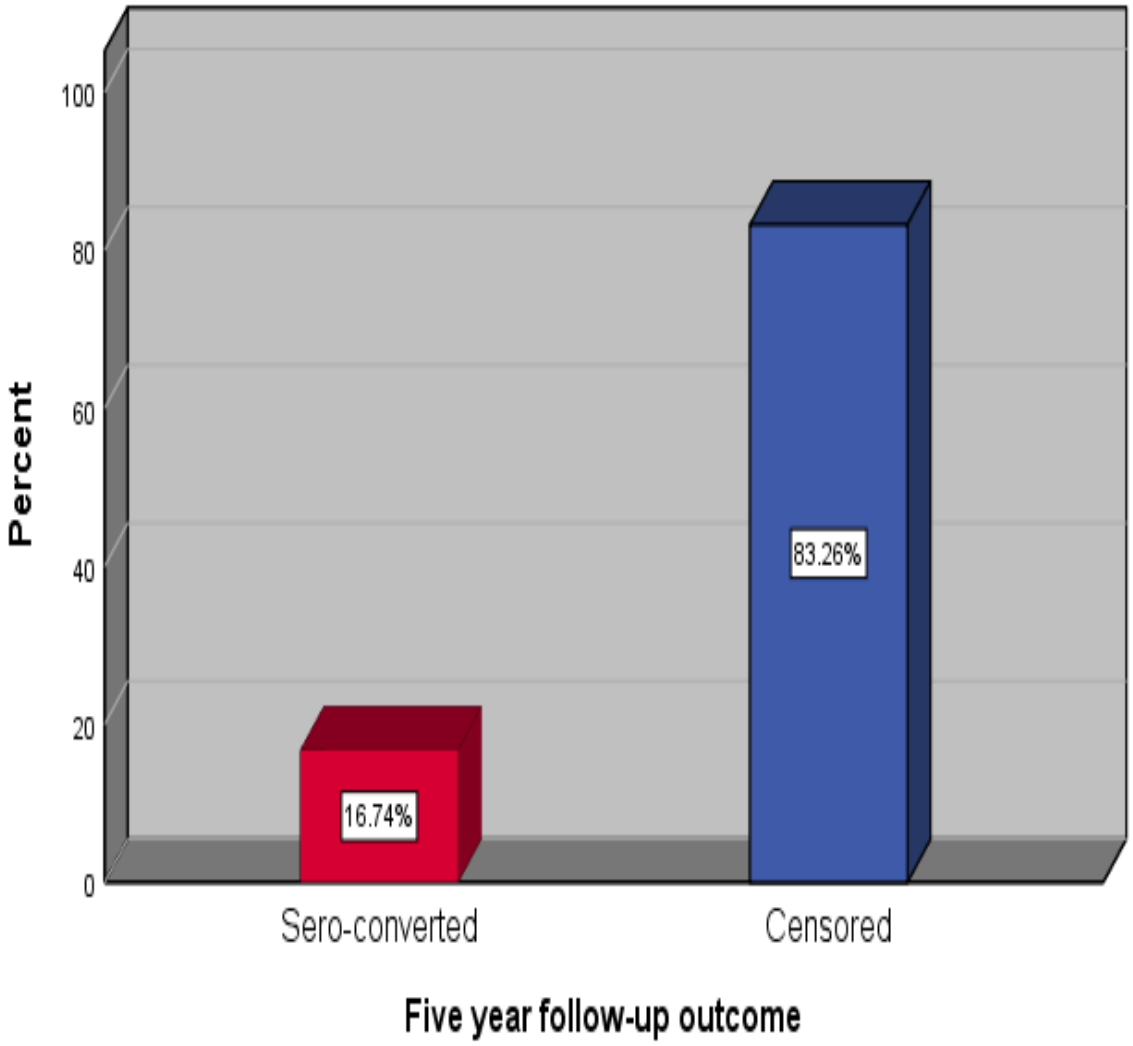


Figure 4: Over all five-year sero-conversion among 227 sero-negative male partners living with HIV positive women from September 2013-september 2018.

5.7. Sero-conversion status of sero-negative male partners

A five-year retrospective cohort with median follow up time of 32 month was undertaken among 227 sero-negative male partners living with HIV positive female partners. The overall sero-conversion rate in the cohort during the 7156 person-years of observation (PYO) was 6.4 per 100 (95% CI: 0.0038639- 0.0072979) person-years follow up. Equality of survival curves for the presence of any significant differences in survival time among various categorical variables was tested by Log-rank test. Significant evidence of differences in survival times was indicated by the Kaplan-Meier analysis. ART initiation, CD4 count, condom use, and desire of pregnancy were the major predictor variable showed significant sero-conversion time difference in the Kaplan-Meier estimation.

The graph below shows, as follow-up time increases the risk of HIV transmission from sero-positive partners to their sero- negative partner increases. This implies that, the probability of living as discordant in all lifetime decreases as time increase with the influence of various predictors (figure 5).

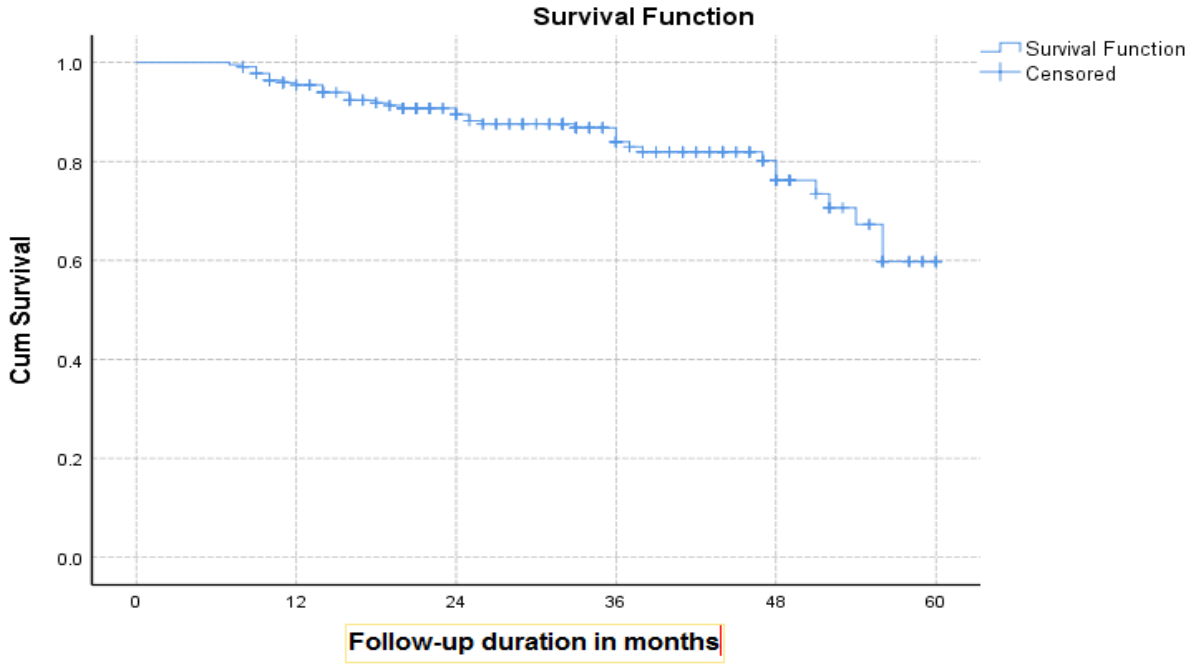


Figure 5: Kaplan-Meier estimation of survival functions of sero-negative male partners living with HIV positive women in Addis Ababa public health institutions from September 2013 to September 2018.

5.8. Predictors of HIV sero-conversion in male sero-negative partners

In bivariable cox regression analysis, age group, educational status, employment status, time of ART initiation, condom use, CD4 count, STI, presence of pregnancy and alcohol use were all associated predictor of HIV sero-conversion among sero-negative male partners living with sero-positive women (P <0.05). Predictors with p-value of <0.25 in bivariable analysis were included to multivariable cox regression analysis and four variables were associated with HIV sero-conversion. Time of ART initiation, condom use, last CD4 count, and presence of pregnancy were significantly associated predictors (P <0.05).

Delay in ART treatment initiation among HIV positive woman increases the risk of HIV transmission by 2.5 times to their sero-negative partner than early ART treatment initiation (AHR=2.551, 95% CI: 1.009- 6.451). Regarding to condom use, inconsistent condom use and not use condom were 4.6 and 4.3 times more risk for sero-conversion in sero-negative male partners than consistent condom use (AHR=4.665, 95% CI: 1.593- 13.659) and (AHR=4.346, 95% CI: 1.633-11.571), respectively. Regarding to CD4 count, last CD4 count of index partner ≤ 200 cells/ul was 3.1 times more risk for sero-conversion in sero-negative partner than last CD4 level of >350 cells/ul (AHR=3.121, 95% CI: 1.204- 8.091). The risk of HIV sero-conversion among sero-negative male partners was 4 times higher when the positive partner had one or more history of pregnancy in their discordant relationship as compared to positive partner who had no report of pregnancy throughout their discordant relationship (AHR=4.061, CI: 1.696- 9.722)(Table 6).

Table 6: Predictor of sero-conversion among male partners living with HIV positive women tested in PMTCT unit of Addis Ababa selected public health institutions, from September 2012 to September 2018 (n=227).

Predictors	Bivariable CHR (95% CI)	Multivariable AHR (95% CI)	P-Value
Age-group			
18-24	1	1	
25-34	0.355 (0.180 - 0.700)	0.637(0.284 - 1.429)	0.274
>34	0.559 (0.186 - 1.679)	3.401(0.798 - 14.497)	0.098
Educational status			
No education	1	1	
Primary	0.396 (0.175 - 0.896)	0.765 (0.275 - 2.132)	0.609
Secondary	0.474 (0.214 - 0.1.051)	1.212 (0.405 - 3.627)	0.731
Tertiary &above	0.266 (0.077 - 0.913)	0.467 (0.105 - 2.073)	0.316
Employment Status			
Employed	1	1	
Un employed	2.089 (1.096 - 3.983)	1.648 (0.734 - 3.701)	0.226
ART initiation			
Early	1	1	
Late	4.697(2.220 - 9.935)	2.551 (1.009 - 6.451)	0.048*
Condom use			
Consistent use	1	1	
Inconsistent use	2.486 (1.077 - 5.740)	4.665 (1.593 - 13.659)	0.005*
Not use	4.065 (1.831 - 9.027)	4.346 (1.633 -11.571)	0.003*
STI			
No	1	1	
Yes	2.427 (1.010 - 5.832)	1.938 (0.669 -5.611)	0.222
Initial CD4 count			
≥ 350cells/ul	1	1	
200-350 cells/ul	2.242 (0.995 - 5.050)	1.420 (0.499 - 4.043)	0.512
≤ 200 cells/ul	4.012 (1.777 - 9.061)	1.392 (0.496 -3.904)	0.530
Last CD4 count			
≥ 350cells/ul	1	1	
200-350	3.474 (1.542 - 7.823)	1.923 (0.638 - 5.793)	0.245
≤ 200 cells/u	7.310 (3.474 - 15.382)	3.121 (1.204 - 8.091)	0.019*
Pregnancy			
No	1	1	
Yes	5.207(2.579 - 10.514)	4.061 (1.696 - 9.722)	0.002*
Alcohol			
No	1	1	
Yes	2.382 (1.046 - 5.424)	2.203 (0.798- 6.085)	0.127

* -Significantly associated in multivariable cox analysis

5.9. Testing proportional hazard assumptions

A Cox regression model was used to examine the effects of predictors on sero-conversion rate. The following variables were included in the model as predictors: Age-group, Educational status, Employment Status ART initiation, Condom use, STI,OI, Initial CD4 count, Last CD4 count, Last WHO stage, Pregnancy, substance use and Alcohol use. Schoenfeld residual (phtest) test was conducted to assess the proportional hazard (PH) assumptions of the Cox model for given predictor variables. The findings indicated that all variable included in the model were satisfy PH assumptions (p-value>0.05). Overall model tested with Global phtest and fitted at p-value of 0.3948 (Table 7).

Table 7: Schoenfeld residual (phtest) test assessing proportional hazard assumptions

Predictors	**Rho**	**Chi-square test**	**df**	**p-value**
Age group	-0.13263	1.07	1	0.3016
Education status	-0.04894	0.12	1	0.7290
Employment status	-0.07012	0.26	1	0.6116
ART Initiation	-0.23743	1.73	1	0.1889
ART Adherence	0.05327	0.16	1	0.6909
Condom use	0.17772	1.57	1	0.2106
STI	-0.04820	0.09	1	0.7627
OI	-0.17624	-2.00	1	0.1570
CD4 at diagnosis	-0.14951	1.09	1	0.2970
Last CD4 level	-0.16134	1.20	1	0.2736
Last WHO HIV stage	-0.00527	0.00	1	0.9733
Pregnancy	0.04761	0.14	1	0.7083
Alcohol use	0.24146	3.24	1	0.0718
Substance use	-0.21975	1.97	1	0.1610
Overall model/Global test		**14.76**	**14**	**0.3948**

Key: rho-the correlation coefficient between the residuals and time.

STI-Sexually transmitted infection. **OI**-opportunistic infection. **df**- degree of freedom.

5.10. Qualitative data Result

5.9.1. Socio-demographic characteristics of the participant

Among 13 participants, three of the participants were experienced HIV sero-conversion and 11 of them were in sero- negative status. The age of participant in the study ranges from 27 - 40 years. The participants educational status were from grade three to degree level, and there monthly income ranges between 1500-5000ETB. Important concepts identified and organized in to 33 codes based on the interview. Conceptually similar codes further organized in to four themes. **Theme I**: male partner perception and challenges in discordant result. **Theme II:** Condom use. **Theme III:** protection measures & reason for sero-conversion, and **Theme IV:** Substance use & sexuality.

Table 8: Socio-demographic characteristics of the in-depth interview participants.

Participants	**Characteristics**					
	Age	Education	Employment	Income in ETB	HIV status	Duration in relationship
1	30	Grade-4	Factory site	1000	Negative	3 year
2	32	Grade-12	Merchant	3000	Negative	5 year
3	29	Grade-8	Construction site	2000	Positive	1-year
4	31	Grade-10	Car driver	3000	Negative	4 year
5	32	Diploma	Construction site	2000	Positive	1-year
6	34	Grade-10	Merchant	3000	Negative	2 year
7	28	Degree	Manager	3000	Negative	5 year
8	40	Diploma	Data clerk	2500	Negative	5 year
9	29	Grade-10	Car driver	2500	Negative	3 year
10	27	Degree	Merchant	3500	Negative	4 year
11	28	Grade-3	Factory site	1500	Negative	5 year
12	27	Grade-10	Hostess	1500	Negative	4 year
13	32	Degree	Teacher	3000	Positive	2 year

Table 9: The lived experience of male partners living with HIV positive woman tested in PMTCT unit of Addis Ababa public health institutions.

Themes	Sub-themes	Codes
Themes I: Perception and Challenges	Perception towards discordant status	• New thing, not known • Resistance of sero-negative partner • Will of God, not known • The virus may be hidden
	Challenges experienced by male partners	• Decrease love and trust in relation • Feel hopeless, carelessness & lose confidence • Fear of HIV transmission • Deciding to live together • Fertility desire-doctor not advice clearly • Keep it confidential from society-fear of discrimination. • Lack of special support method in health institutions
Theme II: Condom use	Reason for Inconsistent use/ not use condom	• Desire of fertility • Discomfort in condom use • Absence of condom at home • Being hopeless and carelessness • Perceive as HIV resistant • Culturally and religiously not support
	Use condom consistently	• To prevent HIV transmission • Dr. advice to use consistently • The wife pushes to use it
Theme III: Protection activity &reason for seroconversion	Protection measures taken by sero-negative partners	• Live together without sexual relation • Use condom during sex • Use sharp materials individually • Taking ART medicine appropriately (index partner) • Try to avoid any blood contact
	Possible reason for sero-conversion	• Desire of pregnancy • Not known .may be increased viral load • Knot known.it is a will of GOD
Theme IV: Substance use & sexuality	Substance use	• Use chat-no effect on sexuality • Use alcohol in holidays & rest day with limit • Drink alcohol to be free from stress
	Sexuality	• No sexual r/ship-live together to grow child • Decreased desire for sex • Sexual r/ship continue as usual

Theme I: Perception and challenges

Perception of male partners about their discordant status

Some of the IIP (in-depth interview participant) reports that, discordant result may be due to resistance of negative partner or the virus may be hidden until it become detectable. Most of the participants perceive discordant result in a couple as new things and as it is a will of God. (participant-7) stated as; *''I have no idea about discordancy. I heard from other people that, some blood type are resistant for HIV and this may the reason but I do not know the exact reason.''*

Challenges experienced by male sexual partner of HIV positive woman

All of the participants report various challenges experienced in their life because of their discordancy status. After the couple knows their status, most of sero-negative male partner passes through dilemmatic situation to decide on future life, to maintain the relationship or to divorce. The major reason for divorce was fear of HIV transmission, lose trust, and love from the positive partner. Lack of special support for sero-negative partners and desire of fertility were other challenging situation that sero-negative partners experienced. Most participants report, as they need clear information about the fate of their future fertility but they challenged to get clear information even in the health workers. All most all of sero-negative sexual partners of HIV positive woman experienced hopelessness, carelessness and lose confidence. This is mainly due to poor support mechanism and their concern about their luck. As stated by IIP respondents: *''I faced a lot challenge to decide to live together or to divorce with my HIV positive wife. Especially it was difficult in the first six month of our discordant diagnosis.'' (Participant-7). ''The very sensitive issue is to have or not to have a child. Sometimes I decide to have a child with the help of God, but I become restless when I think the fate of my child. Our child may scarify by our luck." (Participant-1)*

''I feel as I am unlucky 'እድለቢስ' in my life. I became hopeless and careless in my life. I am not happy in all my life. I simply live for only my child. I have three children one male and two female children. I became carless in all things.'' (Participant-8)

Theme II: Condom use

Few participants report consistent condom use. Positive partner influence, doctors' advice to use condom, and fear of transmission were the major reason of consistent condom use as

mentioned by the participants. However, some of the participant use condom inconsistently and some not use condom totally during their sexual relationship.

Cultural, religious, desire of fertility, absence of condom at hand during sex, discomfort in condom use, perception of HIV resistant, feeling of carelessness, and hopeless were major reasons reported by the participant to use condom inconsistently or not to totally.

''I use condom inconsistently. Sometimes we have sexual intercourse without condom. This is mainly because condom absenteeism in our home when we are ready for sexual intercourse. I feel hopeless and most of my life is unplanned."(Participant-10)

''I never used condom. She is my wife, if God keeps me the condom is not above the God .The doctor advises me to use condom but I am not happy to use it .I discussed with my wife to give all our life for Jesus Christ.'' (Participant-7)

Theme III: Protection measures taken by male partner and reasons for sero-conversion

Some of the participant had similar measure of protection to prevent transmission of HIV from their positive partners. They report condom use, individualized sharp materials, taking ART medicine appropriately, and avoiding blood contact as common measure of protection. Most of sero-negative partners focus on the health of their child other than themselves. Inconsistent use of ART treatment is also among the report of the participant and this is mainly by two reasons. First, the index partner prefers holy water by ignoring the medicine. The second is fear of social discrimination. Social life and presence of other individual at home leads to discomfort to take the medicine.

''Sometimes, my wife become carless and she missed the medicine. Especially if there is social life or other individual at our home, she missed the pill to make it confidential by fear of social discrimination.'' (Participant-5)

A among 13 participants, three of them were sero-converted partner. Desire for pregnancy and inconsistent condom use were mentioned possible cause of sero-conversion, though difficult to know the exact reason. The other report, as he don't know the reason of sero-conversion, simply he considered as it is a will of God.

''It is difficult to be sure. I use condom consistently and I guess the reason for my infection may be our sexual contact with out condom for the purpose of pregnancy.'' (Participant-13)

Theme IV: Substance use & sexuality experience

Male partner's substance use:

Most of the respondents were not substance dependent. Some of them use alcohol and chat during holidays and special days. Some of the participant report alcohol use to be free from stress when they encountered stress. All of them report as they drink with limited amount and as it had no any effect on their sexual life and condom use.

''I have no substance dependency and I drink alcohol some times. I used alcohol to avoid stress in my life, when I become full of stress. I do not remember any event that the alcohol intoxication disturbs my sexual life and condom use." (Participant-9)

Sexual life of sero-negative male partners living together with HIV positive woman

Some of sero-negative partners had decreased sexual initiation due to their psychological trauma, and lose of happiness and love in their partnership due to the occurrence of discordancy result. Some of the participant report as they continue as usual, in a normal sexual relationship. Surprisingly, one partner report that, they live together without sexual relationship simply to help each other and to grow the child. This is mainly due to fear of HIV transmission and lose of interest.

''*We have no sexual contact after we knew our discordant result. We live together simply to help each other and to care for the child.'' (Participant-8)*

''It is not easy to think the event. Sometimes I feel bad as I lose something in my life. I feel discomfort, after I knew our discordancy result. We have sexual contact but I do not know the reason my sexual desire not the same as before.'' (Participant-1)

6. **DISCUSSION**

This study aimed to assess rate of HIV sero-conversion and predictors among sero-negative male partners living with HIV positive women. Accordingly, the overall HIV sero-conversion rate among sero-negative male partners was 6.4-per100 person-year follow-up. This study finding showed that, discordant couples play a great role to increase the incidence of HIV. This finding is in line with a study done in Lusaka, Zambia (25) and Masaka, Uganda (39). On the other hand, sero-conversion rate of this study was lower than the studies done in china (35, 36). This difference might be due to sample size difference and ignorance of sex variable in this study. In other way, this might be due to HIV discordant prevalence and socio-economic difference between china and the study area of this study.

Inconsistent condom use and not use condom during sex among discordant couples showed high risk of HIV transmission from sero-positive women to their sero-negative partners. The finding of this study showed similarity with a study done in China(38). Condom block the entrance of viral particle to the negative partner and it also prevent STI, which further increase the risk of HIV transmission by making genital laceration (44). However, not use condom and inconsistent condom use was explored from the in-depth interview. This is mainly because of several reasons like desire of fertility, discomfort in condom use, and perception of resistant. Absence of condom at hand during sex was the other reason for inconsistent condom use during sex, this is because of that, being carless, and hopples leads to unplanned life. Others report, as condom is not allowed culturally and religiously. This evidence showed similarity with a qualitative study done in Jimma, Ethiopia (29), and Addis Ababa, Ethiopia(30).

Regarding to CD4 count, index partners CD4 count of ≤ 200 cells/ul showed high risk of HIV transmission from sero-positive women to their sero-negative partners compared to CD4 count of ≥ 350cells/ul. CD4 count gets lower when the viral load increases. Low viral load among the index partner showed less risk of HIV transmission to their negative partners. This finding shows similarity with studies done in Chin (33, 38). Some index partners discontinued their ART drug for several reasons. Preference of holy water and fear of discrimination during social life were explored reasons from the interview. Discontinuation of ART drug increase the viral load in the index partner and this further increase the risk of HIV transmission to the sero- negative partners (44, 48).

Late ART treatment initiation (CD4 count <350cells/ul) of the index partner showed higher risk of HIV sero-conversion among sero-negative partners than early initiation of ART treatment. Early initiation of ART treatment controls the virus replication and enhances the positive partner CD4 level. Therefore, the survival time of sero-negative partners increased by early initiation of ART treatment (18, 44, 48).

The finding of this study showed that, desire of pregnancy in discordant couple increases the risk of HIV transmission to their sero-negative partner. This is mainly because of that, desire of pregnancy leads to sexual intercourse without condom. Scientific reports support that, pregnancy desire in discordant couple must be considered under medical advice by considering the viral load. The finding of this study supported by a studies done in Kenya(53), and Zambia(52).This finding is supported by the qualitative in-depth interview. Discordant couples challenged a lot by desire of fertility and some couple experience sexual intercourse without condom for the purpose of pregnancy. *"It is difficult to be sure. I used condom consistently when I was HIV negative, but after two year, we decided to have a child and we experience sexual intercourse. I guess the reason for my infection may be our sexual contact with out condom for the purpose of pregnancy. I simply accept it as a will of God*." (Participant-13). This finding is comparable with qualitative studies done in Addis Ababa, and Jimma, Ethiopia. (29, 30, 40).

Sero-negative male partners living with HIV positive women experienced several dilemmatic issues in their life. Deciding to continue with their relationship, fertility desire, lack of special support method, fear of discrimination, fear of HIV transmission, hopelessness, and lose confidence were major life challenges explored from the in-depth interview. Some sero-negative partners experienced decreased initiation for sexual relationship. Discordant result by itself cause psychological trauma on the partner and this further affect sexual initiation of sero-negative partners. On the other hand, sero-negative partners loses their happiness, hop and love because of the event and this also affect sexual initiation of the negative partners. The reports explored from the interview showed consistency with a qualitative study's done in Addis Ababa, Ethiopia (40, 54).

7. LIMITATION AND STRENGTH OF THE STUDY

7.1. Strength of the study

- The study supported by a qualitative data through in-depth interview.
- The data-extracting checklist was adapted from the national ART follow-up chart.

7.2. Limitation of the study

- Sero-negative partner related characteristics not included in the study.
- Selection bias is possibly introduced, most of charts excluded by exclusion criteria.
- Recall bias during phone call and medical recording problem may affect the quality of data.
- Comparison of findings with other finding was difficult; there was no similar literature in our country.
- Ignorance of sex variable, focused on PMTCT, it was difficult to get discordant diagnosis time other than PMTCT unit. Some literatures show higher transmission of HIV from male to female partners than female to male partners.

8. CONCLUSION

The overall rate of sero-conversion among sero-negative male partners was 6.4-per100 person-year follow-up. The risk of HIV transmission from sero-positive partner to sero-negative partner is poorly controlled. Sero-negative partner in discordant couple can be sero-positive at any time with influence of predictors. Last CD4 count, condom use, time of ART treatment initiation, and fertility desire (presence of pregnancy) were significantly associated predictors and should be emphasized in the health care system to reduce the risk of viral transmission. Sero-negative partners in discordant couples passes through challenging and dilemmatic life situation. Therefore special support method and counseling approach should be one of the strategies to hinder HIV transmission among discordant couples.

9. **RECOMMENDATION**

Based on the findings of this study, the following recommendation have been forwarded for the Ministry of health, Addis Ababa health office and different NGO‘s working on HIV AIDS especially on management of discordant couples.

- Consistent condom use, early initiation and continuous use of ART among index partners should be encouraged and supported by improved counseling service.
- Fertility desire among discordant couple should be supported by medical advice by considering the viral load to reduce the risk of HIV transmission.
- Regular follow up strategy should be strengthen for sero-negative partners of discordant couples to reduce the risk of HIV transmission and to enhance the survival time of sero-negative partners.
- Special support and counseling strategy should be developed for sero-negative partners of discordant couples. Hence, they experienced many dilemmatic issues in their life.
- Further prospective design studies are recommended by including sero-negative partner related characteristics and by addressing the limitation of this study.

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11. **ANNEXES**

Annex I: Information Sheet

Title of the Research

Rate of HIV sero-conversion among sero-negative male partners living with HIV positive women in Addis Ababa, Ethiopia, 2019.

Name of the Organization: Addis Ababa University, college of health science, school of nursing and midwifery

Name of the Sponsor: Addis Ababa University

Objective of the study: To assess rate of HIV sero-conversion and predictors among sero-negative male partners living with HIV positive women in Addis Ababa, Ethiopia, 2019.

Significance of the study: the study will identify predictors of HIV seroconversion among discordant couples and this will guide stakeholders to reduce seroconversion and new HIV incidence, to work on prevention method, to reduce socio-economic impact of HIV and lastly to support partnership of discordant couple by reduce the risk to negative partners. Findings from the study will provide important information for policy makers to develop strategies, guidelines, and early prevention approach towards HIV discordant couples.

Participants to be included: HIV discordant couple tested in PMTCT unit of selected Hospitals and health centers in Addis Ababa.

Procedure: In order to achieve the above objective, all necessary information for the study will be taken from the medical and HMIS record of HIV positive women tested and recorded in PMTCT unit from September 2013- September 2018. In- depth interview will be done in sexual partners of HIV discordant mothers for qualitative part. Chart review checklist and interview guide will be used to collect the data from February 20 - May 27, 2019. There will be a phone call to participants by ART adherence office to collect information on some variables and incomplete data.

Risks and Benefits of the study

Risks and /or Discomfort: The study will be conducted by taking necessary information from the medical chart, so, it will elicit any harm on the client. The name and other identifying information will not be recorded and the information taken from the chart will kept strictly in a confidential manner. The information retrieved will only be used for the study purpose and has

no harm or discomfort on a client. The in-depth interview also has no any type of trauma, and you will not be forced to respond to the information you do not know.

Benefits: the research has no direct benefit or a payment for those whose document/ record is reviewed and participate in the in-depth interview in this research. However, the study has indirect benefit for the participant and other HIV discordant clients, since, the study will identify potential predictors for HIV seroconversion, and the recommendation based on the finding will help stakeholders and policy makers to work on the prevention and follow up approaches.

Confidentiality: All information collected for the research purpose will be kept confidential and cannot be accessible to any third party. Name of the participant will not register on the checklist to assure confidentiality of participants.

In case you want to know more information about the research and its undertakings, you can contact by the following address listed below.

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Advisor:

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E-Mail: leul.deribe@gmail.com

2. Haweni Adugna (BSc, MSc) Mobile: +251911340112 E-Mail: haweniia@gmail.com

Permission: Lastly but not least, you are kindly requested to permit and forward your permission to concerned body in your organization so that the researchers can get cooperation from the data clerks and other responsible bodies in place.

Annex II: English version chart review checklist

Data extraction checklist to assess rate of HIV Seroconversion and predictors among sero-negative partners of HIV positive women tested in PMTCT unit of Addis Ababa public health institutions from February 20 - May 27, 2019.

1. Data abstractor name: _____ phone no: _____

3. Date of abstraction: _____

4. Questionnaire code number: _____

Part I: Socio demographic characteristics				
101	Type of institution	0. Hospital 1. Health center	Skip	Not recorded
102	Age of the participant	_____		
103	Educational status of index partner	0. No formal education 1. Primary 2. Secondary 3. Tertiary and above		
104	Religion of the index partner	0. Orthodox 1. Muslim 2. Catholic 3. Protestant 4. Other		
105	Occupation of the index Partner	0. Governmental employee 1. Private Employee 2. Self-employed 3. Unemployed		
Part II. Follow up outcome of discordant couple				
201	Duration of follow up (first HIV discordant test to the last follow-up record)	0. 3 month- 1 year 1. >1-2 year 2. >2-3 year 3. >3-4 year 4. >4-5 year		
202	Is the partner HIV+ or had seroconversion?	1. Yes 0. Censored (no)		
203	IF Q202 yes; When HIV seroconversion occur after diagnosed as discordant	first DX as discordant: D/_____M/____Year/_____ Time of diagnosis as HIV+: D/_____M/_____Year____ Duration in month: _____		
Part III. Index partner treatment related predictor				
301	Time of ART initiation	0. Early 1. Late		

302	ART adherence	0. Good 1. Fair 2. Poor		
303	Condom use of the couple	0. Consistent condom use 1. Inconsistent condom use 2. Not use		
	Part IV. Index partner health status related predictor			
401	Presence of sexually transmitted infection	0. No 1. Yes	If no go to 403	
402	If Q401 is yes and identified, list type of STI	_____		
403	Presence of Opportunistic infections	0. No 1. Yes	If no go to 405	
404	If Q403 is Yes and identified, list type of OI	_____		
405	CD4 count at diagnosis as discordant	0. ≥ 350cells/ul 1. 200-350 cells/ul 2. ≤ 200 cells/ul	If Partner HIV + Skip	
406	Last CD4 count in follow up period	0. ≥ 350cells/ul 1. 200-350 cells/ul 2. ≤ 200 cells/ul	If Partner HIV + Skip	
411	WHO clinical HIV Stage of index partner at diagnosis as discordant	0. Stage I 1. Stage II 2. Stage III 3. Stage IV	If Partner HIV + Skip	
412	Last WHO clinical HIV Stage of index partner in follow up period	0. Stage I 1. Stage II 2. Stage III 3. Stage IV	If Partner HIV + Skip	
	Part V. Behavior related predictors			
501	Presence of Pregnancy after diagnosed as discordant			
502	Alcohol use	0. No 1. Yes		
503	Substance Use	0. No 1. Yes		
504	If Q503 is' yes' and identified what type of substance used	0. Chat 1. Smoking 2. Other _____		
	Supervisor name: _____ Signature:_____			

Annex III: English version in-depth interview guide for qualitative part

Rate of HIV sero-conversion and predictors among sero-negative male partners living with HIV positive women in Addis Ababa, Ethiopia, 2019.

Consent form:

My name is ----------. I am MSc student in Addis Ababa University, College of Health Sciences, School of Nursing, and Midwifery. I am conducting a study on Rate of HIV seroconversion and predictors among sexual partners of HIV discordant mothers tested in PMTCT unit of Addis Ababa public health institutions. The study aims to identify rate of HIV seroconversion and its predictor among sero-negative male partners living with HIV positive women and you may play your role for the benefit of the society by participating in this study. The result of the study will be important to enhance the survival time of a negative partner in discordant couple by identifying potential factors. Moreover, the result also expected to provide a recommendation to stake holders work on prevention and follow- up strategies of HIV discordant couples. By participating, you will contribute to improvements in care given for discordant couples. Any information you provide will be kept confidential. Your name will not appear on the interview guide. Any information you provide will not be used against you. Your responses will not bring any harm to you and will not affect your job. If you decide to participate in the study, I will interview you for 30-40 minute in related to your lived experiences in discordant relationship.

You are free to choose whether you wish to participate.

Do you agree in this study?

No, thanks!

Yes, Thanks! Conduct the interview

1. Interviewer name _____
2. Interviewer phone no _____
3. Date of interview _____
4. Identification code _____

I. Socio demographic information:

How old are you (age in completed years)? _____

What is your occupation? _____

What is your Religion? _____

Where is your residency? _____

What is the highest educational level you completed?_____

Average monthly income? (Eth. Birr) _____

Date of diagnosis as discordant? Date _____month _____Year_____

What is your HIV status now? 1. HIV+ (seroconverted) 2. Sero- negative

IF HIV+, date you became HIV positive? Date _____month _____year_____

II. What is the Lived experience of sexual partners of HIV discordant mothers tested in PMTCT unit of Addis Ababa public health institutions?

1. How do you understand discordant result and HIV transmission from HIV positive partner to negative partner?

- How do you understand discordant result in a couple?

Probe on: -What is your feeling in living with discordant status_____

- Challenges of discordant result in partnership, can transmit to partners_____

-Challenges discordant result in all life aspect_____

2. Current HIV status and related lived experiences;

-If you are HIV positive, what predisposing factor do you consider for your HIV seroconversion?

-Blood contact? _____ -Sharing of sharp materials?_____

Probe on: -Body fluid contact? _____ -Sexual intercourse?_____

-Not use condom? _____ -Condom tear? _____

-Other possible factors_____

If you are HIV negative until now:

-What is your experience in prevention method of HIV?_____

3. Experience of condom use

What is your experience in condom use as discordant couple? (If HIV -ve)

How was your experience in condom use before you became HIV positive? (If HIV +ve)

-consistent condom use _____

-sometimes, why?_____

Probe on -not use, why?_____

-condom tear during sex?_____

4. Have you experience of substance use while you are in discordant relationship like:

Probe on: -Alcohol_____, smoking_____, Chat_____

-Other?_____

If Yes, contribution of the substances for your current status_____

5. Health status:

-How was your health status before you became HIV positive? (IF HIV+ve)

-How was your health status throughout your discordant status?

No health problem_____

Probe on: History of STI_____

History of OI_____

Did you had other diseases_____

6. How was your sexuality experience with your partner?

Probe on: -Did you have sexual intercourse after you aware your discordant result?_____

-Desire for pregnancy _____

-Presence of pregnancy_____

-Number of sex per week/month_____

-Is it safe and with cooperative with your partner_____

Annex IV: Amharic version information sheet & consent form for qualitative part

የመረጃ መስጫ እና ስምምነት ቅጽ (ውል)፡-

በአዲስ አባባ ከተማ አስተዳደር ስር በሚገኙ የመንግስት ሆስቢታሎችና ጤና ጣቢያዎች በተመዘገቡ እና ክትትል በሚያደርጉ የተለያየ የኤችአይቪ ውጤት ባላቸው ጥንዶች የኤችአይቪ ከሚስቶች ወደ ትዳር አጋራቸው የመተላለፍ መጠን እና ተጽዕኖ የሚያሳድሩ ነገሮችን ለመለየት የተዘጋጀ መጠይቅ፡፡

የጥናቱ ባለቤት ፡- ቀረብህ አበረ

የጥናቱ ርእስ፡- በአዲስ አባባ ከተማ አስተዳደር ስር በሚገኙ የመንግስት ሆስቢታሎችና ጤናጣቢያዎች ኤችአይቪ ከእናት ወደ ልጅ እንዳይተላለፍ ቅድመ መከላከል ውስጥ በተመዘገቡ እና ክትትል በሚያደርጉ የተለያየ የኤችአይቪ ውጤት ባላቸው ጥንዶች የኤችአይቪ ከሚስቶች ወደ ትዳር አጋራቸው የመተላለፍ መጠን እና ተጽዕኖ የሚያሳድሩ ነገሮች

ጥናቱን የሚያሰራው ፡- አዲስ አበባ ዩኒቨርስቲ

ጤና ይስጥልኝ! ስሜ ----------ይባላል፡፡ እኔ ይህንን መረጃ የምሰበስበው በአዲስ አበባ ዩኒቨርስቲ የህክምና ሳይንስ ኮሌጅ፤ የነርሲንግ እና ሚድዋይፈሪ ትምህርት ክፍል የድህረ ምረቃ ተማሪ የማስተርስ ትምህርቴን ለማጠናቀቅ የመመረቂያ ጽሁፌን ለማዘጋጀት እንዲረዳኝ ሲሆን የጥናቱ አላማ የተለያየ የኤችአይቪ/HIV ውጤት ባላቸው ጥንዶች የኤችአይቪ የመተላለፍ መጠን እና ተጽዕኖ የሚያሳድሩ ነገሮችን ለመለየት ነው፡፡ቃለመጠይቁን ለማካሄድ ከ30-40 ደቂቃ ሊወስድ ይችላል፡፡ በጥናቱ ላይ የእርሶ ስምና አድራሻ አይጠቀስም፡፡ የሚሰጡትም መረጃ ከዚህ ጥናት አላማ ውጭ ለሌላ አካል ተላልፎ አይሰጥም ሚስጥራዊነቱም የተጠበቀ ነው፡፡ በዚህ ጥናት ላይ በመሳተፍዎ የሚደርስብዎት ጉዳት ወይም የተለየ ጥቅም አይኖርም፡፡ ነገር ግን የተለያየ የየኤችአይቪ ውጤት ባላቸው ጥንዶች መካከል የኤችአይቪ መተላለፍ እንዳይኖር በሚሰራው ስራ ጥናቱ አስተዋፆ ሊኖረው ስለሚችል የእርስዎ በጥናቱ መሳተፍ ለሌሎች ጥንዶች በጥናቱ በኩል ኢ-ቀጥተኛ አስተዋጾ ይኖረወታል፡፡በዚህ ጥናት መሳተፍ ፈቃደኛ ካልሆኑ፤ በመጠይቁ መሀል ማቋረጥ ከፈለጉ ወይንም መመለስ የማይፈልጉት ጥያቄ ሲኖር የማቁዋረጥ ሙሉ መብት እንዳሎት ልገልጽሎት እወዳለሁ፡፡ በጥናቱ ላይ ለመሳተፍ የእርሶ ትብብር እና ፈቃደኝነት በጉዳዩ ላይ የሚነሱ ችግሮችን ለመለየት እጅግ ጠቃሚ ስለሆነ በጥናቱ ላይ በፍቃደኝነት እንዲሳተፉ በትህትና እንጠይቃለን፡፡

ከላይ በተሰጠኝ መረጃ መሰረት በዚህ ጥናት ላይ ለመሳተፍ፡

ሀ. ፍቃደኛ አይደለሁም

ለ. ፍቃደኛ ነኝ፡ ፊርማ ----------

መጠየቅ የሚፈልጉት ወይም ግልጽ ያልሆነ ነገር ካለ ከታች በተጠቀሰው አድራሻ ማግኘት ይችላሉ፡፡

የጥናት አድራጊው ስም፡- ቀረብህ አበረ

ስልክ ቁጥር፡- +251918668524

ኢሜይል/email: kerebihab2015@gmail.com

የቃለ መጠይቁ መርጃ/መነሻ ጥያቄወች

-የመረጃ ሰብሳቢው ስም_____

- የመጠይቅ መለያ ቁጥር_____

-ቃለመጠይቅ የተደረገበት ቀን_____

፮. የተጠያቂው ማህራዊ እና ግለሰባዊ /ዲሞግራፊያዊ ነባራዊ ሁኔታ

-እድሜዎ ስንት ነው ?_____

-ሀይማኖትዎ ምንድን ?_____

-መኖሪያ ቦታወ የት ነው ?ከተማ/ገጠር_____

-የትምህርት ደረጃን በተመለከተ ?_____

-ስራዎ ምድን ነው ?_____

-አማካኝ ወርሃዊ አጠቃላይ ገቢ ብር(Eth. Birr) ?_____

-ከባለቤትዎ ጋር የተለያየ የኤችአይቪ ውጤት እንዳለወት ያወቁበት ቀን _____ወር _____አ.ም

-አሁን ያሉበት ደረጃ በተመለከተ? 1. በ ኤችአይቪ ቫይረስ ተይዘዋል 2. ከ ኤችአይቪ ነፃ ነዎት

-በ ኤችአይቪ ቫይረስ ከተያዙ የተያዙበት ቀን መቸ ነበር? ቀን_____ ወር _____አ.ም_____

፯. በአዲስ አባባ ከተማ አስተዳደር ስር በሚገኙ የመንግስት ሆስቢታሎችና ጤናጣቢያዎች ኤችአይቪ/HIV ከእናት ወደ ልጅ እንዳይተላለፍ ቅድመ መከላከል ውስጥ በተመዘገቡ እናቶች እና የተለያየ የኤችአይቪ ውጤት ያላቸው ጥንዶች አጠቃላይ የህይወት ልምዳቸው ምን ይመስላል?

1. በጥንዶች መካከል የተለያየ የየኤችአይቪ/HIV ውጤት መኖሩንና ወደ ሌላኛው የትዳር አጋር መተላለፉን እንዴት ይረዱታል? Probe on: -በጥንዶች መካከል በተለያየ የHIV ውጤት ውስጥ መኖሩን እንዴት ያዩታል/ይረዱታል?

-በጥንዶች መካከል በተለያየ የየኤችአይቪ/HIV ውጤት ውስጥ መኖሩ ያለው ተጽኖ እንዴት ይገልጹታል?

-በአጠቃላይ በህይወት ላይ ያለው ተጽኖና ፈተና ምን ይመስል?_____

-በጾታዊ ግንኙነት ያለው ተጽኖ_____

-በትዳር ላይ ያለው ተጽኖ፣ ወደ ትዳር አጋር ሊተላለፍ ይችላል?_____

2. አሁን የአሉበት ኤችአይቪ ሁኔታና የህይወት ልምዳቸው፡-

አሁን ኤችአይቪ በደምዎ ካለ ባይረሱ ከባለቤትዎ ወደ እርሰዎ እንዲተላለፍ አስተዋፅአ ያደረጉ ነገሮች ምንድን ናቸው ?

Probe on: -የደም ንክኪ_____ -ስለታም ነገሮችን በጋራ መጠቀም_____

- ጾታዊ ግንኙነት_____ - ኮንዶም አለመጠቀም_____

- ኮንዶም መቀደድ _____ -ከሰውነት የሚወጣ ፈሳሽ ንክኪ_____

-የማርገዝ ፍላ _____ - ሌሎች ምክናየቶች_____

-በባይረሱ ካልተያዙ ከባለቤትዎ ወደ እርሰዎ እንዳይተላለፍ ምን ጥንቃቄዎችን ያደረጉ ነበር?ለምን አልተያዙም?

3. የኮንዶም አጠቃቀም በተመለከተ

በባይረሱ ከመያዝዎ በፊት የኮንዶም አጠቃቀምዎ ምን ይመስላል/እንዴት ነበር?(If HIV+)

ከባለቤትዎ ጋር የተለያየ የኤችአይቪ ውጤት እንደመኖሩ መጠን የኮንዶም አጠቃቀምዎ ምን ይመስላል (If HIV-ve)

Probe on: -ሁልጊዜ ይጠቀሙ ነበር_____

-አልፎአልፎ ይጠቀሙ ነበር_____

-ተጠቅመው አያውቁም ነበር_____

-በመጠቀም ላይ እያሉ ይቀደድብወት ነበር_____

4. በባይረሱ ከመያዝዎ በፊት አልኮል ወይም ለሌሎች ንጥረ ነገሮች ጥገኛ ሆነው ነበር

ለምሳሌ አልኮል ፣ ሲጋራ፣ ጫት ፣ ሌሎች ካሉ_____

ከላይ የተዘረዘሩትን ነገሮች ተጠቃሚ ከሆኑ፤ በመጠቀምዎ ያሳደረብዎ ተፅኖ ምን ነበር?_____

5. የጤና ሁኔታ በተመለከተ:

-በባይረሱ ከመያዝዎ ከ 3ወር በፊት የጤናዎ ሁኔታ ምን ይመስል ነበር/እንዴት ነበር?(If HIV+)

- የተለያየ ኤችአይቪ ዉጤት መኖሩን ከአወቁ በኋላ አጠቃላይ የጤና ሁንታዎ እንዴት ነበር ?

Probe on: -ሙሉ ጤነኛ ነበሩ?_____

-የአባላዘር በሽታ ታመው ነበር/STI?_____

-ከኤችአይቪ ጋር ተያይዘው በሚመጡ በሽታወች ታመው ነበር/OI ?_____

-በሌሎች በሽታወች ታመው ነበር?_____

6. በባይረሱ ከመያዝዎ ከ 3ወር በፊት ከባለቤትዎ ጋር ያለዎት ጾታዊ ግንኙነት ምን ይመስል ነበር/እንዴት ነበር?

Probe on: -ባለቤትዎ አርግዛ ነበር?_____

-ልጅ ለመውለድ ፍላጎት/ ሙከራ ነበር?_____

-ጾታዊ ግንኙነት ያደርጉ ነበር?_____

-በሳምንት ወይም በወር ስንት ጊዜ ግንኙነት ያደርጉ ነበር?_____

-ግንኙነቱ ጥንቃቄና መተሳሰብ የተሞላበት ነበር?_____