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Fertility desire of HIV-positive men and women in public health hospitals

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Abstract

Objective: Despite the increased emphasis on antiretroviral therapy and other healthcare services for HIV-infected individuals, issues of fertility desire have received relatively little attention. In particular, little is known about actual fertility desire and determinants of fertility desires among HIV-infected women and men receiving antiretroviral therapy.

Methods: A cross-sectional study was conducted among HIV-positive individuals in public health hospitals of Addis Ababa City from 1 October to 30 November 2021. A pretested structured questionnaire was used to collect the data with a consecutive sampling technique. EpiData 4.6.2 and SPSS 25 were used for data entry and analysis. Bivariate and multivariable logistic regression analyses were done to identify factors associated with fertility desire. An adjusted odds ratio with a 95% confidence interval was computed for data interpretation. A p value of $\leqslant 0.05$ was considered to be statistically significant.

Result: Among 400 participants, 55% (95% confidence interval = 50%, 60%) have future fertility desire. Factors like age less than 35 years (adjusted odds ratio = 24.03, 95% confidence interval = 9.99, 57.83), a secondary education level (adjusted odds ratio = 2.78, 95% confidence interval = 1.21, 6.40), being married (adjusted odds ratio = 2.89, 95% confidence interval = 1.39, 5.99), being employed (adjusted odds ratio = 3.12, 95% confidence interval = 1.56, 6.24), being diagnosed with HIV in the past 1 year (adjusted odds ratio = 4.02, 95% confidence interval 2.07, 7.80) or past 2–4 years (adjusted odds ratio = 9.80, 95% confidence interval = 3.89, 26.02) have a significant association with future fertility desire. Respondents using contraceptives were 90.9% less likely to have future fertility desire (adjusted odds ratio = 0.09, 95% confidence interval = 0.05, 0.18).

Conclusion: The magnitude of future fertility desire was founded high. Further research on this topic should include qualitative studies to provide a deeper understanding of people living with HIV fertility desires.

Keywords

Antiretroviral therapy, fertility desire, people living with HIV, Addis Ababa City, Ethiopia

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Introduction

Fertility is the ability of an individual or couple to reproduce normal sexual activity. Fertility desire refers to people's intention to have more children despite having HIV or the need to have a child in the future, whereas intention refers to a determination to carry out that desire.[1] According to the HIV estimates of 170 countries (representing 99% of the global population), an estimated 37.9 million (uncertainty bounds 32.7–44.0 million) people were living with HIV in 2018. Of which 1.7 million (1.4–2.3 million) were new infections and 770,000 (570,000–1.1 million) AIDS-related deaths. New HIV infections dropped in five of the eight regions, and AIDS deaths declined in six of eight regions between 2010 and 2018.[2]

In many areas of the world, most HIV infections are transmitted sexually or associated with pregnancy, childbirth, and breastfeeding. Women of childbearing age constitute nearly half of the estimated 32 million adults living with HIV worldwide.[3] Mother-to-child transmission (MTCT) is the dominant mode of acquiring HIV type 1 in children, resulting in approximately 1800 of the 16,000 new infections occurring each day, mostly in sub-Saharan Africa. Each year, in low-resource regions such as sub-Saharan Africa, over

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half a million newborns are infected with HIV through MTCT despite increasing the desire for fertility.[4]

The advancements in HIV treatment, management, and support over the past three decades have contributed to tremendous shifts in people's lives with HIV in Ethiopia and around the world.[5] Over 80% of people with HIV are of reproductive age. As people with HIV live longer, questions regarding their potential for marriage and/or having children have become increasingly important. Furthermore, effective therapies have improved the prognosis for women infected with HIV, and these individuals are frequently considered childbearing and parenthood.[6,7]

Even though efforts were made to prevent the transmission of HIV from mother to child, studies show that 10% of infants born to infected mothers are identified as HIV infected.[8] Although, the availability of HAART and interventions for the prevention of MTCT (PMTCT) in most countries has markedly changed the life prospects of people living with HIV (PLHIV), creating the possibility of new life projects, including parenthood, the perception of PLWHA regarding PMTCT, and their intention to have children is a gray area to be explored.[9]

Fertility desire of people living with HIV/AIDS

Fertility desire is the natural phenomenon of any men and women at the age of fertility, in cases where PLHIV are the same as any individual, previously they have not to hope due to mother-to-child HIV transmission, but at the moment, the antiretroviral therapy (ART) drug prevents MTCT despite the rate being different according to the development of country medical technology.[1]

HIV/AIDS affects parents' ability to have children and is related not only to psychosocial aspects such as stigma, discrimination, and decreased sexual activity but also to the clinical impact of HIV infection and sexually transmitted infections (STIs) on fertility.[4] Different studies conducted in America and Asia found that many people who live with HIV/AIDS have the desire to have children in the future. Fertility desire was 28%–29% in the USA,[10] 50.8% in Indonesia wanted to have at least one biological child in the future,[11] and 33.5% in India.[12]

In Africa, the magnitude of fertility desire is 41.9 % in Cape Town, South Africa,[13] 34% in Nairobi, Kenya,[14] 37.1% in Tanzania,[15] 65.5% females, and 61.2% males in northern Nigeria,[16] and 28.6% in Uganda.[17] In Ethiopia, the fertility desire is 45.5% in Tigray region,[18] 40%–54.6% in Addis Ababa,[19,20] 56.2% in Harari regional,[21] 40.3% in Amhara Region Referral Hospitals.[22]

Factors associated with fertility desire of people living with HIV/AIDS

Globally scholars have come up with the huge associated factors that contribute to the desire for fertility. People who are living with HIV/AIDS have more life-related factors such as economy, social environment, religion, culture, beliefs, age, gender and marriage, and the relationship in marriage, reproductive age, medical conditions, ethnicity, number of children, and the desire of the partner were some of the detected factors.[19,23–25]

Another study also revealed that parents' children who died were inversely associated with fertility intentions.[26] In Nigeria, significant predictors of stronger desires for fertility were religion, duration of diagnosis, low parity, and awareness of a partner's serostatus.[27] The pregnancy rates decreased sharply with increasing age in all periods, combining the pre-ART and on-ART periods, and higher socioeconomic status (as reflected by education, employment, and access to electricity).[28]

A series of biological and behavioral factors may influence the association between ART use and an increased incidence of pregnancy. Rapid improvements in health and quality of life that occur with ART initiation may lead to increased sexual activity, particularly in those with stable partnerships.[1,29] Furthermore, sex was significantly associated with the desire for fertility in that female respondents were found to be less likely to have fertility in the future than males.[29]

Ethiopia is one of the most severely affected countries in the sub-Saharan region. Therefore, this study aimed to assess fertility desire and associated factors among HIV-positive men and women attending ART clinics at selected Public Hospitals in Addis Ababa, Ethiopia.

Methods

Study design, area, and period

An institution-based cross-sectional study was conducted in four purposely selected public hospitals (Black Lion Specialized Hospital, Zewditu Memorial Hospitals, St Paul's Hospital Millennium Medical College, and Yekatit 12 Hospital) in Addis Ababa, the capital city of Ethiopia, from 1 October to 30 November 2021. Based on the 2016 population projection conducted by the Central Statistical Agency of Ethiopia (CSA), Addis Ababa has a total population of 3,194,999 (1,515,001 males and 1,679,998 females, respectively). The city has 41 hospitals (13 public and 28 NGOs and private), 29 health centers, and 382 modern private clinics. The adult HIV prevalence rate was 7.5%, and also, according to FMOH 2017 survey report, approximately around 127,619 HIV-positive clients were found in Addis Ababa; out of those, 83,566 (65%) were on ART.[30]

Source population: all adult people living with HIV/AIDS (PLWHA) who were attending ART clinics in Addis Ababa City.

Study population: all selected adult PLWHA met the inclusion criteria at the designated public health hospitals of Addis Ababa during the study period.

The inclusion criteria: women in (18–49 years) age group and men aged 18 years and above. All study participants who had at least one visit for antiretroviral (ARV) treatment were included.

The exclusion criteria were as follows: pregnant, infertile, or hysterectomy/vasectomy was excluded from the study—those who were unable to hear, mentally disabled, or seriously ill.

Sample size determination and sampling procedure

The sample size was calculated using the single population proportion formula by taking the previous study conducted in Addis Ababa with a 54.6% prevalence.[19] The following assumptions were made:

Using the formula; $n = \frac{(Z\alpha/2)^2 P(1-P)}{d^2}$

$$n = \frac{(1.96)^2\, 0.546(1-0.546)}{0.0025} = 381$$

where n = Sample size to be determined, $Z(\alpha/2)$ = Level of statistical significance at 95% confidence level (CI) = 1.96, P = population proportion of fertility desire = 0.546, d = margin of error at 5%(0.05).

As fertility desire was the primary outcome measure for this study, the sample size was calculated based on the proportion found in another study. A study in Addis Ababa found that among PLHIV, 54.6% of them had a desire to have children in the future.[19] By considering a 5% nonresponse rate, the final sample size was 400.

Sampling technique and procedure

Twelve of the 13 governmental hospitals in Addis Ababa provided ART services for both sexes. TikurAnbesa Specialized Hospital, Zewditu Memorial Hospitals, St Paul Hospital Millennium Medical College, and Yekatit 12 Hospital were purposively selected based on their high number of ART services. The number of samples for each Hospital was allocated proportionally after identifying each Hospital's average monthly ART service. According to the Hospital's ART registration book, the average monthly number of ART cases was 103 at Black Lion Specialized Hospital, 91 at St Paul Hospital Millennium Medical College, 78 at Zewditu Memorial Hospitals, and 72 at Yekatit 12 Hospital for the last five consecutive months.

Finally, individual study participants were selected using a consecutive sampling method, including every patient who met the inclusion criteria until the total sample size was obtained using the ART registration book.

Then, the allocation for each Hospital was done as follows:

$NX = (n/N)\, Y$, where NX = the sample size will be allocated for "X" hospital, Y = Population size that "X" hospital averagely provides ART services, n = Total sample size for the study = 400

N = Total population size (average number of admissions at each hospital) (Figure 1).

Study variables

Dependent variable: Fertility desire

Independent variables: Sociodemographic characteristics (age, sex, religion, occupation, marital status, income, education), HIV-related factors (duration of HIV diagnosis, PMTCT), fertility-related factors (number of children, partner's desire for children), and family-related factors (family and partner support, partners HIV status)

Operational and term definitions

Fertility desire: whether women or men living with HIV/AIDS who receive ARV treatment would like to have children in the future or not.

PLWHA for women: women living with HIV/AIDS aged 18–49.

PLWHA for men: men living with HIV/AIDS aged 18 and above.

MTCT: refers to the transmission of HIV from mother to child through various mechanisms such as pregnancy, delivery, or breastfeeding.

Data collection procedure: The data were collected using a pretested semistructured questionnaire with sociodemographic features, HIV, family, and fertility-related factors with closed and open-ended questions. The questionnaire was adapted (modified accordingly) from other similar studies and was prepared in English,[22,31] translated into the Amharic language, and then translated back to English by language experts to keep its consistency.

Four BSc holder health professionals collected the data by an interviewer-administered questionnaire using the predesigned checklist during working hours (from eight in the morning till five in the afternoon). Two MSc holders were supervising the data collection process closely and the principal investigator followed them. The process was continued until the required number of samples was obtained.

Data quality control: A range of mechanisms was employed to maintain data quality. Two days of training were given to data collectors and supervisors on the objective and relevance of the study, how to gather the appropriate information, procedures of data collection techniques, inclusion/exclusion criteria, and the entire contents of the questionnaire. The principal investigator collected the checklists from data collectors each day and

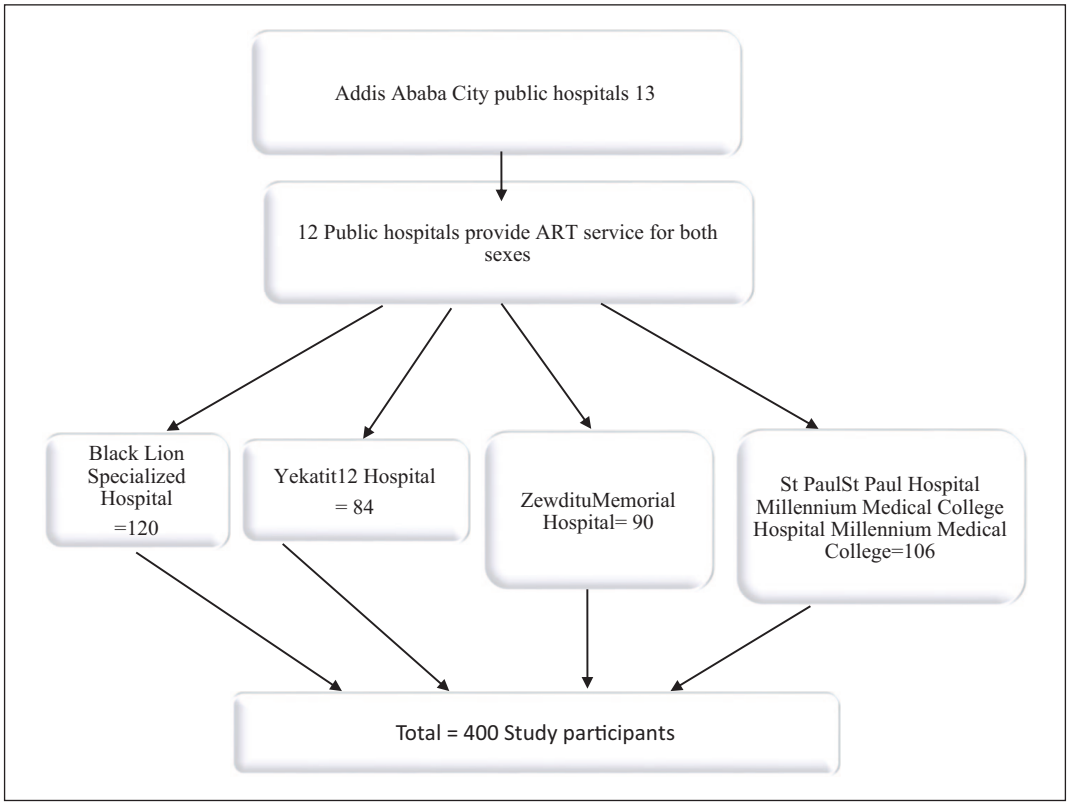

Figure 1. Schematic representation of sampling procedure for assessment of fertility desire among people living with HIV, in Addis Ababa Public Health Hospitals.

checked for any errors. Then, appropriate measures were taken accordingly. Throughout the course of data collection, the data collectors were supervised, and there were regular phone contacts between the principal investigator, data collectors, and supervisors to discuss and correct problems that arose during the data collection period. A pretest was done by taking 5% of the sample size, and necessary modifications in the questionnaires were made based on the nature of the gaps identified.

Statistical analysis: the collected data were coded and entered into Epi data version; after the entry was completed, the data were transferred to SPSS version 25 and cleaned before analysis. Descriptive statistics and bivariate and multivariable logistic regression analyses were done. Variables at p value of <0.2 were transferred to multivariable logistic regression analysis. Then, variables at p value of <0.05 with 95% CI were considered statistically significant and an adjusted odds ratio (AOR) was used to interpret factors associated with episiotomy.

Results

Sociodemographic characteristics

A total of 400 eligible HIV-positive individuals were recruited with a 100% response rate, and their ages ranged from 18 to 72 years for males and 18 to 49 years for females. Most of them were with the age of 35 and above years old. More than half of the respondents, 218 (54.5%), were females, 208 (52%) were orthodox, 129 (32.3%) were with the educational status of college diploma and above, 246 (61.5%) were married, 219 (54.8%) were employed, and 209 (52.3%) had an income greater than $40 per month (Table 1).

Reproductive history and fertility desire

Among the 400 participants interviewed, 220 (55%) of the respondents have fertility desire in the future, 86 (12.5%) planned within 1 year to get pregnant. Of the respondents, 70 (17.5%) have a desire for one child, and 148 (37%) have a desire for two and more children. The majority of respondents, 224 (56.0%), had from one to three children. However, 133 (33.3%) had no children at all. Of them, 65 (16.3%) do not have adequate income to add another child (Table 2).

Contraceptive use and fertility desire

The majority of respondents, 228 (57.0%), used contraceptives before HIV diagnosis, 334 (83.5%) used after HIV diagnosis, and 262 (65.5%) were currently using

Table 1. Sociodemographic characteristics of people living with HIV in public health hospitals ART clinics in Addis Ababa, Ethiopia, 2021 (n = 400).

Variables	Category	Frequency	Percent
Age, years	<35	155	38.8
	35 and above	245	61.3
Gender	Male	182	45.5
	Female	218	54.5
Religion	Orthodox	208	52.0
	Catholic	46	11.5
	Muslim	81	20.3
	Protestant	65	16.3
Educational level	No formal education	125	31.3
	Primary	35	8.8
	Secondary	111	27.8
	College and above	129	32.3
Marital status	Married	246	61.5
	Unmarried	154	38.5
Monthly income	<1000 ETB	130	32.5
	1000–2000vETB	49	12.3
	>2000 ETB (>$40)	209	52.3
	Do not know	12	3.0
Occupational level	Employed	219	54.8
	Unemployed	181	45.3

ART: antiretroviral therapy; ETB: Ethiopian Birr (Currency); HIV: human immune deficiency virus.

Table 2. Reproductive history and fertility desire of people living with HIV in public health hospitals ART clinics in Addis Ababa, Ethiopia, 2021 (n = 400).

Variables	Category	Frequency	Percent
Number of children	No children	133	33.3
	1–3	224	56.0
	>4	43	10.8
Interest to have children in the future	Yes	220	55.0
	No	180	45.0
Time to have a child	Within 1 year	86	21.5
	From 1 to 3 years	71	17.8
	After 3 years	18	4.5
	Do not know	42	10.5
	Other/specify	3	0.8
Number of children you desire in the future	One child	70	17.5
	Two and above	148	37.0
	Do not know	2	0.5
Reason not to have children	Have no desire for children	94	23.5
	For MTCT risk	20	5.0
	Do not have adequate income	65	16.3
	No response	1	0.3
Partner desire	Yes	154	38.5
	No	117	29.3
	Do not know	28	7.0
	Do not have a partner	101	25.3

ART: antiretroviral therapy; HIV: human immune deficiency virus; MTCT: mother-to-child transmission.

Table 3. The contraceptive use and fertility desire of people living with HIV in public health hospitals ART clinics in Addis Ababa, Ethiopia, 202 (n = 400).

Variables	Category	Frequency	Percent
Contraceptive use before HIV diagnosis	Yes	228	57.0
	No	134	33.5
	Do not remember	38	9.5
Contraceptive use after HIV diagnosis	Yes	334	83.5
	No	59	14.8
	Do not remember	7	1.8
Contraceptive use currently	Yes	262	65.5
	No	138	34.5
The method you are using	Abstain from sex	26	6.5
	Condom	30	7.5
	Injectable	82	20.5
	IUCD	50	12.5
	Implants	74	18.5
Reason for using the current family planning	Health professionals advise me	106	26.5
	From my friends' experience/advice	28	7.3
	It is good for my health	116	29.0
	Other specify	11	2.75
Interest to use contraceptives in the future	Yes	14	3.5
	No	122	30.5
	I do not know	2	0.5
Place accessing the service	At ARV treatment units	10	2.5
	Other (specify)	4	1.0
If you are using contraceptives, did you disclose your serostatus to your healthcare provider	Yes	242	60.5
	No	82	20.5
	No response	2	0.5
The reason why did not disclose your status to your healthcare provider	I do not trust the providers	27	6.75
	I feared stigma and Discrimination	21	5.3
	No, response	8	2.0
	Other (specify)	18	4.5

ART: antiretroviral therapy; HIV: human immune deficiency virus; IUCD: Intrauterine contraceptive Device.

contraceptives. Of all contraceptive user participants, 242 (60.5%) have disclosed their seropositive status to family planning service providers (Table 3).

Prevention of MTCT

Almost all of the respondents, 399 (99.8%), have information about the transmission of HIV from mother to child. Of these participants, 386 (96.5 %) of them are informed about the availability of medicines that prevent MTCT of HIV. Nearly half of the respondents, 141 (35.3%), believe that HIV is transmitted from mother to child during pregnancy, followed by 130 (32.5%) of the respondents who conveyed that the means of HIV transmission from mother to child is breastfeeding and 142 (35.5%) of the study participants get information through mass media.

Concerning the risk of HIV transmission from mother to child, 125 (31.3%) respondents informed that half of the children are likely to be positive for HIV infection. Moreover, 67 (16.8%) believed that all children born from HIV-positive mothers could acquire HIV infection without PMTCT service/provision of ART drugs. Similarly, 179 (44.8%) of the respondents did not know the exact transmission figure (Table 4).

HIV/AIDS and treatment conditions

All 400 (100%) of the respondents are on ART, and the majority of the participants, 183 (45.8%), had ART follow-up for 5 years and above since HIV diagnosis. Among those on ART, 396 (99%) reported improved health conditions after ART initiation, and 167 (41.8%) attended the same ART unit for more than 5 years and above. Most of the study subjects, 250 (62.5%), were getting support from different community groups, and 325 (81.3%) had discussed with ART providers/counselors about sexuality, childbearing, and family planning options (Table 5).

Reproductive and sexual characteristics

The majority of the participants, 328 (82.0%), were sexually active in the past 6 months. Of sexually active respondents,

Table 4. Respondents information on mother-to-child HIV transmission and PMTCT people living with HIV in public health hospitals ART clinics in Addis Ababa, Ethiopia, 2021 (n = 400).

Variables	Category	Frequency	Percent
HIV transmit from mother to child	Yes	399	99.8
	Do not know	1	0.3
When does HIV transmissions occur from mother to child?	During pregnancy	141	35.3
	During labor	64	16.0
	Through breastfeeding	130	32.5
	I do not know	65	16.3
Any medication may help to prevent mother-to-child HIV transmission	Yes	386	96.5
	No	7	1.8
	I do not know	7	1.8
How much is the risk of HIV transmission from mother to child, If the mothers do not use any preventive medication?	All children born to infected mother acquire the infection	67	16.8
	About 50% children acquire the infection	125	31.3
	I do not know	29	7.2
	I do not know the exact figure	179	44.8
Source of information about mother-to-child HIV transmission	Mass media	142	35.5
	Health care workers	221	55.3
	From friends	1	0.3
	Home-based caregivers	36	9.0
Medication provided to reduce mother-to-child HIV transmission actually reduce the transmission	Yes	377	94.3
	No	14	3.5
	I do not know	9	2.3

ART: antiretroviral therapy; HIV: human immune deficiency virus; PMTCT: prevention of mother-to-child transmission.

149 (37.3%) used condoms. According to the response of 124 (31.0%), the main reason mentioned for the use of condoms is for dual protection as a result of healthcare providers counseling to use a condom" (Table 6).

Factors associated with fertility desire

The output of the bivariate logistic regression showed that eight variables with a *p* value less than 0.2 (age, marital status, educational status, occupational status, years/duration of HIV diagnosis, current use of contraceptives, support from others, and discussion about sexuality issues) were the candidates for multiple logistic regressions out of 49 independent variables.

In the multivariable logistic regression analysis, age, educational status, marital status, occupational status, years/duration of HIV diagnosis, and current family planning use were statistically significant with fertility desire at a *p* value of ⩽0.05.

This study showed that participants aged less than 35 years were 24.03 times more likely to have children than those aged more than 35 years (AOR = 24.03, 95% CI = 9.99, 57.83). Respondents with secondary education were nearly three times more likely to have future fertility desires than those without formal education (AOR = 2.78, 95% CI = 1.21, 6.40). The odds of married were nearly three to have future fertility desire than unmarried respondents (AOR = 2.89, 95% CI = 1.39, 5.99). Participants who were employed saw a three-fold increase in fertility desire compared to those who were unemployed (AOR = 3.12, 95% CI = 1.56, 6.24).

The respondents with 1 year and below since HIV diagnosis were four times more likely to have future fertility desire compared to five and above years of HIV diagnosis (AOR = 4.02, 95% CI = 2.07, 7.80) and 2–4 years of HIV diagnosis were 9.8 times more likely to have future fertility desire compared to five and above years since diagnosis (AOR = 9.80, 95% CI = 3.89, 26.02). On the contrary, current family planning users were 90.9% less likely to have future fertility desire than their nonuser counterparts (AOR = 0.09, 95% CI = 0.05, 0.18) (Table 7).

Discussion

This study provides sufficient information regarding the magnitude and risk factors of future fertility desire among HIV-positive individuals in Addis Ababa Public Health Hospitals.

The magnitude of future fertility desire was 55% among HIV-positive individuals attending ART clinics. This finding is in line with the study results done in the Niger Delta of Nigeria; among HIV-positive respondents receiving care, 56.9% have the desire to have children.[32] However, this finding is high compared to a study conducted in Nairobi, Kenya, which found that 34% of the study participants have future fertility desires.[14] This finding was also

Table 5. HIV/AIDS and treatment conditions of people living with HIV in public health hospitals ART clinics in Addis Ababa, Ethiopia, 2021 (n = 400).

Variables	Category	Frequency	Percent
Years of since HIV diagnosis	1 year and below	79	19.75
	2–4 years	138	34.5
	5 years and above	183	45.8
Did you start ART?	Yes	400	100.0
When did you start ART?	below 1 year	71	17.8
	2–4 years	131	32.8
	5 years and above	176	44.0
	Do not remember	22	5.5
Who covers the cost of the drugs?	Free access from the Government	400	100.0
Your overall health condition after starting receiving ART	Improved	396	99.0
	No change	4	1.0
Time of attending ART unit	1 year and below	74	18.5
	2–4 years	142	35.5
	5 years and above	167	41.8
	Do not remember	17	4.3
Getting support from different community groups	Yes	250	62.5
	No	150	37.5
From where did you get support?	Relatives/neighbors and friends	182	45.5
	NGOs	10	2.5
	GOs	57	14.2
What kind of support did you get?	Money	72	18.0
	Home-based care)	76	19.0
	Counseling	63	15.8
	Food/healthcare	39	9.8
Would you like to discuss with your counselor about sexuality, childbearing, and family planning?	Yes	325	81.3
	No	75	18.8
If yes, did your ART provider adequately convert its uses like childbearing, sexuality, and family planning?	Yes	302	75.5
	No	23	5.75

AIDS: acquired immunodeficiency syndrome; ART: antiretroviral therapy; GO: governmental organization; HIV: human immune deficiency virus; NGO: nongovernmental organization.

higher as compared to the studies conducted in Ethiopia which was conducted on participants who reported having future fertility desire.[33]

Another similar study was conducted in Fitche Town, North Shewa Zone, Ethiopia, which showed among PLHIV, 58.8% have future fertility desire,[34] and a survey conducted in the same region in the east from 456 sampled PLHIV 192 (42.1%) have fertility desire.[35] This variation may be due to the reason that Addis Ababa is the capital city of Ethiopia, and this enables the PLWHA to access better health care and understanding (better awareness about PMTCT service) due to the presence of well-equipped health facilities in terms of human power and early ART initiation. Besides, the differences in cultural beliefs and accessibility of health facilities between Ethiopia and Kenya may explain this variation. The key factors associated with future fertility desire among HIV-positive individuals in Addis Ababa public hospitals were age, educational status, marital status, occupational status, years/duration of HIV diagnosis, and current family planning use.

The study participants under 35 years were 24.03 times more likely to have children than those aged above 35 years. This finding is supported by similar studies conducted in Brazil, Nigeria, Addis Ababa, and North Shewa Zone.[19,36–38] This association may be due to the belief that having children at a younger age will be good and acceptable.

Marital status was another significant factor identified in this study associated with future fertility desire. Those married individuals were nearly three times more likely to have future fertility desires than unmarried respondents. This was similar to another study conducted in Addis Ababa, in which married individuals were three times more likely to have future fertility desires than others.[39] It is also supported by the study conducted in Nigeria.[37] On the other hand, the study conducted in Uganda revealed that marital status had no association with the desire to have children in the future.[40] This difference may be due to the sociocultural values of Ethiopians that having children before marriage is unacceptable; thus, they prefer to have a child after they get married.

Table 6. Reproductive characteristics and fertility desire of people living with HIV in public health hospitals ART clinics in Addis Ababa, Ethiopia, 2021 (n = 400).

Variables	Category	Frequency	Percent
Having sexual intercourse in the past 6 months	Yes	328	82.0
	No	72	18.0
Have you used condom?	Yes	149	37.3
	No	179	44.8
Frequency of condom use	Always	39	9.8
	Sometimes	110	27.5
Reason for using condoms	To prevent pregnancy	3	0.8
	Because my partner's HIV status is negative	10	2.5
	Healthcare providers advised me to use condom	124	31.0
	Other/specify	12	3.0
If no, the reason for not using condoms	I want to have children	23	5.8
	My partner did not like it	89	22.3
	Other (specify)	67	16.8
Does your partner have HIV test?	Yes	294	73.5
	No	22	5.5
	Have no partner	72	18.0
	I do not know	1	0.3
	No response	1	0.3
	Other (specify)	10	2.5
What was his/her test result?	Positive	272	68.0
	Negative	21	5.3
	I do not now	1	0.3

ART: antiretroviral therapy; HIV: human immune deficiency virus.

In this study, participants using contraceptives were 90.9% less likely to have future fertility desires than their non-user counterparts. This was supported by the studies conducted in Harare Regional State and Papua New Guinea.[26,41] This might be because contraceptive use is significant for HIV-positive patients to limit births and prevent unplanned pregnancy, reduce HIV-positive births irrespective of their fertility desire, and optimize the number of their children.

Respondents with secondary education were almost three times more likely to have future fertility desires than those without formal education. This finding is supported by the study conducted in the Oromiya region.[34] This may be because being an educated person has its input to better understand PMTCT and its services.

In addition, respondents with 1 year and below HIV diagnosis duration were 4.02 times and 2–4 years of HIV diagnosis duration were 9.8 times more likely to have future fertility desire compared to five and above years since diagnosis. This finding is supported by a study conducted in Fiche Hospital.[38] One justification would be that the PLHIV enrolled in ART for a more extended period might have gone through widespread health education that might have influenced their intentions, unlike those that have just registered in ART.

The influence of a long time since diagnosis of infection probably reflects the collective effects of decisions made by individuals who had weighed the consequences of their wish for parenthood over several months or years. Health professionals at different levels of the institution should discontinue the conventional systematic advice against pregnancy but, in addition to emphasizing the risks, provide adequate information on the efficacy of PMTCT and practicable reproductive options for HIV-positive individuals.

The employed participants were three times more likely to have future fertility desires than the unemployed. Even if there are no previous studies supporting this variable, this may be because those employed participants have a sustainable monthly income that enables them to care for their children.

The limitations and strength of the study

The failure to support the study with a qualitative finding will be the limitation of this study. On the contrary, the involvement of males, who are a significant stakeholder of fertility desire in the study, will be a strength because only women are involved in most studies.

Conclusion

The finding of this study indicated that the magnitude of future fertility desire among HIV-positive individuals was high. Factors such as age, educational status, marital status, occupational status, years/duration of HIV diagnosis, and

Table 7. Factors associated (the logistic regression) with fertility desire among people living with HIV in public health hospitals ART clinics in Addis Ababa, Ethiopia, 2021 (n = 400).

Variables	Category	Fertility desire		COR (95% CI)	AOR (95% CI)
		No	Yes		
Age, years	<35	18 (11.6%)	137 (88.4%)	14.855 (8.502,25.957)	24.030 (9.985, 57.832)*
	35 and above	162 (66.1%)	83 (33.9%)	1	1
Education	Illiterate	87 (69.6%)	38 (30.4%)	1	1
	Primary education	15 (42.9%)	20 (57.1%)	3.053 (1.413, 6.595)	1.710 (0.591, 4.950)
	Secondary	31 (27.9%)	80 (72.1%)	5.908 (3.364, 10.377)	2.779 (1.206, 6.403)*
	College and above	47 (36.4%)	82 (63.6%)	3.994 (2.367, 6.741)	1.304 (0.581, 2.930)
Marital status	Married	125 (50.8%)	121 (49.2%)	1.860 (1.230, 2.812)	2.885 (−1.390, 5.986)*
	Unmarried	55 (35.7%)	99 (64.3%)	1	1
Occupation	Employed	84 (38.4%)	135 (61.6%)	1.815 (1.218, 2.706)	3.117 (1.557, 6.239)*
	Unemployed	96 (53.0%)	85 (47.0%)	1	1
Duration of HIV diagnosis	⩽1 year	11 (13.9%)	68 (86.1%)	15.163 (7.436,30.920)	9.800 (3.891, 26.018)*
	2–4 years	39 (28.3%)	99 (71.7%)	6.226 (3.817, 10.156)	4.019 (2.070, 7.803)*
	⩾5 year	130 (71.0%)	53 (29.0%	1	1
Contraceptive use	Yes	149 (57.1%)	112 (42.9%)	0.216 (0.135, 0.345)	0.091 (0.046, 0.182)*
	No	31 (22.3%)	108 (77.7%)	1	1
Support from others	Yes	120 (48.0%)	130 (52.0%)	0.722 (0.479, 1.088)	0.575 (0.314, 1.052)
	No	60 (40.0%)	90 (60.0%)	1	1
Interest to discuss with their counselor	Yes	131 (40.3%)	194 (59.7%)	2.791 (1.652, 4.716)	1.690 (0.805, 3.547)
	No	49 (65.3%)	26 (34.7%)	1	1

AOR: adjusted odds ratio; ART: antiretroviral therapy; CI: confidence interval; COR: crude odds ratio; HIV: human immune deficiency virus.
•Interest to discuss with their counselor is about sexuality, childbearing, and family planning.
•Illiterate: those with no formal education.
*Statistically significant at $p < 0.05$ (Hosmer and Lemeshow test of goodness of fitness: 0.275).

current contraceptive use were associated with future fertility desire among HIV-positive individuals.

Health professionals and other stakeholders should strengthen the health education programs at ART services to increase their awareness about partner involvement in the fertility desires of PLHIV. The family planning providers should promote the consistent and proper utilization of condoms to prevent co-infection and unintended pregnancy. There is a need to devise a contraceptive counseling mechanism in the ART units, so the respondents would access the service in a similar setting, making it more accessible. ART clinics' reproductive health care services need to integrate these desires into reproductive care services. Further research on this topic should include qualitative studies that would provide a deeper understanding of PLHIVs of their future fertility desires in terms of many perspectives.

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Author contributions

Authors play a significant role in this article, whether in the conception, study design, acquisition of data, execution, analysis, and interpretation. Besides, the drafting, revising, or critical reviewing of the article were also done by the researchers. We also agreed on the journal to which the article has been submitted and to be accountable for all regards of this work.

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The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Informed consent

Verbal informed consent was obtained from all subjects before the study and this verbal informed consent was approved by Mizan-Tepi University, College of Medicine and Health Sciences Institutional Ethical Review Board (IRB). All the study participants were informed by the data collectors about confidentiality and the information will not be disclosed to anybody by any means.

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Supplemental material

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