

High Fertility desire and Associated factors among People Living With HIV at the University of Gondar specialized hospital, Ethiopia; a cross-sectional study

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Research Article

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Abstract

Objectives: The quality of life of people living with HIV (PLWHIV) has been improving due to the use of highly active antiretroviral therapy, which in turn results in an increased desire for childbearing. This study aimed to assess the prevalence and determinants of fertility desire among people on ART.

Methods: An institution-based cross-sectional study was conducted among 407 PLWHIV the University of Gondar comprehensive and specialized hospital from August 1 to 30, 2021. A systematically random sampling technique was used to select the study subjects. The data was entered using EPI INFO version 7.2.2.6, analyzed with Stata 14.0, and described using frequency tables and texts. A binary logistic regression model was fitted to identify determinants of fertility desire.

Results: Of 390 participants included in the analysis, 64.87% were females. The mean age of the respondents was 32.79 years (SD±10.89). The overall prevalence of fertility desire among PLWHIV was 44.87% (95% CI: 39.98–49.86). Of these, 42.29% desired fertility because they thought that they could have an HIV-negative child due to ART. Being male (AOR = 2.93), being on WHO treatment stage I (AOR = 2.49), living with HIV for more than 10 years (AOR = 2.50), being on a first-line ART regimen (AOR = 2.44), and having no child (AOR = 2.94) were all associated with fertility desire.

Conclusion: A considerable proportion of PLWHIV have a desire for childbearing. Hence, sexuality and reproductive health counseling measures should consider the fertility needs of PLWHIV.

Introduction

According to the 2020 Joint United Nations Program on HIV/AIDS (UNAIDS) report, there were 38 million people living with HIV (PLHIV) globally, of whom 36.2 million were adults aged 15 years and older. Around 68% of adults living with HIV had accessed antiretroviral therapy (ART), of whom 73% were females and 61% were males [1]. Like every individual, these adults living with HIV want to get married and have a newborn child. But, in previous times, individuals may have hesitated to engage in fertility because of fear of mother-to-child transmission (MTCT) of the virus, poor health status, stigma and lack of support from others [2, 3]. Nowadays, these challenges are reduced due to the availability of antiretroviral (ARV) drugs [4, 5].

Fertility desire is an individual's intention at reproductive age to have more children among PLHIV, which is improved by the introduction of ART [6]. The life expectancy and overall quality of life of PLHIV have noticeably increased due to the use of highly active antiretroviral therapy (HAART) [7, 8]. Similarly, the rate of MTCT of HIV has decreased to less than 5% as a result of the effective use of ARV drugs [9]. This in turn results in an increased desire among HIV-infected individuals for pregnancy and child bearing [10–12]. The desire for childbearing can also have significant public health importance among PLHIV because they feel that having more children will increase the chance of being retired by their offspring [13].

Although HIV can affect a person's whole life, it does not prevent people living with HIV from having children. Like HIV-uninfected individuals, PLHIV have sexual and reproductive health needs, including the ability to make an informed decision about how many and when to have children. Studies in different areas of the world have shown that a significant proportion of PLHIV wish to be parents. A study conducted in thirteen European countries showed the prevalence of the desire for fertility was 43%[14]. Other studies conducted in Brazil and Spain revealed that the prevalence of fertility desire among people on ART was 25.9% [15] and 49%[16], respectively. Studies conducted in Asian countries including Georgia, India, Indonesia, Nepal, and China showed the prevalence of fertility desire among PLHIV ranged from 12.1–50.8%[2–4, 13, 17].

As more human beings get admission to antiretroviral therapy (ART) and live healthier and longer lives with human immunodeficiency virus (HIV) in sub-Saharan Africa, their choice of destiny to be pregnant is increasing[18]. Studies conducted in Nigeria showed that the prevalence of fertility desire among PLHIV ranged from 47.5 to 75.8% [7, 19, 20]. Other studies conducted in Tanzania, Nairobi, Malawi, and Uganda revealed that the prevalence of fertility desire among PLHIV was 17, 34, 51, and 59%, respectively[21–24]. Similarly, in Ethiopia, the desire for fertility in the future among PLHIV was reported and ranged from 33.4–58.8% [6, 8, 9, 11, 25–29].

PLHIV's desire for future childbearing has been linked to a variety of socio-demographic, current health condition, cultural, and social factors. As a result, increased desire for childbearing has been linked to younger age, male sex, education, marriage, having no or few children, improved health, increased CD4 + T-cell count, duration on ART, community pressure, and having good PMTCT knowledge [2, 3, 9, 15, 17, 20, 21, 23, 25, 27].

Although there are studies in Ethiopia, we find it important to do so because most of the studies are on women, and the desire to have children is not limited to women. Similarly, the target population of previous studies was HIV-infected people, either on ART or not, which may have underestimated or overestimated the results. So, in order to see the clear effect of ART on fertility desire in both men and women, this study was conducted. Therefore, this study aimed to assess the prevalence of fertility desire and its determinant factors among PLWHIV.

Methods

Study design, area and period

An institution-based cross-sectional study was conducted among PLWHIV at the University of Gondar comprehensive and specialized hospital (UOGCSH) from August 1 to 30, 2021. The UOGCSH is located in Gondar Town in the Central Gondar administrative zone of Amhara Nation Regional State. It is located 712 km northwest of Addis Ababa, the capital city of Ethiopia, and 170 km from Bahir Dar, the capital city of Amhara Nation Regional State. The hospital started an ART service in 2005, and currently the number of ART users is around 5,509.

Source and Study Population

Source populations: All adults living with HIV on follow-up care at the ART clinic of the University of Gondar comprehensive and specialized hospital.

Study populations: The study populations were all sexually active adults PLWHIV, and had a follow-up visit during the study period.

Inclusion and exclusion criteria

All HIV-infected individuals whose reproductive age groups were (15–49 years for women, and 15–60 years for men) at UOGCSH were included in the study. But, individuals who were unable to hear or who had a known mental disorder were excluded from the study.

Sample size determination and sampling procedure

The sample size was determined by using a formula to estimate single population proportion with the assumption of a 95% level of confidence, 40.3% proportion [6], and a 5% marginal error. Finally, the sample size was calculated using the EPI INFO statistical package version 7.2.2.6 and, with consideration of a 10% expected non-response rate, the final sample size was 407. A systematically random sampling technique was employed to select the study subjects using the order of their coming during their follow-up period. The value of the 'k' interval was calculated based on the number of patients visited per day divided by the total working days of data collection period, and the calculated sample size.

Operational definition

Fertility desire: people who are on ART follow-up care and who would like to intend to have children in the future.

Treatment stage: is based on the WHO classification of a patient's clinical condition on ART, and it can be labeled as treatment stage I to II.

Data collection tools and procedures

An interviewer-administered structured questionnaire was prepared to collect information from the respondents regarding socio-demographic, clinical, and sexuality-related characteristics of people on ART. The data collection tool was first prepared in the English language and then translated into the local language, Amharic. It was pretested on 5% of the total sample size of people attending ART at the Gondar health center. Prior to the data collection, the purpose of the study and importance of participation were

informed, and verbal consent was ensured. Based on their willingness to participate in the study, data was collected by trained 4th year BSc nursing students with the help of two supervisors.

Data quality assurance

In the current study, the authors used different techniques to assure the data quality, including the use of a pretested data collection tool, the employment of trained nurses for data collection, and close monitoring of the data collection procedure by supervisors. Lastly, each filled questionnaire was checked for completeness and consistency by the principal investigator and data collectors every day at the end of each data collection day.

Statistical analysis

After the completion of the data collection, the data was first checked for consistency and completeness. Then, it was coded and entered into EPI INFO version 7.2.2.6 and exported to STATA version 14.0 for analysis. A frequency table, percentage, and text were used to describe the result of the study. The prevalence of fertility desire among people on ART was determined. A binary logistic regression model was employed to identify factors associated with fertility desire. After a bivariate analysis, those variables with a p-value <0.2 were considered for multivariate binary logistic regression. Model fitness was checked by using the Hosmer-Lemeshow goodness of fit test (*p-value* = 0.5625), and the model was fitted well. An odds ratio (OR) with a 95% confidence interval (CI) was computed, and variables having a p-value <0.05 in the multivariate logistic regression were considered as statistically associated factors of fertility desire.

Results

Socio-demographic characteristics of PLWHIV

From a total of 407 participants, 390 were included in the analysis, with a response rate of 95.8%. There were 253 (64.87%) females among them. The mean age of the respondents was 32.79 years (SD±10.89), with a minimum and maximum age of 15 and 56 years, respectively. The majority of the respondents (83.08%) were orthodox Christians. Almost all of the participants (94.87%) lived in urban residences. Around 36.15% of the participants had completed high school. One hundred sixty seven (42.82%) of the respondents were married, and 33.08% were self-employed (**Table 1**).

Table 1

Socio-demographic characteristics of PLWHIV at the University of Gondar comprehensive specialized hospital (n = 390).

Variables	Categories	Frequency	Percent
Age in years	15 – 29 years	148	37.95
	30 – 39 years	127	32.56
	≥ 40 years	115	29.49
Sex	Male	137	35.13
	Female	253	64.87
Religion	Orthodox Christian	324	83.08
	Muslim	55	14.10
	Others	11	2.82
Residence	Urban	370	94.87
	Rural	20	5.13
Marital status	Single	159	40.77
	Married	167	42.82
	Widowed/divorce	64	16.41
Educational status	Unable to read/write	80	20.51
	1 ⁰ school	117	30.00
	High school	141	36.15
	College and above	52	13.33
Occupation	Self employed	129	33.08
	Gov't employed	88	22.56
	Housewife	85	21.79
	Student	88	22.56

Clinical and sexuality-related characteristics of PLWHIV

In this study, two-thirds (66.67%) of the participants disclosed their HIV status to their partners or families. About 79.21% of the partners' HIV status was found to be reactive. Of all respondents, 250 (64.10%) were on WHO treatment stage one, and 44.36% had a current CD4+ T-cell count of more than 500 cells/ μ l. Almost half (51.79%) of the respondents' HIV status was confirmed about 10 years ago or

longer. Similarly, 146 (37.44%) had taken ART medication for more than 10 years, with the majority (88.46%) being on first-line ARV drug therapy. Among 390 respondents, 352 (90.26%) had no known medical comorbid disease. Regarding the prevention of mother-to-child transmission (PMTCT) of HIV, seventy percent were knowledgeable. Two hundred thirty-three (59.74%) of the respondents have at least one living child. On the other hand, 61.79% reported that they discussed sexuality with healthcare providers. More than half (56.67%) of the respondents didn't use condoms consistently during sexual intercourse. Lastly, the majority of the participants (83.85%) reported that they didn't have support from other nearby communities (**Table 2**).

Table 2

Clinical and sexuality characteristics of PLWHIV at the University of Gondar comprehensive specialized hospital (n = 390).

Variables	Categories	Frequency	Percent
HIV status disclosed	Yes	260	66.67
	No	130	33.33
Partners' HIV status (n = 178)	Reactive	141	79.21
	Non-reactive	37	20.79
WHO HIV treatment stage	1 st stage	250	64.10
	2 nd stage	91	23.33
	3 rd stage	49	12.56
Time since ART initiation	< 5 years	133	34.10
	5 – 10 years	111	28.46
	> 10 years	146	37.44
CD4+ T-cell count in cells/ μ l	\leq 200	40	10.26
	201 – 350	62	15.90
	351 – 500	115	29.49
	> 500	173	44.36
Time since HIV diagnosis	< 5 years	67	17.18
	5 – 10 years	121	31.03
	> 10 years	202	51.79
ART regimen type	1 st line	345	88.46
	2 nd line	45	11.54
Presence of comorbidity	Yes	38	9.74
	No	352	90.26
Knowledgeable for PMTCT	Yes	273	70.00
	No	117	30.00
Have child	Yes	233	59.74
	No	157	40.26
Use condom during intercourse	Yes	169	43.33
	No	221	56.67

Discussion with healthcare worker about sexuality	Yes	241	61.79
	No	149	38.21
Support from communities	Yes	63	16.15
	No	327	83.85

ART: Antiretroviral Therapy; CD4: Cluster of Differentiation Four; HIV: Human Immunodeficiency Virus; PMTCT: Prevention of Mother-to-child transmission; WHO: World Health Organization

Fertility desire among PLWHIV

In the current study, the overall magnitude of fertility desire among PLWHIV was 44.87% (95% CI: 39.98–49.86). Of those who desired fertility, about 46.86% desired to have a child when they felt healthy or corrected their CD4 count. Similarly, 42.29% desired fertility because they thought that they could have an HIV-negative child due to ART (**Table 3**).

Table 3

Magnitude of fertility desire among PLWHIV at the University of Gondar comprehensive specialized hospital.

Variables	Categories	Frequency	Percent (95% CI)
Desire for fertility (n = 390)	Yes	175	44.87 (39.98, 49.86)
	No	215	55.13 (50.13, 60.02)
When you want to deliver a child (n = 175)	When I feel healthy	82	46.86 (39.51, 54.34)
	When CD4 corrected	82	46.86 (39.51, 54.34)
	Any time as it happens	11	6.29 (3.49, 11.05)
Reason for fertility (n = 175)	No child before	31	17.71 (12.70, 24.16)
	My partner desire	20	11.43 (7.46, 17.12)
	Importance of parenting	50	28.57 (22.31, 35.78)
	I can have HIV negative child due to ART	74	42.29 (35.12, 49.79)

ART: Antiretroviral Therapy; CD4: Cluster of Differentiation Four; CI: Confidence Interval; HIV: Human Immunodeficiency Virus

Factors associated with fertility desire among PLWHIV

First, a bi-variable binary logistic regression analysis was computed in order to identify the associated factors of fertility desire. Then, variables with a p-value of 0.2 or lower at bi-variable analysis were candidates for multi-variable binary logistic regression analysis. After multi-variable logistic regression analysis, five variables, including male sex, WHO treatment stage I, duration of time since HIV status was confirmed, and having no child, were found to be statistically significant factors of fertility desire among people on ART at a p-value less than 0.05. Hence, the current study revealed that the odds of fertility desire was 2.93 times higher among males than females (AOR = 2.93; 95% CI: 1.70–5.06). Similarly, the odds of fertility desire was 2.49 times higher among HIV-infected adults leveled on WHO treatment stage I compared to those on stage III (AOR = 2.49; 95% CI: 1.17–5.28). On the other hand, the likelihood of desiring fertility among participants who lived with HIV for more than 10 years was 2.5 times higher than that of those who lived with HIV for less than 5 years (AOR = 2.50; 95% CI: 1.12–5.55). Fertility desire was 2.44 times higher among first-line ART respondents than among second-line ART respondents (AOR =

2.44; 95% CI: 1.07–5.58). Lastly, the odds of fertility desire among people who had no live children was 2.94 times higher compared to those who had children (AOR = 2.94; 95% CI: 1.35–6.38) (**Table 4**).

Table 4

Bi-variable and multivariable binary logistic regression analysis of factors associated with fertility desire among PLWHIV at the University of Gondar specialized hospital.

Variables	Categories	Fertility desire		COR (95% CI)	AOR (95% CI)	P-value
		Yes	No			
Age in years	15 – 29 years	89	59	3.06 (1.84, 5.09)	1.63 (0.62, 4.25)	0.320
	30 – 39 years	48	79	1.23 (0.73, 2.09)	1.65 (0.86, 3.19)	0.135
	≥ 40 years	38	77	1.00		
Sex	Male	81	56	2.45 (1.59, 3.74)	2.93 (1.70, 5.06)	0.000*
	Female	94	159	1.00		
Residence	Urban	169	201	1.96 (0.74, 5.22)	1.29 (0.39, 4.25)	0.668
	Rural	6	14	1.00		
Marital status	Single	97	62	3.44 (1.86, 6.38)	1.18 (0.45, 3.13)	0.738
	Married	58	109	1.17 (0.63, 2.17)	0.96 (0.46, 1.97)	0.901
	Widowed/divorce	20	44	1.00		
Educational status	Unable to read/write	24	56	1.00		
	1 ⁰ school	47	70	1.57 (0.86, 2.87)	0.81 (0.39, 1.67)	0.565
	High school	74	67	2.58 (1.44, 4.61)	1.05 (0.51, 2.18)	0.888
	College +	30	22	3.18 (1.54, 6.59)	1.62 (0.69, 3.76)	0.266
WHO HIV treatment stage	1 st stage	131	119	2.27 (1.19, 4.33)	2.49 (1.17, 5.28)	0.018*
	2 nd stage	28	63	0.92 (0.44, 1.93)	0.92 (0.38, 2.22)	0.851
	3 rd stage	16	33	1.00		
Time since ART initiation	< 5 years	66	67	1.00		
	5 – 10 years	50	61	0.83 (0.50, 1.38)	1.45 (0.68, 3.07)	0.336
	> 10 years	59	87	0.69 (0.43, 1.11)	0.79 (0.39, 1.57)	0.500

CD4+ T-cell count in cells/ μ l	≤ 200	20	20	1.00		
	201 – 350	23	39	0.59 (0.26, 1.32)	0.60 (0.22, 1.61)	0.313
	351 – 500	53	62	0.85 (0.42, 1.76)	0.93 (0.38, 2.26)	0.874
	> 500	79	94	0.84 (0.42, 1.67)	0.76 (0.33, 1.74)	0.523
Time since HIV diagnosis	< 5 years	24	43	1.00		
	5 – 10 years	50	71	1.26 (0.68, 2.34)	1.29 (0.54, 3.12)	0.563
	> 10 years	101	101	1.79 (1.01, 3.17)	2.50 (1.12, 5.55)	0.025*
ART regimen type	1 st line	160	185	1.73 (0.89, 3.33)	2.44 (1.07, 5.58)	0.034*
	2 nd line	15	30	1.00		
Knowledgeable for PMTCT	Yes	131	142	1.53 (0.98, 2.38)	1.60 (0.93, 2.77)	0.091
	No	44	73	1.00		
Have child	Yes	76	157	1.00		
	No	99	158	3.53 (2.31, 5.39)	2.94 (1.35, 6.38)	0.006*
Use condom	Yes	83	86	1.35 (0.90, 2.03)	1.44 (0.86, 2.40)	0.163
	No	92	129	1.00		
Support from communities	Yes	37	26	1.95 (1.13, 3.37)	1.86 (0.95, 3.63)	0.069
	No	138	189	1.00		

*statistically significant factors at a p-value of < 0.05. AOR: Adjusted Odds Ratio; ART: Antiretroviral Therapy; CD4: Cluster of Differentiation Four; CI: Confidence Interval; COR: Crude Odds Ratio; HIV: Human Immunodeficiency Virus; PMTCT: Prevention of Mother-to-child transmission; WHO: World Health Organization

Discussion

In the current study, the overall prevalence of fertility desire among PLWHIV was 44.87% (95% CI: 39.98–49.86). This is in line with studies conducted in Wolaita zone (43%)[28], Tigray region (45.5%)[29], and

Jimma town (46.8%)[11]. Similarly, it is in line with studies from Nigeria (47.5%)[7], Spain (49%)[16], and China (42.04%)[3]. But, the proportion of fertility desire among people on ART is lower than a study from Addis Ababa (54.6%). All participants involved in a study conducted in Addis Ababa were urban dwellers as compared to the current study, which might contribute for better understanding of HIV and sexual health. This in turn results in better desire for child bearing among peoples on ART from Addis Ababa [8]. Fertility desire in the current study is also lower than studies in Nigeria (75.8%), Malawi (51%), Uganda (59%), Jamaica (66%), and Indonesia (50.8%). This could be due to difference in socio-demographic factors, cultural factors, and difference in health-care delivery system [4, 19, 22, 23, 30].

The current study revealed that the odds of fertility desire was 2.93 times higher among males than females (AOR = 2.93; 95% CI: 1.70–5.06). According to studies conducted in Ethiopia [9, 27], Tanzania, Kenya, India, Jamaica, Nepal, and China, males have a greater desire to bear children than females [2, 3, 13, 21, 24, 30]. Although men and women are both involved in the process of child bearing, women often suffer and are concerned about the negative effects of pregnancy, labor, and delivery, which might make them more hesitant about becoming pregnant than men. Additionally, men's interest in leaving a name behind their name might have contributed to the higher fertility desire among males [2, 3].

Similarly, the odds of fertility desire was 2.49 times higher among HIV-infected adults on WHO treatment stage I compared to those on stage III (AOR = 2.49; 95% CI: 1.17–5.28). People who are in WHO treatment stage I are more likely to be in good health than those who are in stage III. This is supported by a study conducted in Addis Ababa. This could be due to the positive effect of being on ART; people on WHO treatment stage one could have improved social, economic, and physical status, which enables them to bear a child [8].

On the other hand, the likelihood of desiring fertility among participants who lived with HIV for more than 10 years was 2.5 times higher than that of those who lived with HIV for less than 5 years (AOR = 2.50; 95% CI: 1.12–5.55). This finding is supported by a similar study conducted in Malawi in which people who lived longer with HIV were more likely to desire child bearing [23]. This could be explained by the fact that people who have lived with HIV for a longer period of time are more likely to be aware of the possibility of having an HIV-negative child as a result of their adherence to HIV prevention measures for the newborn.

Even though it was not statistically associated with fertility desire in the previous studies, the likelihood of fertility desire among people on ART was found to be statistically associated with the type of ART regimen in the current study. Thus, people on first-line ART were 2.44 times more likely to want to have children than those on second-line ART (AOR = 2.44; 95% CI: 1.07–5.58). People on first-line ART regimens are relatively healthy and exposed to fewer side effects compared to those on second-line ART regimens, which might contribute to an increased fertility desire [15].

Lastly, the odds of fertility desire among people who had no live children was 2.94 times higher compared to those who had children (AOR = 2.94; 95% CI: 1.35–6.38). This is supported by other studies from Ethiopia [6, 9, 25], Nigeria [7, 20], Kenya [24], Spain [16], Brazil [15], Nepal [2], and China [3]. In many

African countries, including Ethiopia, individuals who did not have a child wanted to replace themselves in order to have a caretaker when they became older [3, 9]. Individuals might also desire fertility in order to reduce pressure from the community [25].

This study has limitations, including the cross-sectional nature of the study, which prevents the establishment of cause and effect relations. Additionally, due to healthcare workers' encouragement of individuals on ART to have a protected sexual practice and use of contraceptives, there might be a social desirability bias.

Conclusion

In this study, a considerable proportion of PLWHIV (44.87%) desired child bearing. Of these, 42.29% desired fertility because they thought that they could have an HIV-negative child due to ART. Male sex, WHO treatment stage I, first-line ART regimen, and having no child were discovered to be associated with fertility desire factors. Hence, sexuality and reproductive health counseling measures should consider the fertility needs PLWHIV.

Abbreviations

AIDS: Acquired Immunodeficiency Syndrome; AOR: Adjusted Odds Ratio; ART: Antiretroviral Therapy; CD4: Cluster of Differentiation Four; CI: Confidence Interval; COR: Crude Odds Ratio; HAART: Highly Active Antiretroviral Therapy; HIV: Human Immunodeficiency Virus; PLHIV: People living with HIV; PMTCT: Prevention of Mother-to-child transmission; UNAIDS: Joint United Nations Program on HIV/AIDS; WHO: World Health Organization

Declarations

Ethics approval and consent to participate

Ethical clearance was obtained from the Institutional Review Board (IRB) of the University of Gondar. Permission was also obtained from the medical director of the University of Gondar comprehensive specialized hospital and the ART focal person. Moreover, informed verbal consent was obtained from each study participant during data collection, and confidentiality was ensured by avoiding the registration of personal identifiers. Additionally, the data was fully anonymized and no raw data was given to anyone other than the investigator.

Consent for publication

Not applicable

Availability of data and materials

The datasets used during the current study is available from the corresponding author.

Competing interest

The Authors declare that there is no competing of interest

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Authors' contribution

The authors made a significant contribution to the work reported. **AA** conceived the idea and design for work, analyze and interpretation of data and also draft the manuscript. **AW** approved the designed work with some revisions, participated in data analysis and reviewed the manuscript. Both authors gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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