Epidemiology: Open Access

Kebede et al., Epidemiology (Sunnyvale) 2019, 9:1
DOI: 10.4172/2161-1165.1000373

Research Article Open Access

Understanding the Socio-Psychological, Demographic, Obstetric and Treatment-Status Aspects of Fertility Desire among Anti-Retroviral Treatment Clients, Dodota District, Oromia, Ethiopia

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Received date: February 06, 2019; **Accepted date**: March 18, 2019; **Published date:** March 28, 2019

Abstract

Background: The reproductive decisions made by partners of and people living with HIV/AIDS (PLWHA) impact the wellbeing of their families. Multi contexts correlates of fertility desire are less studied among Anti-Retroviral Therapy (ARVT) clients.

Methods: We used health facility based cross sectional study design. The study was conducted from February 20 to March 30, 2016 on 242 ARVT clients. A pre-tested and structured questionnaire was used to collect quantitative data. The data were analyzed using the windows statistical package for social science software version 21. Univariate, bivariate and multivariate analysis were used to describe fertility desires and associated factors.

Results: Ninety-five (39.3%) of the ARVT clients wished to have more children. One hundred thirty two (54.5%) of them were using Family Planning (FP) methods. Two-third of, or 91 (68.9%) FP users planned to have no more children. Seventy-six (31.6%) of the respondents gave birth after knowing their HIV sero-status. Young males who had never had child and married respondents were more likely to desire fertility in the foreseable future compared to their counterparts. Respondents, who work as merchants were less likely to wish to have a child compared to the housewives. Two hundred thirty-nine (97.6%) of the respondents generally knew about Prevention of Mother to Child Transmission (PMTCT) of HV/AIDS. This level of knowledge was strongly associated with fertility desire itself. In fact, qualitative findings portrayed social pressure, perceived compensation from giving birth to a healthy newborn and eagerness for confirmation as chief reasons for the desire to give birth to a baby. Knowledge of PMTCT of HIV/AIDS moderated the paths of these chief reasons. Having been followed for a long time in an ARVT clinic and better recent CD4 counts were significant contributors to fertility desire.

Conclusions: Two in every five ARVT clients wish to have a child. To meet their fertility desires; socio-demographic, maternity and psychosocial contexts specific Information-Education-Communication (IEC) should be initiated shortly after enrollment on ARVT. Those who never gave birth, males, married, merchants deserve especial attention.

Keywords: ARVT clients; Fertility desire; Social pressure; Healthy newborns; Mixed method; Dodota-Arsi; Ethiopia

Abbreviations: AOR: Adjusted Odds Ratio; ARVT: Anti-Retroviral Therapy; CD4: Cluster of Differentiation 4; COR: Crude Odds Ratio; FP: Family Planning; HIV/AIDS: Human Immuno Virus/Acquired Immuno-Deficiency Syndrome; OR: Odds Ratio; PMTCT: Prevention of Mother to Child Transmission; PLWHA: People Living with HIV/AIDS

Background

In Sub-Saharan African countries, most PLWHA are of reproductive age, and, the desire to have children even after knowing their HIV status has been observed [1-3]. According to the 2014 HIV estimates, the national HIV prevalence in Ethiopia was 1.14%. The estimate for this same indicator in the Oromia Regional State was 0.9%. The Millennium Development Goals (MDGs) target six was aimed at reducing HIV prevalence below 2.5% [4]. The World Health Organization's (WHO) 2014 report depicted the estimated number of PLWHA in Ethiopia to be 769,600 with 15,700 new HIV infections and 35,600 AIDS-related deaths [5].

To overcome this problem, Ethiopia has made significant progress to ensure universal access to HIV Testing and Counseling (HTC) and HIV/AIDS treatment services. As a result, about 9.6 million HIV tests were conducted in 2013/14 together with provision of Prevention of Mother-to-Child Transmission of HIV (PMTCT) services; with the national coverage level of 61% [3,4]. Besides, the expansion of HIV testing and counseling services, provision of ARVT services (ongoing provision of fetal HIV infection prophylaxis as part of perinatal care, counseling about healthy living with HIV, and family planning options to prevent unwanted pregnancies) also have expanded on a large scale and are free of charge. This has encouraged high enrolment of PLWHA

in ARVT services. Currently, the number of PLWHA receiving ARVT services has reached more than 317,443 [5].

Therefore, in Ethiopia, the accessibility of ARVT changed the lives of most PLWHA and evidence indicates rising intention to give birth to children in the future. In general, for PLWHA, who desire to have children, comprehensive and coordinated services must be provided beginning with increased primary prevention services, as well as reproductive health choices. This enables either the prevention of unintended pregnancies or appropriate planning for intended future pregnancies for PLWHA [4-7].

Unfortunately, for PLWHA who become pregnant, access to and follow-up through effective interventions must be done to prevent transmission to the fetus. Providing treatment for the mothers can maximize maternal health and enhance HIV-free survival generation by preventing vertical transmission from mother to newborn. The knowledge of ARVT clients' fertility desire is an important element of ARVT services if vertical transmission of HIV/AIDS is to end [6,7].

If HIV-positive clients conceive without close follow-up by ARVT clinic and use of anti-retroviral drugs, they may end-up with unexpected outcomes. Most studies in this area have been conducted only among women, and did not evaluate many variables that might impact decision making. And, they have not utilized qualitative methods for triangulation.

In addition, specific regions of Ethiopia have not been studied. Thereof, the researchers question about the status of fertility desire among ARVT clients and push and pulls involved in the decisions. Thus, it is appropriate to study correlates of fertility desire, and the use of family planning methods. The objective of this study was to determine magnitude of fertility desire and assess its socio-demographic, knowledge, social and obstetric and ARVT related aspects using mixed methods in Dodota district-one of the 30 high density ARVT sites located in the Oromia Regional State, Ethiopia.

Methods

Study design and setting

A cross-sectional study was conducted in Dodota District, Dera Health Center. Dodota district is located South-East part of Oromia 125 km away from Addis Ababa (the capital of Ethiopia) along the main road of Adama to Asella. It is comprised of 20 health professionals and 11 supportive staff. It was started to provide ARVT service for PLWHA in 2006 and currently, the number of PLWHA receiving ARVT has reached 580. This made the Dera health center with the largest number of ARVT clients in the zone at health center level (unpublished district annual health report [8]. The total population of the Dodota district in fiscal year 2015 is estimated to be 84,729 (unpublished district annual health report [9] and the health by 2015 in the district there were 2 health centers, 12 health posts and 9 private clinics providing health services [10].

Population and sample

The source population was all ARVT clients aged 15-49 years for female and greater than 18 years for males having at least one visit in the ARVT unit at the Dera Health Center during the study period. The sample size was calculated using single population proportion formula. Finite population correction formula was used to produce final sample size. The proportion (41.13%) of future fertility desire was obtained from a study conducted in 2015 in Western Shoa Zone [11]. A 5% margin of error, 95% confidence level, level of significance (α=5%) and non-reponse rate of 15% were assumed. Finally, we used a formula ($n_0=((Z\alpha/2)^2 \times P(1-P)/d^2$). We later used a correction formula ($n=n_0/1 + n_0/N$) [12] to determine the final adequate sample size since the target population at Dera Health center was 580, which is <10,000 where, Z=1.96 is coefficient of reliability at 95% confidence level, α/2 (5% level of significance), d=(margin of error tolerated), n=the final corrected sample size, n_0=the initial sample size, N=the size of study population. Accordingly, the final sample size used was n=242. Additionally, this study involved four key informants to get qualitative data for triangulation: the ARVT care provider, counselor, peer supporters/counselor, and family planning service provider. The key informants were expected to provide rich information about ARVT clients' fertility desires, related feelings and perceptions.

Sampling procedures: The Medical Record Numbers (MRN) of ARVT clients enrolled in Dera Health center was identified. Then, consecutive sampling technique was used to involve every other ARVT clients. Those clients on follow-up visits were recruited into the study and were interviewed. The interviews continued till the required sample size was filled.

Instrument and measurement: We used structured, pre-tested local language (Afan Oromo) questionnaires. The questionnaire was adapted from that used in similar published studies [13-23]. The themes of the questionnaire were socio-demographic characteristics (age, sex, marital status, gender, occupation etc.), maternity experience, fertility desire, and-family planning use (history of giving birth, desire to have more children, current use of FP-birth control methods including abstinence etc.), HIV/AIDS diagnosis, disclosure and ARVT enrollment characteristics (time of diagnosis with HIV, disclosure status, partner's HIV status, time of enrollment on ARVT, etc.) and general knowledge of MTCT (knowledge of HIV transmit from mother to child, conditions under which HIV transmits from mother to child, PMTC, etc.).The questionnaire was initially prepared in English and translated into Afan Oromo by experts. We pre-tested the tools on 12 (5%) of the sample size in Eteya health center ARVT clinic located in Hetosa, one of the adjacent districts.

Data collection procedures: Quantitative data were collected by face to face interviews. We trained data collectors on how to use the study instruments. We used five trained nurses anonymous to Dera health center to supervise the data collection process. Two supervisors checked the data for consistency and completeness every day after data gatherings. The data were collected after informed consent was sought from each of the respondents. The data were collected in separated room to keep privacy of the participants. Furthermore, qualitative data were collected by investigators through in-depth interview with key informants. The interview was guided by themes of questions with further probing. The themes include: ARVT clients' feelings and plans of having more children, community perception/social pressures of giving births as HIV positive, clients' beliefs and feelings of having children as being HIV positive, and perceptions of mother to child transmission. The in-depth interview was tape recorded for later transcription.

Data processing and analysis: The quantitative data were edited, coded and entered into Epi-Data version 3.1 Software. Data were double checked during entry. Then, data were exported to SPSS version 21.0 software for analysis. Before analysis, we reversed scores for negatively worded items. We used univariate analysis (frequency tables) to describe fertility desire level, Socio- demographic

characteristics, knowledge of PMTCT, HIV status-CD4 count and ARVT profiles, maternal history and use of family planning methods. Then, we executed bivariate analysis to look for correlates of fertility desire using crude Odds-Ratio (OR) within 95% confidence interval. We used p-value <5% to declare the significance of the effect of correlates. Finally, using enter-method, multiple logistic regressions were executed to determine adjusted effects of the correlates of fertility. The qualitative data were first transcribed into Afan Oromo language and translated into English. The meanings of the responses were interpreted using thematic analysis approach. First the transcriptions were thoroughly read. Then interpretations were made to the responses considering questions of interest. Next, main categories of themes were emerged based on the main questions asked through interviews. Finally, the themes were triangulated with quantitative aspects of fertility desire.

Ethical considerations: Ethical clearance was obtained from the research review committee of Arsi University, College of Health Science. Next, formal support letter was written to Arsi zonal health department. Then, official support letter was written to Dodota district health office. Finally, the district health offices offered permission for the study. Furthermore, verbal informed consent was secured from each respondent after loudly reading the information sheet to every one of them. Verbal consent was sought because there was no risk perceived to happen to ARVT clients by involving in the study. The information sheet stated about the title and purpose, potential risk and benefit, confidentiality, privacy, voluntary participation and withdrawal rights from the study. The data collection was made in a private room. No personal identifiers were presented in reporting the finding. The data collected were kept confidential as it was exposed to any other body except the researchers.

Results

Socio demographic characteristics of the participants

From a total of 255 ARVT clients approached, 242 participated in the study, producing a response rate of 94.9%. The majority of respondents 151 (62.4%) were from urban settings. 129 (53.3%) were females and 150 (62%) of the respondents were of the Oromo ethnic group.

Most of them, 172 (71.1%) were married and 60(24.8%) of the respondents were housewives. The majority, 129 (53.3%), of the respondents were 30-39 years old. Nearly half, 124 (51.2%) of the respondents had attended primary school (Table 1).

Characteristics	Fertility desire in conceivable future		
	Yes	No	Total
	Number (%)	Number (%)	Number (%)
Sex			
Male	58 (51.3)	55 (48.7)	113 (46.7)
Female	37 (28.7)	92 (71.3)	129 (53.3)
Age group (years)			
<29	32 (71.1)	13 (28.9)	45 (18.6)
30-39	45 (34.9)	84 (65.1)	129 (53.3)
40-49	18 (36.7)	31 (63.3)	49 (20.2)
>49	0 (0)	19 (100)	19 (7.9)
Religion			
Orthodox	65 (41.7)	91 (58.3)	156 (64.5)
Muslim	25 (43.1)	33 (56.9)	58 (23.9)
Protestant	5 (17.9)	23 (82.1)	28 (11.6)
Educational status			
Unable to read and write	17 (30.4)	39 (69.6)	56 (23.2)
Able to read and write	4 (19.0)	17 (81)	21 (8.7)
Primary	52 (41.9)	72 (58.1)	124 (51.2)
Secondary or Tertiary	22 (53.7)	19 (46.3)	36 (14.9)
Ethnicity			
Oromo	68 (45.3)	82 (54.7)	150 (62.0)
Amhara	26 (29.5)	62 (70.5)	88 (36.4)
Others	1 (25)	3 (75.0)	4 (1.6)
Marital status			
Married	78 (45.3)	94 (54.7)	172 (71.1)
Single	14 (73.7)	5 (26.3)	19 (7.9)
Widowed	1 (2.9)	34 (97.1)	35 (14.5)
Divorced	2 (12.5)	14 (87.5)	16 (6.5)
Occupational status			
Housewife	20 (33.3)	40 (66.7)	60 (24.8)
Farmer	14 (31.1)	31 (68.9)	45 (18.6)
Merchant	18 (58.1)	13 (41.9)	31 (12.8)
Daily laborer	23 (36.5)	40 (63.5)	63 (26.0)
Others	20 (43.5)	23 (56.5)	43 (17.8)
Income (ETB)			
<200	42 (34.4)	80 (65.6)	122 (50.5)
200-400	14 (38.9)	22 (61.1)	36 (14.8)
401-600	19 (43.2)	25 (56.8)	44 (18.2)
601-800	7 (46.7)	8 (53.3)	15 (6.2)
>800	13 (52.0)	12 (48.0)	25 (10.3)

*Others=Government employee, private employee, student and commercial sex workers.
ARVT: Anti Retro-Viral Therapy; ETB: Ethiopian Birr.

Table 1: Socio demographic characteristics for ARVT clients attending Dera Health Center, Dodota district, Ethiopia, 2016 (N=242).

HIV status disclosure, sex partner's behavior and enrollment on ARVT

Most, 194 (80.2%) participants had known their HIV sero-status for five years. HIV sero-positivity disclosure rates were 218 (90.1%) and 178 (73.6%) for sex partners and immediate neighbors/friends respectively. 206 (85.1%) of the respondents reported that their sex partners were ever screened for HIV. And 174 (71.9%) of the partners were tested to be sero-concordant. Clients' sex partners who were reported as not screened for HIV (36=29.1%) were characterized as: not living with respondents/their sex partner/currently (15=41.7%), died before the respondents knew their HIV sero-positivity (14=38.9%) and the respondents didn't disclose their HIV sero-positivity to them (7=19.4%). About 11 (6.2%) of the respondents perceived that their community does not expect HIV positive people to have a child in future and they may face discrimination. A majority, 182 (75.2%) of ARVT clients were on therapy for more than five years and 237 (97.9%) of the respondents on ARVT perceived that their health status was improved at the time of study compared to when they started ARVT. 197 (81.4%) of the respondents reported that they had a CD4 count greater than or equal to 350 cells/m^3 (Table 2).

Characteristics	Number	Percent (%)
HIV diagnosis duration (N=242)		
<5 years	48	19.8
≥ 5 years	194	80.2
HIV status disclosed to partner (N=242)		
Yes	218	90.1
No	24	9.9
HIV status disclosed to neighbor/friends (N=242)		
Yes	178	73.6
No	64	26.4
Perceived unfavorable community expectation to give birth to child (N=242)		
Yes	11	6.2
No	231	93.8
Duration of clients on ARVT		
<5 years	60	24.8
≥ 5 years	182	75.2
Perceived current health condition (N=242)		
Improved	242	97.9
No change	5	2.1
Recent CD4 count (N-242)		
<350	45	18.6
≥ 350	197	81.4
Partner screened for HIV (N=242)		
Yes	206	85.1
No/don't know	36	14..9
Partner HIV status (N=242)		
Positive for HIV	174	71.9
Negative for HIV	32	13.2
No response/Not sure	36	14.9
Reason partner was not tested (N=36)		
I did not disclose myself	7	19.4
Died before I tested for HIV	14	38.9
Not with partner currently	15	41.7

ARVT: Anti Retro-Viral Therapy; CD4: Cluster Differentiation 4; HIV: Human Immunodeficiency Virus.

Table 2: HIV status disclosure, partners' behavior and ARVT related characteristics for ARVT clients attending Dera Health Center, Dodota district, Ethiopia, 2016 (N=242).

Magnitude of fertility desire among ARVT clients

This study revealed that the fertility desire among ARVT clients at Dera health center was 39.3% (24% and 15.3% of this percentage was shared by male and female respondents respectively). The fertility desire differed significantly by sex and was (58/113=51.3% among males and 37/129=28.7% among females, x^2=12.9, p-value=0.001). A higher desire for having children in the future were seen in the age groups 30-39 and 15-29 at 129/242 (53.3%) and 45/242 (18.6%) respectively. And of those who desire to have children in the future, 61 (64.2%) wanted to have two more children. The main reasons for why the respondents desired to have more children were to replace oneself or heredity, 86 (90.5%), because partner wants more children, 8 (8.4%) and to avoid stigma 1 (1.1%). An overwhelming number, 224 (94.6%) felt that being on ARVT did not affect their fertility desire. 27 (28.4%) of the respondents who wanted children preferred to have children after two years (Table 3).

Characteristics	Number	Percent (%)
Fertility desire to have children in the future (N=242)		
Yes	95	39.3
No	147	60.7
Number of children intended to have in the future (N=95)		
1	21	22.1
2	61	64.2
≥ 3	13	13.7
Reasons for need to give birth (N=95)		
To replace heredity	86	90.5
To avoid stigma and discrimination	1	1.1
Partner wants	8	8.4
Time preferred to have children (N=95)		

<one year	27	28.4
Within two years	7	7.4
After two years	27	28.4
When felt health	27	28.4
Not sure	7	7.4
ARVT and PMTCT affect clients' fertility desire (N=242)		
Yes	18	7.4
No	224	92.6
Measures that would be taken if pregnancy happen unexpectedly (N=242)		
Simply give birth	174	71.9
Abort	61	25.2
Others	7	2.9
ARVT: Anti Retro-Viral Therapy; PMTCT: Prevention of Mother To Child Transmission.		

Table 3: Magnitude of Fertility desire among ARVT clients attending Dera Health Center, Dodota district, Ethiopia, 2016 (N-242).

Use of family planning and maternity history

148 (61.2%) of the ARVT clients were using modern family planning (this include contraceptive pills, Depo-Provera, Intra uterine devices, implant, and Norplant) after they were diagnosed for HIV. 132 (54.5%) were currently using family planning including abstinence. The majority, 91 (68.9%) of the FP users use to stop giving births. 76/242 (31.6%) of the ARVT clients ever gave birth after knowing their HIV sero-status and 8/242 (3.3%) of them were currently pregnant. Those who were not using family planning gave a reason as they need to have a child 35/110 (31.8%), have no partner 52 (47.2%) and fear of side effects 5 (4.5%) respectively.

Characteristics	Number (n)	Percent (%)
Use of family planning method after knowing HIV status (N=242)		
Yes	148	61.2
No	93	38.4
No response	1	0.4
Current use of family planning method (N=242)		
Yes	132	54.5
No	110	45.5
Purpose of using Family planning (N=132)		
To space birth	38	28.8
To limit number of children	3	2.3
To stop birth	91	68.9
Reason not using family planning (N=110)		
Fear of side effect	5	4.5
I have no partner	52	47.2
I want to give birth	35	31.8
I am using condom	17	15.4
My partner does not agree	1	0.1
Ever given a birth (N=242)		
Yes	210	86.8
No	32	13.2
Current number of children they have (N=242)		
Have no child	32	13.2
1-3	85	35.1
≥ 4	125	51.7
Ever practice abortion (N=242)		
Yes	61	25.2
No	181	74.8
How many times? (N=61)		
One	31	50.8
≥ Two	30	49.2
Given birth after knowing HIV status (N=210)		
Yes	76	36.2
No	134	63.2
Your/spouse last pregnancy was wanted (N=210)		
Yes	210	100
No	0	0
You/spouse use of family planning during last pregnancy (N=210)		
Yes	143	68.1
No	67	31.9
You/spouse currently pregnant (N=242)		
Yes	8	3.3
No	231	95.5
I don't know	2	0.8
No response	1	0.4
ARVT: Anti Retro-Viral Therapy; HIV: Human Immunodeficiency Virus.		

Table 4: Use of family planning and fertility history among ARVT clients attending Dera Health Center, Dodota district, Ethiopia, 2016 (N=242).

In fact, 17 (15.4%) were using condoms. The fertility history of the respondents showed that 210/242 (86.8%) of the respondents/spouses had at least one birth. 125 (51.7%) of the respondents had four or more children at the time of study while 32 (13.2%) had no children at all.

Finally, 76/242 (31.4%) of the respondents had their last birth after learning their HIV status (Table 4).

Comprehensive knowledge about PMTCT among ARVT clients

Among the 242 respondents, 237 (97.9%) reported that they had knowledge of transmission of HIV/AIDS from mother to child and how to avoid transmission. Accordingly, 97 (40.1%), 76 (31.4 %) and 62 (25.6%) reported transmission *via* delivery and breast feeding, pregnancy and delivery and only during pregnancy respectively. Similarly, 237/242 (97.9%) of the study participants had information about the presence of interventions to prevent mother to child transmission and 206 (85.1%) of the respondents heard about PMTCT option B+ service i.e. PMTCT services that HIV patients who would love to become pregnant can get (Table 5). The in-depth-interviews explored that the majority of the ARVT clients knew that HIV/AIDS can be prevented as long as they are on ARVT. One ART Counselor said, "*…ART clients just, like any other people, want to have children because their knowledge and perception of PMTCT is highly increased…*." They know that they can give birth to a HIV free baby. In fact, those who don't have many children in marriage life, would like to confirm that by giving birth to a new child. For example, one interviewee reported, "*…ART clients know about PMTC….especially those who have one or no child are so eager. They want to have negative child despite possibility of mother to child transmission.…*"

Characteristics	Number	Percent (%)
Knowledge on mother to child HIV transmission		
Yes	237	97.9
No	5	2.1
Having Knowledge on the time of HIV transmission to baby		
Yes	235	97.1
No	7	2.9
Period of transmission of HIV to their baby		
During pregnancy	62	25.6
During pregnancy & delivery	76	31.4
During pregnancy, delivery and breast feeding	97	40.1
Knowledge on PMTCT		
Yes	237	97.9
No	5	2.1
Presence of intervention to prevent mother to child transmission		
Yes	237	97.9
No	5	2.1
Aware of PMTCT option B+ service		
Yes	206	85.1
No	36	14.9

ARVT: Anti Retro-Viral Therapy, PMTCT: Prevention of Mother To Child Transmission.

Table 5: Comprehensive Knowledge about PMTCT among ARVT clients attending Dera Health Center, Dodota district, Ethiopia, 2016 (N=242).

Factors associated with fertility desire

The socio-demographic of the total 242 study participants, 95 (39.3%) desired to have children in the future. In multivariate analysis, ARVT clients' age, sex, marital status, occupation, number of children, number of CD4 count, duration of HIV diagnosis and duration on ARVT were found to be significantly affecting fertility desire in conceivable future. Being male was found to be significantly associated with fertility desire. Accordingly, female clients were nearly five times more likely to have no fertility desire compared to their male counterparts (AOR=4.9, 95% CI=2.08, 11.45). The study participants in 30-39 year old age group were four times more likely not want children than those 15-29 years (AOR=4.1, 95% CI=1.49, 11.35).The participants' marital status was one of the social statuses that affected fertility desire. Widows were sixteen times more likely not to want children in the future than those who were married (AOR=16.3, 95% CI=1.54, 173). Regarding occupational status of the study participants, merchants (small business) were averagely four times more likely to not want children than those who were house wives (AOR=4.02, 95% CI=1.08, 14.95). Income was found to be positively correlated with fertility desire. Every 200 Ethiopian Birr (ETB) increase showed significant slight reduction in declining to have baby in conceivable future compared to lowest range income securers i.e. <200 ETB (COR: 1.21, 1.45, 1.67 and 2.10 respectively for income range of 201-400, 401-600, 601-800 and >800). ARVT clients whose educational level was secondary education or above were 61% less likely to not want children in the future compared to illiterates (COR=0.39, 95% CI=0.16, 0.93). In fact, both income and educational status had no effect on fertility desire after adjustment was made with other significant variables. A positive association was found between fertility desire and the number of children that the ARVT clients currently had (Table 6).

Variables	Fertility Desire		OR (95% CI)		P-value
	Yes N (%)	No N (%)	COR (95% CI)	AOR (95% CI)	
Sex					
Male	58 (51.3)	55 (48.7)	1	1	
Female	37 (28.7)	92 (71.3)	2.62 (1.54, 4.46)*	4.9 (2.08, 11.45)**	0.0001

Age group					
15-29	32 (71.1)	13 (28.9)	1	1	
30-39	45 (34.9)	84 (65.1)	4.60 (2.19, 9.62)*	4.1 (1.49, 11.35)**	0.006
40-49	18 (36.7)	31 (63.3)	4.24 (1.78, 10.10)*	2.80 (0.77, 10.20)	0.118
≥ 50 for Male	0 (0)	19 (100)	397 (0.00, 0.00)*	622 (0.00,0.00)	0.998
Marital status					
Married	78 (45.3)	94 (54.7)	1	1	
Single	14 (73.7)	5 (26.3)	0.30 (0.1, 0.86)*	0.59 (0.03, 10.82)	0.72
Widowed	1 (2.9)	34 (97.1)	28.21 (3.78, 210)*	16.3 (1.54, 173.06)**	0.02
Divorced	2 (12.5)	14 (87.5)	5.81 (1.28, 26.3)*	2.39 (0.43, 13.47)	0.321
Occupational status					
House wife	20 (33.3)	40 (66.7)	1	1	
Farmer	14 (31.1)	31 (68.9)	1.11 (0.48, 2.54)	0.85 (0.27, 2.65)	0.781
Merchant	18 (58.1)	13 (41.9)	0.36 (0.15, 0.88)	4.02 (1.08, 14.95)**	0.038
Daily laborer	23 (36.5)	40 (63.5)	0.87 (0.41, 1.83)	0.59 (0.16, 2.09)	0.409
Others***	20 (46.5)	23 (53.5)	0.58 (0.26, 1.29)	1.51 (0.49, 4.59)	0.467
Number of children owned					
Have no child	27 (84.4)	5 (15.6)	1	1	
1-3	34 (40)	51 (60)	8.10 (2.84, 23.11)*	12.84 (0.89, 185)	0.061
≥ 4	34 (27.2)	91 (72.8)	14.45 (5.15, 40.57)*	18.65 (1.27, 274)**	0.033
Duration on ARVT					
<5 years	25 (52.1)	23 (47.9)	1	1	
≥ 5 years	70 (36.1)	124 (63.9)	1.93 (1.02, 3.64)*	0.19 (0.07, 0.57)**	0.003
Recent CD4 count					
<350	20 (44.4)	25 (55.6)	1	1	
≥ 350	75 (38.1)	122 (61.9)	0.47 (0.25,0.90)*	0.20 (0.09, 0.55)**	0.001

AOR: Adjusted Odds Ratio; ARVT: Anti Retro-Viral Therapy; CD4: Cluster Differentiation 4; COR: Crude Odds Ratio; OR: Odds Ratio.

*Significant association to Fertility desire in binary logistic regression analysis, **Significant association to Fertility desire in multivariate logistic regression analysis, Others***: including government employee, private business employee.

Table 6: Multivariate Logistic regression for Fertility Desire and associated factors among ARVT clients attending Dera Health Center, Dodota district, Ethiopia, 2016 (N=242).

Maternity history and experience dimension: Clients who had ≥ 4 children were 18.65 times more likely no want no more children than those who had no children (AOR=18.65 (1.27, 274). This result was also supported by the qualitative aspect of the study. For example, a health professional, who is an ARTV service provider, "*ARVT clients who are on treatment have great desire to have children to replace themselves and especially those who had no children, are so eager to have in the future*".

Social pressure: The qualitative aspect of this study indicated that social pressures were important for fertility desire among ARVT clients. The pressure starts when the client discloses his/her HIV sero-positivity. In addition to the stigma and discrimination, the disclosure imposes many people may view the clients that they are not supposed to give birth anymore. They may be regarded as a source of infection to the coming generation. In fact, this was not real feelings of the clients. One key informant provides supportive quote, "*…during counseling,… significant number of clients specially the females wish not to disclose their sero status because of the perception that they may be supposed to give birth anymore, they may even be considered as they wish to transmit the disease to any other body else and hostile…*" In fact, the

interview with peers rather portrayed the opposite to be true. The interviews explored sexual partners' perception as another dimension of social pressure especially among married couples. Some ART clients don't disclose their HIV sero-status to their sexual partner partly because they fear family disturbance. One interviewee explains this as such, "…*some ART clients desire to give birth in order to address their counterpart' desire to have baby….things become out of their control especially when they have not disclosed their HIV status to their partner. They can't say no to their partners request to have baby. Disclosure is an important thing; it can give freedom if learned in our society*".

Knowledge and perception: Though magnitude of knowledge of PMTCT during pregnancy, delivery and breast feeding was as high as 97.9%, it has resulted in significant statistical differences in fertility desire among ARVT clients. In fact, knowledge was modifying the effect by interacting with other correlates of fertility desire. For example, across the interviews, the key informants implied that more or less the, ARVT clients have adequate knowledge for preventing mother to child transmission of HIV. And, the knowledge of PMTCT of HIV seems to relate with fertility desire as it realizes ARVT clients' wish to see HIV free baby coming out of their womb especially for those who have few or no children. One interviewee reported, "*… ARVT clients just like any other people, want to have children because their knowledge and perception on PMTCT is high and they know very well they can deliver a HIV free baby…*" Another interviewee said, *"…ARVT clients have a great desire to have children, most of them frequently request whether they can give birth or not and push us to allow them. Especially, those who had one or no child are so eager to have baby…"* Furthermore, married couples who wish to meet social expectation to have babies will use the knowledge so that they desire to have baby especially in the absence of disclosure of sero-status to partner. For example, one interviewer reported, "…*some ARVT clients desire to give birth in order to address their counterparts' desire to have baby…things become out of their control especially when they have not disclosed their HIV status to their partners*" Therefore, knowledge works through social-demographic and maternity experiences.

ARVT service: Enrollment in the ARVT clinic was related to fertility desire among ARVT clients. Long duration of ARVT follow -up was associated with fertility desire. Those on ARVT for greater than or equal to 5 years, were 81% less likely to have no desire for fertility than being on follow-up for less than 5 years (AOR=0.19, 95% CI=0.07, 0.57). In the qualitative survey, majority of the participants shared similar ideas. In-depth interviews key informant participant said, "*ARVT clients who were on ARVT for longer duration have fertility desire to have children in the future…the reasons for having fertility desire by ARVT clients were replacing themselves or to continue the heredity and to get someone who helps them in an old ages*" In addition, interaction between the ARVT service providers and clients during their stay in the clinic, improves their knowledge and confidence to give healthy baby. Gradually, in the process of counseling and discussing with the service providers/counselors, the ARVT clients begin to feel free and imply their need for getting healthy baby. One ART service provider reported, "*ARVT clients who are on treatment have a great desire to have children. Most of them frequently request whether they can give birth or not and push us to allow them; especially, those who had one or no child are so eager. They want to have negative child despite possibility of mother to child transmission. But, we always advise and tell them not to give birth for the sake of their health. We counsel all the alternatives and leave decision for them*." As their duration as an ARVT client and interaction with service providers advance-, the clients want to prove the effectiveness of ARVT for giving birth to HIV negative baby that is by giving birth to just a new HIV free baby. One ARVT counselor said, "…*They (ARVT clients) know that they can give birth to a healthier baby. They also know how to prevent during lactation time. In fact, due to these reasons, they are eager to have children; at least one child…*" Giving birth to at least one HIV negative baby was regarded as self-compensation and source of relief for ARVT clients. One interviewee who is ARVT client peer supporter says, "…*most clients become positive without the knowledge of their risk. They will be deeply anxious when they become positive. However, when they stepwise come to know they can give births to HIV free babies they will rejoice*…." It seems that the ARVT clients would love to give more births to get relief from their sorrowful feelings and perceived social pressure. Giving births to newly born HIV free babies after they become HIV positive, will give them some aspects of joyful life.

Discussion

Addressing fertility among ARVT clients is very important for prevention of unwanted pregnancy and mother to child HIV transmission. Women, merchants and those with higher educational achievement were less likely to intend to have children in the future. Married women who did not work outside the home were more likely to have a desire for fertility. Many prior studies showed that knowledge of PMTCT had positive and direct effects on fertility desire while this study did not. In fact, this study showed a high magnitude of knowledge of PMTCT of HIV (i.e. 97%). Nonetheless, qualitative findings produced significant outlook as to how knowledge of PMTCT of HIV could potentially play as moderator/mediator as it was found to locate at the center of the paths to fertility desires among ARVT clients. Some desire to have child because they never had a child or few, some because they want to satisfy their sex partner, some because they were informed repeatedly since enrolled into ARVT that they can have HIV free baby that they want to confirm, and some think they are compensated when they give birth to HIV free baby. But, these all kinds of reasons were found to work well through knowledge of PMTCT of HIV. From this, it is possible to hypothesize that perception to PMTCT of HIV provides basic & inevitable platform for every kind of intenders to provide strength to their fertility desire and beyond.

The overall level of fertility desire may indicate how PLWHA are intended to cope with their reproductive desires [18-25]. Accordingly, in this study, 39.3% of ARVT patient wished to have more children. A similar finding was reported in Fiche Hospital (39.1%), Woreilu District, Amhara Region (39.54%), Hosanna Town, Southern Ethiopia (36.45%) and Addis Ababa (39.9%) [21,23-25]. In fact, slightly higher levels of fertility desire were reported in the Tigray regional of Ethiopia; two different studies in Tigray and Mekelle reported 45% and 66.1% respectively [21,25]. On the other hand, this finding is higher than the previous study findings from similar studies conducted in Tanzania, 37.1%; Uganda, 28.6% and Kenya 34% [1,18,19]. This difference may be because of the socio-cultural differences within our country or might also be due to differences in general health status.

Regarding factors associated to fertility desire in this study, socio-demographic dimensions were found to be key factors of the fertility desire for ARVT clients. This was also reported in other studies [1,18-25]. For example, ages of the study participants were significantly associated with fertility desire. In this study, being younger, age 15-29 years old increased the desire to have child. This finding is similar with

the findings of various studies conducted in different areas of Ethiopia and Africa [1,17-28] which indicate that younger ARVT clients have more fertility desire than older ARVT clients. Male ARVT clients were multiple fold more likely to have a child compared to women in this study. Similarly, studies conducted in North and East of Ethiopia revealed that men were more likely to want to have babies [21-24]. Perhaps, this could be because men do not face the reality of conception, delivery or breast feeding. Regarding marital status, married respondents were more likely to desired children compared to those widowed and divorced. This is perhaps, because in Ethiopian context, children are regarded as one of the requirements in living/social environment of married couples. In support of this idea, the qualitative aspect of one study conducted in Ethiopia reported that many PLWHA who are married explain their desire to give birth mainly in order to address their married partners' intention to have children and giving birth at the same time is relevant to maintain their marriage life [23,26,27]. Additionally, not-giving birth in marriage life may also pose social question by neighbors or relatives as to why the couples don't bear children anymore.

A study conducted in South Africa showed positive societal expectation to give birth to many children. In fact, interviewees reported the existence of community disapproval to have children when it comes to being HIV positive [13,29]. Regarding the effect of occupation; merchant (small business) respondents seem to have averagely four times lower fertility desire compared to those women who stay at home. This could be because those ARVT clients engaged on small business may be too busy to conceive as they struggle to earn compared to women who stay at home. And, those women who stayed at home may demand having more children for social security in their marriage life.

Maternity history and experiences were also other noteworthy factors. For example, in this study, the number of children the ARVT clients ever gave birth to was a relevant in fertility desire. Those who had no children were more likely to desire children compared to those who had more than one child, especially greater than four. This finding is also consistent with similar studies in various settings of Ethiopia [16,17,20]. In this study, current use of family planning was not statistically significantly correlated with the desire to have a child in the foreseeable future of ARVT clients. This indicates that ARVT clients are just living their choices i.e. (most of FP users desire to stop births and majority, 51% have even more than 4 children). In fact, some studies reported that who are not currently FP users FP non-users are more likely to have desire for children [28].

In this study HIV status and ARVT profile of ARVT clients were also found to be associated with their fertility desires. For example, the recent CD4 count and length of duration on ARVT are factors that determined the fertility desire. ARVT clients whose recent CD4 count was ≥ 350 were a five times more likely to desire having a child. This may be because poor health status is commonly observed among those with lower CD4 counts and ARVT counselors advise them to improve their health status before conceiving. To support this idea, in this study, 27/95 (28.4%) of those who preferred to have child in the future planned to have baby when they felt healthier. Additionally, the duration that clients were on ARVT increased the chance of desiring to have a baby compared to recent clients. Those who were using ARVT for more than five years were nearly five times more likely to want a child. This could be because of adaptation to living with HIV, higher specific knowledge on PMTCT and the desire to have a child as their best supporter in their old age.

In to this study, there was no statistically significant association between fertility desire and comprehensive knowledge about PMTCT, though it seems that ARVT clients, who were not aware of PMTCT, had lower fertility desires. This finding is similar with some studies [13,20,22] conducted in various settings of Ethiopia that reported there was no significantly association between fertility desire and knowledge of PMTCT. There were also studies conducted in Ethiopian settings which reported positive associations between fertility desire and knowledge of PMTCT [22-25,20]. The weak correlation found in this study could be attributed to the high prevalence (97%) of general knowledge of PMTC of HIV/AIDS in this study. In fact, the qualitative aspect of this study explored that some clients wish to confirm getting HIV negative babies as they learn PMTC of HIV is possible. Therefore, in this study, knowledge seemed to exert modifying effect rather than directly influencing fertility desire. Finally, this study is not without limitation. Its scope was limited to one Health Center in the district that may challenge inferences to other settings. Limitation of the qualitative interviews to key informants could be hiding community members' actual perceptions, social pressure and the connection with fertility desire. Furthermore, though this study has found out many correlates of fertility desire among ARVT clients that could inform policy, the regression analysis can't draw the networks and interplay of how those correlates work altogether in predicting fertility desire.

Conclusions

Nearly two in five ARVT clients wish to have children in the future. More than half (>54%) were family planning users. Current FP use status was unrelated to with future fertility intention. Socio-demographic factors play significant roles in the desire to have a child among ARVT clients. Long duration (5 years) since enrolled in ARVT clinic has affected fertility desire. We recommend: 1) ARVT clinics should be more responsive to the clients' need for children through counseling about fertility planning shortly after enrollment into ARVT scheme. This means clients should not necessarily stay longer time on the treatment in order to freely think about fertility. This would be especially worthwhile for ARVT clients who were recently enrolled and have a risk of unwanted pregnancy as it could reduce the chance of vertical transmission of HIV/AIDS. 2) Information-Education-Communication (IEC) interventions that focus on beliefs about healthy births and social pressures for ARVT clients to have children are indicated. In fact, socio-demographic and obstetric contexts should be considered for designing the interventions. 3) Further studies on the quality of ARVT education and counseling especially for newly enrolled ARVT clients to support their fertility plans and why certain women (gender) and merchants (occupation) are less likely to intend to have children in the future.

Declarations

Ethics approval and consent to participate

Arsi University, College of Health Science review committee approved the study. Verbal informed consent was sought from every respondent.

Availability of data and material

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Funding

Arsi University financially supported this study.

Authors' contributions

YK and GT conceived the idea. GT, YK, AH designed the study. GT, AH and YK drafted the manuscript. YK participated in the critical review of the manuscript. All authors gave their final approval of the version of the manuscript submitted for publication.

Acknowledgements

The authors acknowledge Arsi University for financial support for this study. We also would like to thank Dodota district Health Office and Dera Health Center workers for their cooperation over the study period. We are grateful to Mr. Salilew Abebe for making editions to writing in English for this article. Finally, we would thank participants and data collectors involved in this study.

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