Original Article

SAGE Open Medicine

SAGE Open Medicine
Volume 11: 1–11

DOI: 10.1177/20503121221145614
journals.sagepub.com/home/smo
SAGE

Two-thirds of pregnant mothers attending antenatal care services at Arsi Zone, Oromia Regional State, Ethiopia had no comprehensive knowledge of HIV/AIDS: A cross-sectional study

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Abstract

Objective: The study aimed to assess the magnitude and factors associated with comprehensive knowledge of HIV/AIDS among pregnant mothers attending antenatal care (ANC) services at health institutions in Arsi zone, Oromia Regional State, Ethiopia.

Methods: The study employed a health facility-based cross-sectional study design from 18 March to 25 June 2019. Out of an estimated sample size of 4481, a total of 4440 (92.23%) pregnant women were selected by multistage random sampling technique and interviewed. Multivariable binary logistic regression was used to identify the factors associated with comprehensive knowledge of HIV/AIDS. The model fitness was tested by Hosmer and Lemeshow goodness of fit, which provided a *p* value of 0.72 and deviance reduced (i.e., −2log likelihood was reduced from 5580.38 to 5069.55 with a *p* value of 0.000).

Results: Out of the total mothers (4440) interviewed, only 1430 (32.2%; 95% confidence interval: (30.83%, 33.60%)) had comprehensive knowledge about HIV/AIDS. Not knowing safe period to be pregnant (adjusted odds ratio = 0.67; 95% confidence interval: 0.56, 0.81), and not empowering women's for sexual practice (adjusted odds ratio = 0.50; 95% confidence interval: 0.43, 0.58) let women have less comprehensive knowledge while women who never educated about the sexual matter (adjusted odds ratio = 1.65; 95% confidence interval: 1.42, 1.92), who had a discouraging attitude toward having multiple partners (adjusted odds ratio = 1.53; 95% confidence interval: 1.24, 1.88), who had a discouraging attitude toward premarital sex (adjusted odds ratio = 1.68; 95% confidence interval: 1.38, 2.03), and who had a positive attitude toward accepting HIV/AIDS patients (2.69; 95% confidence interval: 2.34, 3.10) had more comprehensive knowledge of HIV/AIDS.

Conclusion: Only about one-third (32.2%) of pregnant mothers on ANC follow-up had comprehensive knowledge. Thus, it would be better if the health institutions emphasize educating the mothers attending antenatal care follow-up about HIV/AIDS, for those who do not know pregnancy occurrence date, not empowered of sexual practice, and had an encouraging attitude toward multiple partners, premarital sex, and negative attitude toward accepting HIV/AIDS patients.

Keywords

Comprehensive knowledge of HIV/AIDS, mothers' HIV/AIDS knowledge, mothers attending ANC

Date received: 10 September 2021; accepted: 29 November 2022

Introduction

Worldwide, mother-to-child transmission (MTCT) of HIV is a significant contributor to the HIV pandemic, accounting for 9% of new infections. The Joint United Nations Programme on HIV/AIDS reported that in 2016 an estimated 160,000 children were newly infected with HIV, and an estimated 3.1 million children were living with HIV globally.[1] Although this is still a large number of new infections, at the

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peak of the HIV epidemic, there were close to 500,000 children infected with HIV through MTCT each year. MTCT of HIV occurs when HIV is transmitted from a woman living with HIV to her baby during pregnancy, labor or delivery, or after delivery through breastfeeding.

Without treatment, approximately 15%–30% of infants born to HIV-positive women will become infected with HIV during gestation and delivery, with a further 5%–15% becoming infected through breastfeeding.[2] However, the 2021 Ethiopian guideline of Prevention of Mother to Child Transmission (PMTCT) revealed that the transmission rate was 10%–15%, 35%–40%, and 35%–40% during pregnancy, labor and delivery, and breastfeeding, respectively.[3]

An estimated 1.3 million women living with HIV become pregnant every year.[4] The World Health Organization has developed a campaign aimed at almost eliminating pediatric HIV to reduce the danger of MTCT. A four-pronged approach is implemented as part of the virtual elimination of HIV in children. Primary prevention of HIV infection in women of childbearing age; preventing unintended pregnancies among HIV-positive women; preventing HIV transmission from a woman living with HIV to her infant; and providing appropriate treatment, care, and support to HIV-positive mothers, their children, and their families are among the approaches.[5] One of the greatest challenges in preventing HIV transmission from mother to child is a lack of awareness and knowledge about the MTCT and PMTCT. Mothers' understanding of PMTCT, in particular, plays an important role in implementing preventive measures and utilizing the service.[6]

Ethiopia has been implementing the PMTCT program since 2001 focusing on equitable access to services without any discrimination (Equity), upholding the right of all persons to the highest attainable standard of health, which includes Antiretroviral therapy (ART), PMTCT, and access to family planning information and services. Respecting the right of persons with HIV to decide on the number and timing of their children (human rights); integrating PMTCT with all appropriate services (Integration); using PMTCT as an entry point to HIV care for family (Family Focused); Prioritization of pregnant women with advanced disease to Highly active antiretroviral therapy (HAART); setting the essential PMTCT package of services as standard for all sectors (Standardization); the health networking of facilities and the community to reduce gaps in coverage (i.e., health centers to hospitals and community to health care facilities) (Referral linkages); HIV counseling and testing services after adequate information and voluntarily following informed consent (Confidentiality and voluntary informed consent); involving the community in offering prevention, treatment, care, and support (Community participation and mobilization); and encouraging male partners and fathers to participate in PMTCT programs and services (Male involvement).[3,7]

Comprehensive knowledge about HIV/AIDS was considered as knowing that consistent use of condoms during sexual intercourse and having just one uninfected faithful partner can reduce the chance of getting the AIDS virus, knowing that a healthy-looking person can have the AIDS virus.[8–10]

HIV prevalence depends on the knowledge of preventive actions, the attitude toward the disease, and people's sexual behaviors.[11,12] Studies conducted in different areas of Ethiopia indicated different levels of comprehensive knowledge. It was indicated that 24.5%, 25%, and 35.5% in Eastern Ethiopia (Hararge Zone) among in-school youths,[9] Western Ethiopia (Wayu Tuka District) among out-of-school youths,[13] and Mekelle city among secondary school students,[14] respectively. The Ethiopian demographic and health survey 2016 (Ethiopian Demography and Health Survey (EDHS 2016) indicated 20.5% comprehensive knowledge among women aged 15–49 years which fluctuated from one group to the other, ranging from 3.5% in the Somali region to 24.9% in Tigray region, respectively.[15] Other studies among youth in northern Uganda and the Villagers of Comilla District of Bangladesh reported 29% and 36% comprehensive knowledge, respectively.[8,9]

Different studies revealed that different factors threw in for the instability of the magnitude of comprehensive knowledge of HIV/AIDS among women from country to country as well as from place to place. The study conducted in Hararge Zone, Ethiopia showed that comprehensive knowledge was more common among those who were from families with a relatively middle or high wealth index, who got HIV/AIDS information mainly from friends or mass media, and who received education on HIV/AIDS and sexual matters[2]; gender, geographic location, marital status, and education were found to be associated with comprehensive knowledge of HIV/AIDS among youth in northern Uganda[16] and Palestinian women.[17] A study on demographic and health survey (DHS) analysis in Ghana identified that comprehensive knowledge was associated with education, gender, marital status, locality, occupation, and wealth status.[18] The DHS analysis from Kenya was identified education, having tested for HIV, knowing someone with HIV, and/or having a small or moderate to great risk perception as predictors of comprehensive knowledge.[19] Attitude and religion were other factors found to have an association with comprehensive knowledge of HIV/AIDS in Greece.[20] Sources of information, ever being tested for HIV, educational level, and wealth status were significant factors associated with comprehensive knowledge of HIV/AIDS in the reproductive age group of Uganda.[21]

The study conducted in Wayu Tuka district, Western Ethiopia among out of school youths revealed that comprehensive HIV/AIDS knowledge was more common among youths with secondary and above educational level, who live with their friends/partners or relatives/other persons like a neighbor, who used media as their major HIV/AIDS information source, who knew about sexually transmitted infections other than HIV/AIDS and those who discussed the sexual matter with their parents or other family members.[13]

Many world countries including Ethiopia have adapted and established sustainable development goal three to end

the epidemic of HIV/ADS, and to reduce maternal mortality ratio and neonatal mortality to 70 per 100,000 and 12 per 1000 live births by 2030, respectively, through strengthening the capacity of all developing countries' early warning, risk reduction, and management of national and global risks.[22] Even though the variety of studies showed that the magnitude of comprehensive knowledge about HIV/AIDS among different sub-group of females and factors associated with them; no study was indicating magnitude and factors associated with comprehensive knowledge about HIV/AIDS among pregnant mothers attending antenatal care (ANC) clinic at health institutions in Ethiopia, particularly in the Arsi zone. Thus, the study is aimed to assess the magnitude and factors associated with comprehensive knowledge of HIV/AIDS among pregnant mothers attending ANC services at health institutions in Arsi zone, Oromia Regional State, Ethiopia.

Methods

Study design and area

A quantitative health facility-based cross-sectional study design was conducted among pregnant mothers attending ANC at health institutions in Arsi zone, Oromia Region, Ethiopia from 18 March to 25 June 2019. Administratively, the Arsi zone had 24 districts, one town administration, 58 towns, and 498 rural Kebeles. The zone has been located at southeast Oromia and hemmed in East Showa (in the north), West Arsi (in the south and west), and West Harargie (in the east). The climate condition of the zone is Dega (42%), Weyna Dega (28%), and Kolla (30%). In the zone, there were four governmental hospitals, 96 health centers, and 496 health posts as well as one private hospital, two health centers, and 256 clinics with 96 drug stores. In 2018, the total health coverage in the zone was 88%. The number of health professionals in the zone was estimated to be 12 medical doctors, 102 health officers, 21 pharmacists, 112 druggists, 662 nurses, 82 environmental health professionals, 26 laboratory technologists, 102 laboratory technicians, and 923 health extension workers. The health service delivery system was through four tiers, that is the primary healthcare unit, district hospital, zonal hospital, and referral hospital. The primary healthcare unit in the zone encompassed one primary hospital with one health center and five health posts.[23] According to the 2007 Ethiopian census report, Arsi Zone (excluding Asella town, with 67,250 population) has a total population of 2,635,515 with nearly one to one sex ratio.[24]

Sample size and sampling procedures

The sample size for the study was determined by double population proportion formula of unmatched case–control study by Epi Info version 7 considering 95% confidence level (CI), 80% power, one to one ratio, 11.57% proportion of the population with comprehensive knowledge having low family wealth index (P_1), and 15.67% proportion of the population without comprehensive knowledge having low family wealth index (P_2) from the study conducted among in-school adolescent at Eastern Ethiopia, Arargie Zone.[9] Thus, since the sample size calculated by comparing middle family wealth index with low family wealth index was the largest, it was considered for investigation. By adding a 5% nonresponse rate and considering the design effect of two, the final sample size considered for the investigation was 4814 ((2292 + 115)*2) pregnant mothers of which 4440 (92.23%) were responded to the interview.

In the Zone, 100 health institutions were providing ANC service. According to Arsi Zone Health bureau report, about 69,757 pregnant mothers were on ANC service in 2010 (2017–2018).[23] To select 4440 pregnant mothers for the investigation in the zone, who were on ANC follow-up in the health institutions of the zone, multistage random sampling was employed (Figure 1).

Data collection and data quality

Data were collected by interview, using a structured and pretested questionnaire which was developed by reviewing the literature.[8,13,15–18,21,25] All pregnant mothers without hearing problems, who can communicate properly and are not seriously ill were interviewed. The questionnaire contains information related to comprehensive knowledge, sociodemographic characteristics, behavioral factors, healthcare services, pregnancy and delivery, information seeking, and family-related factors. Comprehensive knowledge about HIV/AIDS was considered as knowing that consistent use of condoms during sexual intercourse and having just one uninfected faithful partner can reduce the chance of getting the AIDS virus; knowing that a healthy-looking person can have the AIDS virus, and rejecting the two most common local misconceptions about transmission or prevention of the AIDS virus. The two most common local misconceptions in Ethiopia are as follows: (1) AIDS virus can be transmitted by mosquito bites and (2) AIDS virus can be transmitted by supernatural means.[8–10] In the study, those who knew these five components were considered knowledgeable (yes), and the magnitude/proportion of knowledgeable mothers was calculated by dividing those who responded "yes" for the five components by total sample size.

Data collection was done by trained health professionals who were working in the ANC clinics nearest to the selected health institutions. One supervisor of health officer from each health institution supervised the data collection procedures in addition to investigators. The questionnaire was prepared originally in English and translated to Afan Oromo and Amharic, and then retranslated back to English by bilingual experts independently to keep the consistency of the questions. Training for data collectors and supervisors was given for 2 days by the investigator at their respective health

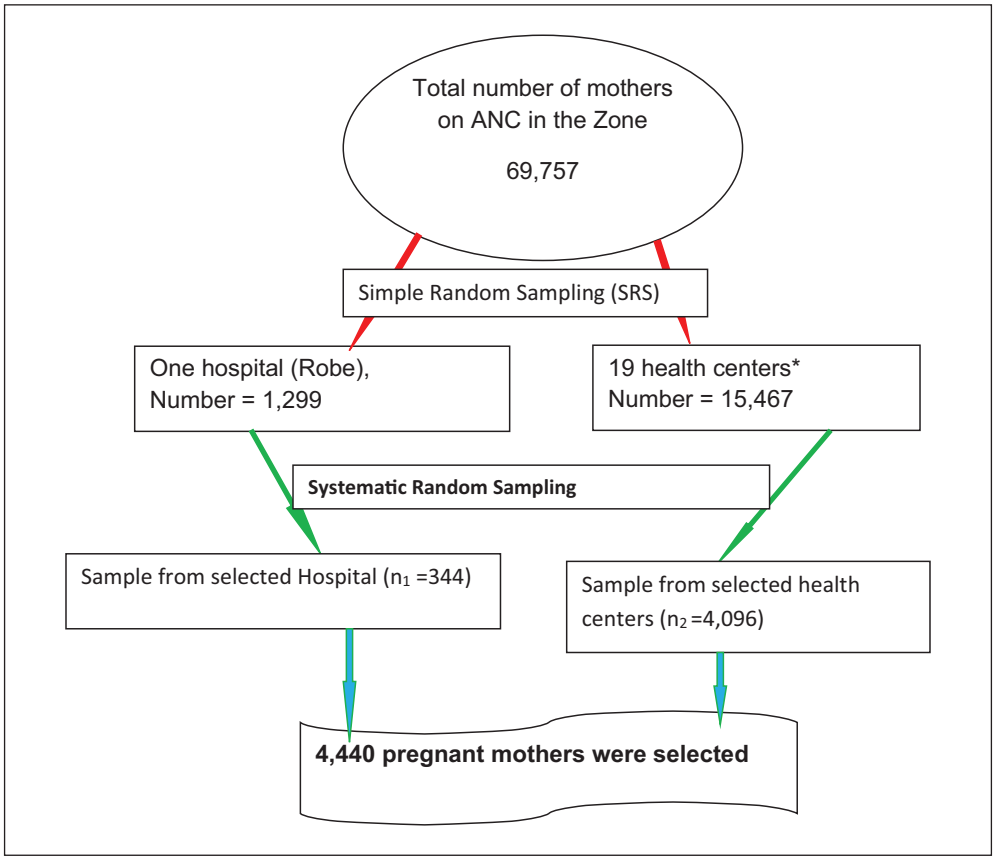

Figure 1. Schematic presentation of the sampling procedure for selecting pregnant mothers on ANC in health institutions of the Arsi zone, Oromia Regional State, Ethiopia, 2019.

institutions. The questionnaire was pre-tested to identify a potential problem, unanticipated interpretations, and cultural objections to any of the questions on 241 (5%) respondents having similar characteristics with the study subjects nearby health institutions not selected for the actual investigation. Based on the pre-test results, the questionnaire was additionally adjusted contextually and terminologically and then used for the actual data collection. Counter-checking of the daily filled questionnaires was done by supervisors. Double data entry was done into EPI INFO 7 statistical software. Privacy of the mothers was kept during data collection to get honest responses.

Statistical analysis

The collected data were cleaned, edited, and entered into EPI INFO 7 statistical software and then exported to STATA version 14 for further analysis. Descriptive statistics of the data were done for most variables in the study using different statistical measurements. Bivariable binary logistic regression analysis was conducted primarily to identify variables that had an association with the comprehensive knowledge of mothers. Variables found to have an association with the comprehensive knowledge of pregnant mothers about HIV/AIDS at 0.25 probability were then entered into multivariable binary logistic regression for controlling the possible effect of confounders. Finally, the variables which had significant association were identified by adjusted odds ratio (AOR), with its 95% CI and p values less than 0.05 to fit into the final model. The model fitness was checked for logistic regression by Hosmer and Lemeshow goodness-of-fit, which provided a p value of 0.72 (i.e. >0.05) and deviance reduced (i.e., −2log likelihood was reduced from 5580.38 to 5069.55 with the p value of 0.000). Reliability of the tools used to measure comprehensive knowledge of HIV/AIDS was tested by Cronbach's alpha which yielded 0.75 with Cronbach's alpha if item deleted ranging 0.69–0.77.

Results

Sociodemographic characteristics of pregnant mothers attending ANC

Out of the total sample size (4814), 4440 were responded to the interview providing a response rate of 92.23%. The average age of pregnant women attending ANC was 26.21 (±5.5) years. Among these pregnant women, the majority (64.8%) were from urban, 59.5% were Muslim followers, the highest

Table 1. Sociodemographic characteristics of pregnant mothers attending antenatal care services in health institutions of Arsi Zone, Oromia Regional State, Ethiopia, 2019 ($n = 4440$).

Variables	Frequency (%)
Residence	
Urban	1563 (35.2)
Rural	2877 (64.8)
Religion	
Orthodox	1481 (33.4)
Muslim	2643 (59.5)
Protestant	276 (6.2)
Catholic	36 (0.8)
Others*	4 (0.1)
Educational status	
Uneducated	656 (14.8)
Read and write only	633 (14.3)
primary (1–8 grade)	1429 (32.2)
Secondary (9–12 grade)	792 (17.8)
12 complete	180 (4.0)
Certificate	138 (3.0)
Diploma	416 (9.4)
Degree	167 (3.8)
Masters	29 (0.7)
Marital status	
Married (living together)	4128 (93.0)
Single	118 (2.7)
Widowed	43 (1.0)
Separated (not living together)	100 (2.2)
Divorced	51 (1.1)
Work status	
Housewife	2984 (67.2)
Government employee	549 (12.4)
None-government employee	121 (2.7)
Farmer	404 (9.1)
Merchant	330 (7.4)
Others**	52 (1.2)
Husband had multiple wives	
Yes	816 (18.4)
No	3312 (74.6)
No marriage	312 (7.0)

*Wakefata and Joba.
**Students and daily laborer.

proportion of women was at the primary education level (32.2%), 93.0% were married, about two-thirds were housewives (67.2%) and 18.2% of their husbands were polygamy (Table 1).

Healthcare service accessibility, availability, and delivery history of mothers

More than half (51.2%) of the pregnant mothers were not visited during their pregnancy period by health extension workers, whereas about one-third (33.9%) of them delivered at home their previous births (Table 2).

Pregnant mothers' family history and sexual empowerment

About 10% of pregnant mothers attending ANC were widows while 23.3% and 21.3% of the educational status of their husbands or partners were secondary levels and primary level, respectively. Nearly one-third of pregnant mothers had children who attended primary level education (32.5%); followed by secondary educated (6.7%) children (Table 3). More than half of them reported that they can refuse to have sex when they have no interest and discussion about the sexual matter with their husbands (i.e., 54.44% versus 56.82%), respectively. Nearly two-thirds (62.73%) of mothers knew sexually transmitted infection while only about one-third took education about sexual matters (Figure 2).

HIV/AIDS magnitude, knowledge, and attitude of pregnant mothers attending ANC

Among the total pregnant mothers interviewed, only one-third, 1430 (32.2% (95% CI: 30.83%, 33.60%)), of mothers were found to have comprehensive knowledge About HIV/AIDS. The study showed about 85.9% were tested for HIV of which 97.96% received their result. The prevalence of HIV/AIDS was found to be 2.82% among pregnant mothers attending ANC in the health institutions of the Arsi Zone (Table 4).

Pregnant mothers substance use in the last 12 months

In the last 12 months before data collection, 10.7%, 15.7%, 3%, and 2.3% of pregnant mothers attending ANC services had the habit of alcohol drinking, khat chewing, cigarette smoking, and using Shish, respectively (Table 5).

Discussion

The study revealed that only about one-third (32.2%; 95% CI: 30.83%, 33.60%) of pregnant mothers attending ANC follow-up had comprehensive knowledge about HIV/AIDS. The result is similar to prevention gap reports of the United Nations which stated that two-thirds of young people do not have correct and comprehensive knowledge of HIV.[26]

However, this result is lower than studies conducted among staff in public universities of Kenya which reported 83% of females had high knowledge of HIV/AIDS,[27] among urban young women in Kenya (53.9%),[19] Palestinian women in the occupied Palestinian territory (48.1%) which reported that healthy-looking persons can be infected by HIV/AIDS,[17] among adult population in Ghana (50%),[18] among Indian women, around 70% had awareness of AIDS while 64.2% of the women knew that one can reduce chances of acquiring HIV/AIDS using condoms,[28] among the nursing school of a Technological Educational Institute in Greece, 60.2%

Table 2. Healthcare service accessibility, availability, and delivery history of pregnant mothers attending ANC services in health institutions of Arsi Zone, Oromia Regional State, Ethiopia, 2019 ($n = 4440$).

Variables	Frequency (%)
Visited by health extension workers	
Yes	2166 (48.8)
No	2274 (51.2)
Place of delivery for a previous birth	
Home	1507 (33.9)
Health institution	1388 (31.3)
Not given birth	1545 (34.8)
Type of pregnancy	
Wanted (planned)	3268 (73.6)
Not wanted (unplanned)	1172 (26.4)
Order of current pregnancy	
First	1559 (35.1)
Second	1079 (24.3)
Third	779 (17.6)
Fourth and more	1023 (23.0)
Number of ANC visit	
First visit	1503 (33.9)
Second visit	1455 (32.8)
Third visit	903 (20.3)
Fourth visit	515 (11.6)
Fifth and more	64 (1.4)
Mothers' attitude on premarital pregnancy	
Discouraging attitude	3838 (86.4)
Encouraging attitude	602 (13.6)
Parity	
Nullipara	1559 (35.1)
Primipara	1079 (24.3)
Multipara	1802 (40.6)
Contraceptive methods mentioned	
Female sterilization	513 (11.6)
Male sterilization	540 (12.2)
Pill	3391 (76.4)
IUD	1971 (44.4)
Injectable	3841 (86.5)
Implants	3392 (76.4)
Male condoms	1682 (37.9)
Female condoms	291 (6.6)
Lactation amenorrhea method	467 (10.5)
Emergency contraception	397 (8.9)
The standard days' method	255 (5.7)
Periodic abstinence (or rhythm)	189 (4.3)
Withdrawal	254 (5.7)
Source of contraception mentioned	
Government hospital	2313 (52.1)
Government health center	3693 (83.2)
Government health post/HEW	2506 (56.4)
Private hospital	1466 (33.0)
Private clinic	1874 (42.2)
Pharmacy	818 (18.4)
NGO health facility	682 (15.4)
Voluntary community health workers	130 (2.9)
Drug vendor/store	90 (2.0)
Shop	195 (4.4)
Friend/relative	127 (2.9)

ANC, antenatal care; IUD, intrauterine device; NGO, non-governmental organization.

believed that mosquitoes cannot transmit HIV, whereas 62% believed the virus could not be transmitted via the toilet seat.[20] In addition, in Uganda nearly three-fourths, 55%, 88%, and 74% of women, knew that HIV can be prevented using condoms, limiting sexual intercourse to one uninfected partner, HIV cannot be transmitted by mosquito bites, a healthy-looking person can have HIV, and a person cannot be infected by sharing food with a person who has HIV, respectively.[29] In Palestine, reports of UNICEF revealed that 34.8% of women knew that they can protect themselves from contracting HIV both using condoms and having sex solely with one faithful uninfected partner,[30] In Mekelle City, Ethiopia, 85.5% respondents had good knowledge about HIV/AIDS.[14] The possible reason for the difference could be measurement difference as most of these studies used only one criterion to estimate comprehensive knowledge of HIV/AIDS while this study used five criteria. In addition, most of these studies were conducted among educated and/or urban population, whereas this study covered urban and rural as well as uneducated pregnant mothers.

On the other hand, the result of this study is higher than results of the studies conducted among out-of-school youths in Wayu Tuka district, Western Ethiopia, and among in-school adolescents in eastern Ethiopia in which 25% and 24.5% of them had comprehensive knowledge of HIV/AID,[9,13] respectively. About 20% of women in India thought that sharing food with an infected person can transmit HIV/AIDS,[28] 24% of young women aged 15–24 years has comprehensive knowledge of HIV/AIDS in Nigeria[31] and in Uganda, 30% of young women have comprehensive knowledge of HIV/AIDS.[16] The explanation for the differences could be information exposure as our study was among mothers attending ANC follow-up with the high probability of exposure to information in the health institutions while most of the studies were on general as well as on young population with less probability.

Mothers who knew safe period to be pregnant concerning their menstruations were 32.89% more likely to have comprehensive knowledge compared to those who did not know their safe period to be pregnant concerning menstruation

Table 3. Family history of pregnant mothers attending antenatal care services in health institutions of Arsi Zone, Oromia Regional State, Ethiopia, 2019 ($n=4440$).

Variables	Frequency (%)
Husband/ partners alive	
Yes	3990 (89.9)
No	450 (10.1)
Husband/ partners' educational status	
Uneducated (not read and write)	681 (15.3)
Primary (1–8 grade)	945 (21.3)
Secondary (9–12 grade)	1033 (23.3)
12 complete	246 (5.5)
Certificate	177 (4.0)
Diploma	460 (10.4)
Degree	376 (8.5)
Masters	72 (1.60)
No husband	450 (10.10)
The highest educational level attained by one of their children	
Uneducated (not read and write)	891 (20.1)
Primary (1–8 grade)	1442 (32.5)
Secondary (9–12 grade)	298 (6.7)
12 complete	62 (1.4)
Certificate	28 (0.6)
Diploma	79 (1.8)
Degree	89 (1.9)
Masters	29 (0.7)
No child	1525 (34.3)

date (AOR = 1.49; 95% CI: 1.24, 1.78). As mothers read about their safe period to be pregnant, the probability of reading about HIV/AIDS has increased which, in turn, increases their comprehensive knowledge. As these mothers intended to prevent pregnancy the likelihood of exposure to information of HIV/AIDS is increased through reading and discussion with the health professionals.

The odds of having comprehensive knowledge among pregnant mothers who took education on any sexual matter were one point six five times more likely compared to those who did not take education (AOR = 1.65; 95% CI: 1.42, 1.92). The result is supported by studies conducted in Palestine, Uganda, Hararge Zone which showed that comprehensive knowledge was more common among those who received education on sexual matters.[9,16–18,21] Education is a key to disseminating information about HIV/AIDS, so, currently, a new curriculum on HIV/AIDS is added to the higher education program in Ethiopia.

Women who had no sexual practice empowerment were 50% less likely to have comprehensive knowledge compared to those who were empowered (AOR = 0.50; 95% CI: 0.43, 0.58). As women are getting empowered, the probability of seeking new information and knowledge about what they are practicing to prevent themselves will increase. Other factors associated with comprehensive knowledge of mothers attending ANC were the attitude toward having multiple partners, attitude toward premarital sex, and attitude toward accepting HIV/AIDS patients. Accordingly, mothers who

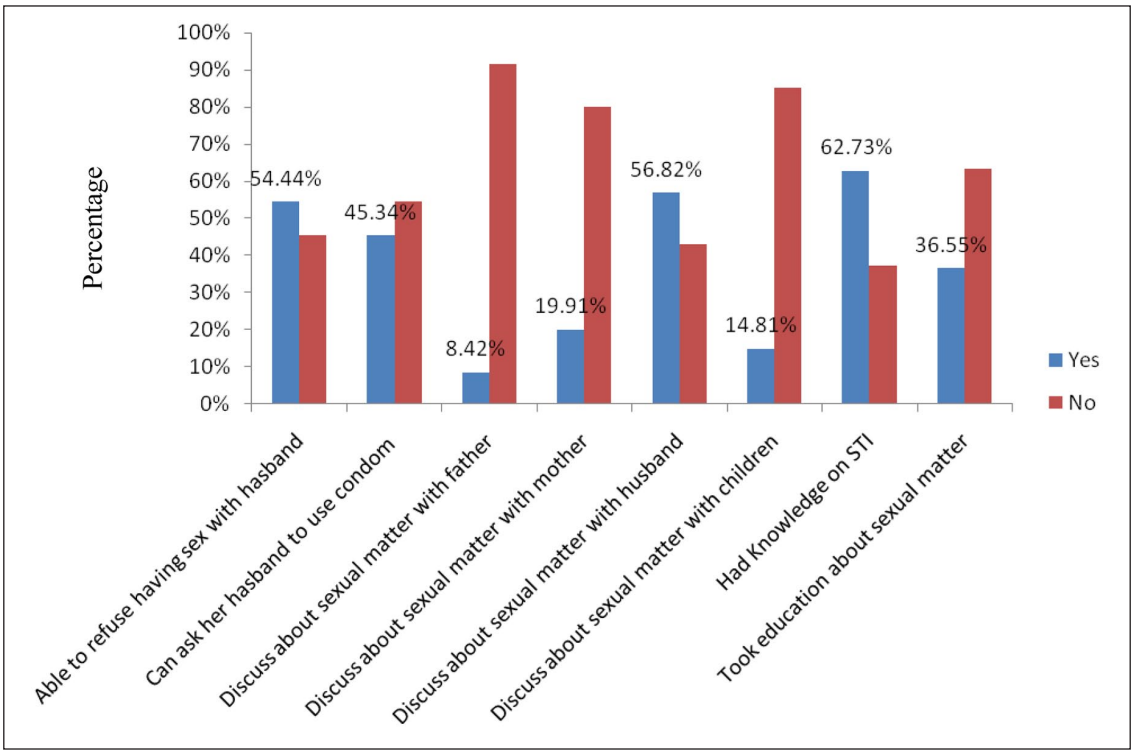

Figure 2. Knowledge of STI and empowerment on sexual matters of pregnant mothers on ANC in health institutions of Arsi Zone, Oromia Regional State, Ethiopia, 2019 ($n=4, 440$).
ANC, antenatal care; STI, sexually transmitted infection.

Table 4. HIV/AIDS Magnitude, knowledge, and attitude of pregnant mothers attending antenatal care services in health institutions of Arsi Zone, Oromia Regional State, Ethiopia, 2019 ($n = 4440$).

Variables	Frequency (%)
Heard of HIV/AIDS	
Yes	3833 (86.3)
No	607 (13.7)
Took education on HIV/AIDS	
Yes	3667 (82.6)
No	773 (17.4)
Had a comprehensive knowledge of HIV/AIDS	
Yes	1430 (32.2)
No	3010 (67.8)
Attitude toward HIV/AIDS patients	
Not accepting attitude	2930 (66.0)
Accepting attitude	1510 (34.0)
Know somebody who died of HIV/AIDS	
Yes	1867 (42.0)
No	2573 (58.0)
Had relatives died of HIV/AIDS ($n = 1867$)	
Yes	961 (21.6)
No	1031 (23.2)
Tested for HIV/AIDS	
Yes	3815 (85.9)
No	625 (14.1)
Received test result ($n = 3815$)	
Yes	3737 (97.96)
No	78 (2.04)
The magnitude of HIV/AIDS	
Positive	125 (2.82)
Negative	3690 (83.11)
Not tested	625 (14.07)
Sources of information mentioned for HIV/AID	
Radio	2712 (61.1)
Television	1610 (36.3)
News paper	716 (16.1)
Health institution	3054 (68.8)
School	1690 (38.1)
Church	653 (14.7)

Table 5. Substance use in the last twelve months among pregnant mothers attending antenatal care services in health institutions of Arsi Zone, Oromia Regional State, Ethiopia, 2019 ($n = 4440$).

Variables	Frequency (%)
Drink alcohol	
Yes	473 (10.7)
No	3967 (89.3)
Chewed khat	
Yes	697 (15.7)
No	3743 (84.3)
Smoked cigarette	
Yes	133 (3.0)
No	4307 (97.0)
Used shisha	
Yes	104 (2.3)
No	4336 (97.7)

had a discouraging attitude toward having multiple partners were 34.64% more likely to have comprehensive knowledge about HIV/AIDS compared to those who had an encouraging attitude (AOR = 1.53; 95% CI: 1.24, 1.88). Likewise, mothers who had the discouraging attitude toward having premarital sex were 40.48% more likely to have comprehensive knowledge of HIV/AIDS compared to those who had the encouraging attitude (AOR = 1.68; 95% CI: 1.38, 2.03). Mothers who had a positive attitude toward accepting HIV/AIDS patients were about 62.83% more likely to have comprehensive knowledge of HIV/AIDS compared to those who had a negative attitude (AOR = 2.69; 95% CI: 2.34, 3.10) (Table 6). These results are supported by the study conducted in Greece in which attitude was associated with comprehensive knowledge of HIV/AIDS.[20] As the mother's attitude is favorable/positive for comprehensive knowledge, the likelihood of looking for the information will increase.

Limitation of the study

Even though the study disclosed the magnitude and factors associated with comprehensive knowledge of HIV/AIDS, the result is not free of the effect of cross-sectional study design (i.e., not indicating temporal relationship). Since most of the information was based on self-report, it is also not free of social desirability biases. In addition, there was a shortage of similar studies so that the comparison and justification of the discussion were not strongly supported.

Conclusion

In conclusion, only about one-third (32.2%) of pregnant mothers attending ANC services had comprehensive knowledge of HIV/AIDS. Knowledge of safe period to be pregnant, education about the sexual matter, women's sexual practice empowerment, attitude toward having multiple partners, attitude toward premarital sex, and attitude toward accepting HIV/AIDS patients were factors significantly associated with pregnant mothers' comprehensive knowledge of HIV/AIDS. Thus, it would be better if the health institutions in the zone focused on educating mothers on ANC follow-up about HIV/AIDS, particularly for those with an unplanned pregnancy, who do not know the safe period to be pregnant, not empowered of sexual practice, and had an encouraging attitude toward multiple partners, premarital sex, and negative attitude toward accepting HIV/AIDS patients.

Table 6. Factors associated with comprehensive knowledge of HIV/AIDS among pregnant mothers attending antenatal care services in health institutions of Arsi Zone, Oromia Regional State, Ethiopia, 2019 ($n = 4440$).

Explanatory variables	Comprehensive knowledge		COR (95% CI)	AOR (95% CI)	*p* Value
	Yes	No			
Residence					
Urban	537	1026	1		
Rural	893	1984	0.86 (0.75, 0.98)		
Number of ANC visit					
First visit	498	1005	1		
Second visit	382	1073	0.72 (0.61, 0.84)		
Third visit	263	640	0.83 (0.69, 0.99)		
Fourth visit	275	240	2.31 (1.89, 2.84)		
Fifth and more	12	52	0.47 (0.25, 0.88)		
Visited by HEW					
Yes	588	1578	1		
No	842	1432	1.58 (1.39, 1.79)		
Know safe period to be pregnant					
Yes	332	462	1.67 (1.42, 1.95)	1.49 (1.24, 1.78)	0.000
No	1098	2549	1		
Current pregnancy					
Planned	1142	2126	1		
Unplanned	288	884	0.61 (0.52, 0.71)		
Mother and father live together					
Yes	1029	2046	1		
No	401	964	0.83 (0.72, 0.95)		
Ever taught about a sexual matter					
Yes	441	1182	1		
No	989	1828	1.45 (1.27, 1.66)	1.65 (1.42, 1.92)	0.000
Women's sexual practice empowerment					
Empowered	610	849	1		
Not empowered	820	2161	0.53 (0.46, 0.60)	0.50 (0.43, 0.58)	0.000
Attitude toward premarital pregnancy					
Discouraging	1196	2642	1		
Encouraging	234	362	1.41 (1.18, 1.68)		
Attitude toward multiple partners					
Encouraging	214	761	1		
Discouraging	1216	2249	1.92 (1.63, 2.27)	1.53 (1.24, 1.88)	0.000
Attitude toward premarital sex					
Encouraging	262	979	1		
Discouraging	1168	2031	2.15 (1.84, 2.51)	1.68 (1.38, 2.03)	0.000
Attitude toward accepting HIV/AIDS patients					
Negative	692	2238	1		
Positive	738	772	3.09 (2.71, 3.53)	2.69 (2.34, 3.10)	0.000
Attitude toward compensated dating with sex					
Encouraging	142	518	1		
Discouraging	1288	2492	1.89 (1.55, 2.30)		

ANC, antenatal care; AOR, adjusted odds ratio; CI, confidence interval; COR, crude odds ratio.

Acknowledgements

We would like to forward our deepest gratitude to Arsi zone and Asella town health bureau for the permission and information they provided us. A very special thank goes to Guta Tola Debela and Daniele Abebe Mekuriya for the time they devoted to organizing the information required for the research.

Author contributions

Teresa Kisi Beyen, conceived the idea, wrote the proposal, supervised the data collection, analyzed the data, drafted the manuscript, and revised subsequent drafts. Abenet Menene Gurara wrote the proposal, supervised the data collection, analyzed the data, drafted the manuscript, and revised subsequent drafts.

Availability of data and materials

As the study was our original work, we have primary data collected from the study participants and the tool for the collected data. We are happy to share the data and tools through communication.

Declaration of conflicting interests

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

Ethical approval and consent to participate

Ethical approval for this study was obtained from Institutional research ethics review board of Arsi University, College of Health Sciences Research Ethics Review Committee with approval number of A/CHS/R001/15/16. Oral informed consent was obtained from each mother after getting permission from each health institution. The verbal consent was approved by the Institutional Review Board of the Arsi University. Verbal consent was obtained due to difference in mothers' educational levels and based on Arsi University Institutional Review Board (IRB) recommendation. Each pregnant mother was informed about the objective of the study and those who refused to participate in the study were not forced. Confidentiality was granted for information collected by keeping the privacy of the respondents while interviewing, using means which was not disclose mothers and keeping the collected information in the locked cabinet.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was funded by Arsi University from its annual research and community service grant.

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Supplemental material

Supplemental material for this article is available online.

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