

Prevalence and determinants of condom failure among female sex workers in Ethiopia: a cross-sectional study with a respondent-driven sampling technique

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Abstract

Background: Condom failure is one of the main factors that exposes female sex workers (FSWs) to sexually transmitted infections (STIs), including HIV. To date, evidence on the factors contributing to condom failure is scarce in Ethiopia. Therefore, this study was conducted to identify the determinants of condom failure among FSWs and generate evidence to support the nation's STI/HIV prevention program.

Methods: A national cross-sectional study was conducted in Ethiopia using a respondent-driven sampling technique among 6085 FSWs in 16 major towns in the country. A structured interview was used to collect the data. Descriptive statistics as well as multiple logistic regression analyses were used. A p -value ≤ 0.05 was used to determine the statistical significance.

Results: The mean (SD) age of the study participants was 26.3 (± 0.08) years. Those who were never married and completed their primary education were 48.4% and 58.5%, respectively. The prevalence of condom failure among FSWs within the 30 days preceding the survey was 29.7%. Divorced, separated, or widowed women were more likely to report condom failure than married women (AOR = 1.45, 95% CI: 1.04–2.03, $P = 0.027$). FSWs with no formal or primary education had higher odds of condom failure compared with those who had secondary education and above (AOR = 1.56, 95% CI: 1.33–1.83, $P < 0.001$). FSWs who had harmful alcohol drinking (AOR = 1.2, 95% CI: 1.01–1.41, $P = 0.035$), alcohol dependency (AOR = 1.62, 95% CI: 1.40–1.87, $P < 0.001$), and used other drugs (AOR = 1.35, 95% CI: 1.13–1.62, $P < 0.001$) had a higher risk of condom failure. Furthermore, those who started selling sex before the age of 20 were more likely to report condom failure than those age above 25 (AOR = 1.35, 95% CI: 1.13–1.62, $P < 0.001$). Factors that were also significantly associated with condom failure were ever being raped in the last 12 months (AOR = 1.65, 95% CI: 1.39–1.96, $P < 0.001$), and being HIV positive (AOR = 1.35, 95% CI: 1.16–1.57, $P < 0.001$).

Conclusion: Condom failure was a major challenge among FSWs and was significantly associated with various determinants. This finding will help the country to strengthen prevention and control strategies to halt the acquisition and transmission of HIV and other STIs among FSWs.

Keywords: HIV, condom failure, sex workers, alcohol, drugs

Introduction

Since the beginning of the HIV/AIDS epidemic, condoms have played a vital role in preventing the virus's transmission through sexual activities, especially among those involved in the sex trade (Waugh 2010). The effectiveness of condoms is dependent on how they are used. The risk of pregnancy or sexually transmitted infections (STIs), including HIV, is greatest when condoms are not used properly with every act of sex (World Health Organization 2023).

According to published research, condom failure is linked to a lack of experience, improper handling, and other important personal characteristics (Bradley et al. 2012). Similarly, it has been reported that poor condom fit, duration and roughness of the sex act, use of alcohol and other drugs, and lack of lubrication or use of oil-based lubrication have all been linked to condom failure (Choi et al. 2008; Bradley et al. 2012;

Mukumbang 2017).

Various studies with this population group in various countries found varying rates of condom failure. The incidence of condom breakages and slippages has always been recurrent, and different underlying factors escalate the occurrence, especially among FSWs (Mukumbang 2017; Masvawure et al. 2018). Various studies with this population group in various countries found varying rates of condom failure. A Ghanaian study reported a rate of 17.4 in the preceding two weeks, while an Indian study reported a rate of 11.4% in the past month (Bradley et al. 2011; Augustine et al. 2021), and another study conducted in Ethiopia reported a rate of 26.8% at least once in the past month (Amogne et al. 2021). Alcohol and drug use are among the main factors reported to contribute to condom failure among FSWs, as those under the influence of alcohol and drugs would not use condoms properly and/or do nothing when a condom breaks or slips (Bradley et al. 2012; Mukumbang 2017).

Violence against women is another factor that has been reported to have a direct and/or indirect association with condom breakage or slippage among FSWs. In addition to its direct association, violence puts FSWs in a position where they cannot control the working environment, leading to poor condom use (Choi et al. 2008). There is evidence indicating that clients sometimes perceive that they are in control of the act of paid sex, a factor that affects FSWs' negotiation for condom use and puts them at risk of unwanted consequences (Mukumbang 2017). Such behaviors are generally expressions of the power relationships exhibited between clients and FSWs (Davidson 2002). Vulnerability to condom breakage or slippage has also been reported by an Indian study to be high among younger and marginalized FSWs (Bradley et al. 2011).

The outcomes associated with condom breakage or slippage are not limited to the acquisition and transmission of STIs, including HIV, but also include unwanted pregnancies and other negative social and behavioral consequences (Trussell 1992; Waugh 2010; Tounkara et al. 2014; Abdella et al. 2022). Despite relying on condom use every time, FSWs remain vulnerable to STIs if the condom breaks or slips off during intercourse or withdrawal (Trussell 1992).

Understanding the factors contributing to increased condom breakage or slippage is critically important in the prevention and control of HIV and other STIs. Nevertheless, factors that are associated with condom failure among FSWs in Ethiopia are not well studied and documented. Therefore, we conducted this analysis to assess the prevalence and determinants of condom breakage or slippage, including socio-demographic, behavioral, and environmental factors, to generate evidence that will support HIV and other STI prevention and control programs.

Materials and Methods

Study design: The current analysis is part of a larger cross-sectional study concerning HIV prevalence and related risk factors among FSWs in Ethiopia, conducted from December 2019 to March 2020. The study data were collected using a respondent-driven sampling (RDS) method, which involves a chain referral sampling technique that, if done according to the principles of the method, yields a representative sample of the study population (Heckathorn 1997).

Study population and study sites: The study was conducted in 16 major towns in Ethiopia, including Addis Ababa, Hawasa, Bahir Dar, Gambella, Harar, Dire Dawa, Logia, Gonder, Dessie/Kombolcha, Adama, Shashemene, Jimma, Nekemte, Dilla, Mizan, and Arbaminch. The towns were selected considering

their population size, geographical location, and the number of FSWs residing there.

For the purposes of the study, sex work was defined as sexual activity or practice with the precondition of financial or in-kind benefits, and women who were involved in this practice were considered FSWs. The inclusion criteria were receiving money or other benefits in exchange for sex with four individuals within the last 30 days; age ≥ 15 years; being recruited by a peer using a coupon and presenting the coupon to the study team; and giving consent for both the interview and blood sample collection.

Sample size: A minimum sample size was calculated using the anticipated HIV prevalence in each town with a 3.5% width, a 95% CI, and a design effect of 2. A total of 6085 FSWs (1101 from Addis, 372 from Bahir Dar, 676 from Adama, 522 from Hawasa, 434 from Dire Dawa, 468 from Gambella, and 242-257 for the rest of the towns selected proportionately to population size) participated in the study.

Data collection procedure: Five FSW seeds were selected to initiate the recruitment process in each town according to the RDS principle. The seeds were selected purposefully to represent all types of FSWs residing in the towns, including geographic and venue/residential diversity. They were identified during the formative assessment performed before the actual data collection.

After giving informed consent, participants were interviewed in a private room using a structured questionnaire in the local language and then asked to provide blood samples for HIV testing. The questionnaire was piloted before the actual implementation of the study in a town that was not included as a study site. Subsequently, three coupons were provided to each participant, and all were instructed to recruit their FSW peers into the study. After completion of data collection, each FSW was given a primary incentive of 162 ETB (US \$6.8) and an additional 80 ETB (US \$3.0) for each eligible peer they recruited and enrolled in the study. To create a unique study identification number and prevent the same participant from enrolling more than once, fingerprint recognition software was used. HIV testing was conducted on-site using the HIV testing algorithm adopted and used across the country. Personal identifiers were not used during or after data collection, so the authors did not have access to information that could identify individual participants.

Variables: In this analysis, condom failure was defined as the number of condoms that reportedly open/split/completely fall off at any time during sexual intercourse and/or during withdrawal. Studies use different numbers of days to measure the occurrence

of these as well as condom failure in general. In the current survey, condom breakage or slippage was measured in terms of the last 30 days before the study. The participants were asked, "Has a condom broken or failed anytime in the last 30 days with any paying client?" Those who responded "yes" were considered to have condom failure experience.

To examine potential determinants of condom failure, we considered the following independent variables: age at the start of sex selling, being forced to have sex, monthly income from selling sex, educational status, alcohol drinking status, mobility from place to place, sex selling venue, khat (*Catha edulis*) chewing frequency, ever using any other drugs, HIV status, and syphilis status. Those who chewed khat in the last 30 days were considered "yes" and the rest were considered "no".

Age at the start of sex work was measured as a continuous variable and categorized as (<20 years), (20–24 years), and ($\geq$ 25 years). Monthly income from selling sex was an open-ended question and was categorized into groups: $\leq$ 2500 ETB (US \$92), 2500–4999 ETB (US \$92–\$185), 5000–7499 ETB (US \$185–\$277), and $>$ 7500 ETB ($>$ US \$277) based on the cost of living. Educational status was categorized into groups based on Ethiopia's education system: no formal education, primary first cycle (grades 1–4), primary second cycle (grades 5–8), and secondary and above. Data collected on ever using (at least once) any other drug besides alcohol and khat during the last 30 days were categorical ("yes" or "no"). Depression was measured according to the PHQ-9 depression score (Kroenke and Spitzer 2002) and for the current analysis, it was categorized as "none," "mild," and "moderate to severe." The alcohol consumption level was measured with an AUDIT score according to World Health Organization (WHO) guidelines (Thomas et al. 2001), and for the current analysis, it was categorized as "not risky," "harmful/hazardous" and "alcohol dependent". Violence was measured by "being forced to have sex in the past 12 months". Comprehensive knowledge means if the respondents answered correctly all the six indicators, such as: always using condoms during sex can reduce the risk of getting HIV; having one sexual partner only who has no other partners can reduce the risk of getting HIV; a healthy-looking person can have HIV; can get HIV from mosquito bites; can get HIV by sharing food with persons who have AIDS; and can get HIV by witchcraft or supernatural means (Kawuki et al. 2023).

Inconsistent condom use refers to any situation where condoms are not used consistently and correctly every time you have sex.

Data analysis: Statistical analysis was performed using SPSS version 20. Descriptive statistics were used to summarize the data, and crude and adjusted odds ratios with 95% CI were obtained using bivariate and multivariate logistic regression models to measure the association and strength of association between the independent and dependent variables. Variables that achieved a P-value of <0.2 in the bivariate analysis were considered for the multivariate model. Before conducting multivariate analysis, we performed a correlation analysis to examine for potential multicollinearity. P-values of <0.05 were considered statistically significant. Prior to data collection, the research team underwent comprehensive training to ensure consistent and accurate data acquisition. We conducted a pilot survey to refine data collection tools and questionnaires, and implemented close monitoring and supervision throughout the process to maintain data quality.

Results

Socio-demographic and behavioral characteristics:

A total of 6085 FSWs participated in the study, and all were included in the analysis of condom breakage or slippage. Nearly one-third, 1980 (32.5%), of the participants were in the age group 20–24 years, with a mean (SD) age of 26.3 ($\pm$ 0.08) years. The number (proportion) of those who got divorced/ separated/ widowed and never married were 2908 (47.8%) and 2946 (48.4%), respectively. Over one-half, 3560 (58.5%), of them completed primary first or primary second cycle of education, and over three-quarters 4676 (76.9%) of them started selling sex between the ages of 15 and 24 (Table 1).

Behavioral and other related characteristics of the FSWs in the study are summarized in Table 2. Of the 6085 participants, 3617 (59.4%) reported depression, 3467 (57.2%) had hazardous alcohol drinking or were alcohol dependent, 3827 (62.9%) chewed Khat in the last 30 days, and 11.5% used other drugs. Only street FSWs constituted 1871 (30.7%), and only hotel FSWs constituted 2023 (33.2%) of the participants. A majority, 5119 (84.1%), of them used condoms consistently in the last 30 days. One-third, or 1825 (29.7%), reported condom breakage or slippage in the past 30 days, and 1140 (18.7%) were HIV positive.

Table 1: Socio-demographic characteristics of female sex workers (FSWs), national HIV and other sexually transmitted infections biobehavioral survey, Ethiopia 2020 (N=6085)

Variables	Categories	Frequency	Percent
Age (years)	15 – 19	615	10.1
	20 – 24	1980	32.5
	25 – 29	1815	29.8
	30 – 34	856	14.1
	35 – 59	819	13.5
Marital status	Married/Cohabitation	231	3.8
	Divorced/Separated/Widowed	2908	47.8
	Never married	2946	48.4
Education level	Non-formal Education	1054	17.3
	Primary ^{1st} cycle (grade 1-4)	848	13.9
	Primary ^{2nd} cycle (grade 5-8)	2712	44.6
	Secondary school and above	1471	24.2
Average monthly income from selling sex in ETB (USD)	<2500 (US \$92)	1778	29.2
	2500-4999 (US \$92-185)	2066	34.0
	5000-7499(US \$185-277)	1175	19.3
	>7500 (US \$277)	1066	17.5
Age at first sex selling (years)	< 20	2328	38.3
	20 – 24	2348	38.6
	>25	1406	23.1
Age at first sex (years)	≤15	2430	39.9
	16 – 20	3384	55.6
	>21	271	4.5

Multivariable logistic regression analysis results: In the multivariable logistic regression model (Table 3), divorced, separated, or widowed women were more likely to report condom breakage or slippage than married women (AOR = 1.45, 95% CI: 1.04–2.03, P = 0.027). FSWs who had no formal education (AOR=2.15, 95%CI: 1.76-2.63, P <0.001) or primary 1st cycle (grades 1-4) (AOR=1.87, 95%CI: 1.52-2.3, P <0.001), or primary 2nd cycle (grades 5-8) (AOR=1.56, 95%CI: 1.33-1.83, P <0.001) had higher odds of condom breakage or slippage than those who completed secondary school and above. Having a monthly income greater than 7500 ETB (\$277) was a significant predictor of condom breakage or slippage (AOR = 1.25, 95% CI: 1.04–1.50, P = 0.018). FSWs who reported having mild depression had significantly higher odds of breakage or slippage than those with no depression (AOR = 1.36, 95% CI: 1.18–1.56, P <0.001) and moderate to severe depression (AOR = 1.59, 95% CI: 1.34–1.89, P <0.001).

Similarly, FSWs who reported harmful alcohol consumption (AOR = 1.2, 95% CI: 1.01–1.41, P = 0.035) and alcohol dependency (AOR = 1.62, 95% CI: 1.40–1.82) had a higher risk of condom breakage or slippage than those who did not drink alcohol.

Condom breakage or slippage was also significantly associated with users of drugs other than alcohol and Khat (AOR = 1.35, 95% CI: 1.13–1.62, P = 0.001) compared with those who did not use other drugs. Compared to FSWs who sold sex in one town, those who sold sex in more than two towns (AOR = 1.49, 95% CI: 1.18–1.5, P <0.001) and those who sold sex in one more town (AOR = 1.36, 95% CI: 1.15–1.62, P < 0.001) had significantly higher odds of having condom breakage or slippage.

Other factors that were significantly associated with condom breakage or slippage compared to their counterparts were inconsistent condom use (AOR=2.44, 95% CI: 2.09-2.86, P <0.001), anal sex (AOR=1.4, 95% CI: 1.12-1.76, P =0.003), having at least two STI symptoms in the last 12 months (AOR=1.45, 95% CI: 1.24-1.69, P <0.001), ever been raped or forced to have sex in the last 12 months (AOR=1.65, 95% CI: 1.39-1.96, P <0.001), never being tested for HIV and received test result (AOR=1.49; 95% CI: 1.24-1.80, P <0.001), HIV positive status (AOR=1.35, 95% CI: 1.13-1.57, P <0.001), and age at first sex selling of less than 20 years (AOR=1.35; 95% CI: 1.13-1.62, P <0.001).

Table 2: Behavioral and other related characteristics of female sex workers, national HIV and other sexually transmitted infections biobehavioral survey, Ethiopia 2020 (N =6085)

Variables	Categories	Frequency	Percent
Depression level	No depression	2468	40.6
	Mild depression	2525	41.5
	Moderate to severe depression	1092	17.9
Hazardous drunker (AUDIT)	Not Risky	2594	42.8
	Harmful or Hazardous Drinking	1210	20.0
	Alcohol dependence indication	2257	37.2
Chewing khat in the last 30 days	Never	2258	37.1
	Yes	3827	62.9
Used any other drugs other than alcohol and khat	Never	5385	88.5
	Yes	700	11.5
Only street FSW	No	4214	69.3
	Yes	1871	30.7
Only bar and/or hotel FSW	No	4062	66.8
	Yes	2023	33.2
Only own home FSW	No	5737	94.3
	Yes	348	5.7
Number of partners and condom use in the last 30 days	Consistent	5119	84.1
	Inconsistent	966	15.9
Experienced condom breakage and slippage in the last 30 days	No	4260	70
	Yes	1825	29.7
HIV test result	Negative	4945	81.3
	New Positive	565	9.3
	Known Positive	575	9.4

Table 3: Logistic regression of condom breakage and slippage on independent variables among FSWs, national HIV and other sexually transmitted infections biobehavioral survey, Ethiopia 2020 (N =6085)

Variables	COR	95%CI		P-value	AOR	95%CI		P-value
		LCI	UCI			LCI	UCI	
Marital status								
Married/Cohabitation	1				1			
Divorced/Separated/Widowed	1.28	0.95	1.73	0.107	1.45	1.04	2.03	0.027
Never married	1.07	0.79	1.45	0.640	1.26	0.90	1.75	0.176
Education level								
Non-formal Education	1.96	1.65	2.34	<0.001	2.15	1.76	2.63	<0.001
Primary 1st cycle (grade 1-4)	1.82	1.51	2.19	<0.001	1.87	1.52	2.30	<0.001
Primary 2nd cycle (grade 5-8)	1.54	1.33	1.79	<0.001	1.56	1.33	1.83	<0.001
Secondary school and above	1				1			
Average monthly income from selling sex in ETB (USD)								
<2500 (92)	1				1			
2500-4999 (92-185)	1.10	0.96	1.27	0.183	1.11	0.95	1.90	0.197
5000-7499(185-277)	1.08	0.92	1.27	0.343	1.03	0.86	1.23	0.747
>7500 (277)	1.43	1.22	1.68	<0.001	1.25	1.04	1.50	0.018
Depression severity								
None	1				1			
Mild	1.86	1.63	2.11	<0.001	1.36	1.18	1.56	<0.001
Moderate to severe	2.51	2.16	2.93	<0.001	1.59	1.34	1.89	<0.001
Alcohol consumption level (AUDIT)								
Not Risky	1				1			
Harmful or Hazardous Drinking	1.32	1.13	1.55	0.001	1.20	1.01	1.41	0.035
Alcohol dependent	2.41	2.12	2.73	<0.001	1.62	1.40	1.87	<0.001
Chewing khat in the last 30 days								
No	1							
Yes	1.51	1.34	1.69	<0.001				
Used any drugs								
No	1							
Yes	2.03	1.73	2.38	<0.001	1.35	1.13	1.62	0.001
First sex experience								
Wanted	1							
Forced	1.48	1.30	1.68	<0.001				
Changed location of selling sex in the past 6 months								
No	1							
Yes	1.64	1.45	1.85	<0.001				
Number of cities worked sex selling in the last three years								
Same town	1				1			
1 more town	1.67	1.42	1.95	<0.001	1.36	1.15	1.62	<0.001
2 or more towns	2.39	1.93	2.95	<0.001	1.49	1.18	1.90	0.001
Inconsistent condom uses with paying partners during the last 30 days								
No	1				1			
Yes	3.65	3.16	4.20	<0.001	2.44	2.09	2.86	<0.001
Ever had anal sex								
Never	1				1			
Yes	2.54	2.08	3.09	<0.001	1.40	1.12	1.76	0.003
Number of non-paying partners in the past 6 months								
Never	1							
Only one	1.44	1.26	1.63	<0.001				
2 and more	2.15	1.71	2.69	<0.001				

Variables	COR	95%CI		P-value	AOR	95%CI		P-value
		LCI	UCI			LCI	UCI	
At-least two STI symptoms occurred in the last 12 months								
No	1				1			
Yes	2.11	1.84	2.43	<0.001	1.45	1.24	1.69	<0.001
Ever been raped or forced to have sex in the past 12 months								
No	1				1			
Yes	3.00	2.57	3.50	<0.001	1.65	1.39	1.96	<0.001
HIV comprehensive knowledge								
Sufficient	1							
Not sufficient	1.17	1.03	1.33	0.015				
Self-reported knowledge of HIV status								
Ever tested and received the test result	1				1			
Never tested and received the test result	1.98	1.68	2.34	<0.001	1.49	1.24	1.80	<0.001
HIV Status								
Negative	1				1			
Positive	1.52	1.33	1.74	<0.001	1.35	1.16	1.57	<0.001
Syphilis								
Non-Reactive	1							
Reactive	1.53	1.22	1.91	<0.001				
Age at first sex selling								
< 20	1.4	1.21	1.62	<0.001	1.35	1.13	1.62	<0.001
20 – 24	1.26	1.1	1.46	0.003	1.30	1.1	1.54	0.002
25+	1				1			
Age at first sex								
15 or less	2.14	1.57	2.92	<0.001				
16 – 20	1.51	1.11	2.06	0.008				
21+	1							
constant					0.09			0.000

Note: *P*-value <0.2 was used for multivariable analysis; *P*-value < 0.05= significantly associated; COR = crude odds ratio; AOR = adjusted odds ratio; LCI= lower confidence interval; UCI= upper confidence interval; 1= reference

Discussion

Although there are studies conducted on condom breakage or slippage among FSWs, they vary in the measurements used, such as condom breakage or slippage in the previous week, the last sexual intercourse, and the past month. The current study assessed the rate of condom breakage and slippage in the past month and identified a rate of 29.3%. Different demographic, behavioral, and environmental factors were significantly and independently associated with the condom failure rate in our study. FSWs who were divorced, separated, or widowed, had no formal education, had a monthly income greater than 7500 ETB, had mild to severe depression, reported harmful alcohol drinking, used drugs other than alcohol and Khat, sold sex in one more town, were using condoms inconsistently, had at least two STI symptoms in the last 12 months, were never tested for HIV, and were HIV positive had significantly higher rates of condom failure.

The rate of condom breakage or slippage among FSWs within the past 30 days identified in our study was

comparable with a rate (26.8%) reported by a previous study in Ethiopia (Amogne et al. 2021) and that reported (34%) from a similar study conducted in South India (Bradley et al. 2012). This indicates that the rate of condom breakage or slippage is consistently high across similar settings and that HIV programs need to strengthen the appropriate use of condom and provide quality condoms to support efforts toward STI control. FSWs who started selling sex before the age of 20 years experienced more condom failure, which supports findings from a study conducted in India (Bradley et al. 2011). A high proportion of alcohol using female sex workers started sex work at the age of 15-20 years higher than that of never used alcohol female sex workers (Sharma and Singh 2016), leading to high exposure to unprotected sex and condom use failure.

Condom breakage or slippage was more prevalent in less educated FSWs, which is similar to what is observed in northern Gondar Province, Ethiopia (Mekonen and Mekonen 1999). In addition, poor awareness of proper condom use (Mukenge-Tshibaka et al. 2005) and not realizing the consequences due to

their young age also contribute to the high experience of condom breakage or slippage. Thus, special attention should be given to the younger generation joining the sex trade.

Condom breakage or slippage was significantly associated with average monthly income. FSWs who had a higher average monthly income were more likely to report condom breakage or slippage. This is partially explained by FSWs who had a higher average monthly income, which was significantly associated with heavy alcohol drinking, which in turn was associated with condom failure (Amogne et al. 2021).

Inconsistent condom use and positive HIV status were also significantly associated with condom breakage or slippage, which supports the findings from a study conducted in Karnataka, India (Bradley et al. 2011). FSWs could use condom inconsistently due to poor condom use knowledge (Kanda and Mash 2018), high alcohol consumption (Iakunchykova and Burlaka 2017), violence (Mooney et al. 2013), or other unmentioned factors that increase the incidence of condom breakage, and further expose FSWs to HIV infection as evident in the current study. Thus, targeting FSWs who reported inconsistent condom use helps the prevention activity to be more effective. Nevertheless, care should be taken during the interpretation of the HIV status. Considering the limitations of a cross-sectional study, it is difficult to generalize that the HIV status was due to condom breakage; they might be positive before the incidence of condom breakage or slippage.

FSWs in our study who reported condom breakage or slippage were more likely to have hazardous alcohol consumption and be alcohol dependent; this result is in line with other studies in Ethiopia and India (Bradley et al. 2011; Amogne et al. 2021). Alcohol drinking in the context of a sexual encounter is highly associated with unprotected sex (Kalichman et al. 2007), particularly among commercial sex workers (Chen et al. 2013; Shirley et al. 2016). FSWs who work in alcohol-serving venues are especially exposed to high alcohol consumption since they are expected to facilitate sales, which exposes them to more drinking and, consequently, to unprotected sex. Furthermore, FSWs who reported drug use other than Khat and alcohol had a significantly higher association with condom breakage or slippage than those who did not use these drugs. This finding is similar to other study conducted in China (Choi et al. 2008). Similar to high alcohol consumption, drug use also changes the state of mind, making FSWs reluctant to use condoms properly, which increases the rate of condom breakage or slippage (Amogne et al. 2021).

FSWs who reported forced sex in the past one-year experienced condom breakage or slippage in our study. Violence by itself creates physical and mental harm, and increases the risk of condom failure, and contracting STIs (Choi et al. 2008). Thus, programs working with FSWs should continue to create awareness regarding the relationship between violence, condom failure, and STIs, for both FSWs and law enforcement bodies. Usually, in countries like Ethiopia, law enforcement bodies do not give protection to FSWs or support them as clients when the case is legally processed (Amogne et al. 2021). Therefore, raising awareness among legal enforcing bodies could contribute to minimizing and mitigating the risks associated with violence in FSWs.

Limitations of the study

Our study was based on a large sample that was representative of each town involved in the survey. In addition, a respondent-driven sampling technique was employed. However, since the study used a cross-sectional study design, it is difficult to assume cause-and-effect relations. The data were collected in selected major towns, and as the findings of this study relied on self-reported measures, they might be affected by social desirability and recall biases. Therefore, the interpretation of the results from our study needs to consider these factors.

Conclusion

Our study found that condom breakage or slippage among FSWs remained a major problem. Various socio-demographic and behavioral factors, including marital status, education level, depression, alcohol, and other drug use, selling sex in different venues, inconsistent condom use, STI symptoms, not testing for HIV and being positive for HIV and syphilis, and sexual encounters at a young age were identified determinants that were associated with condom breakage or slippage. These determinant factors, including the role of FSWs in preventing condom failure, need to be considered during awareness creation programs for the prevention and control of STIs, including HIV, among FSWs.

Ethics approval and consent to participate

Ethical approval was obtained from the Scientific and Ethical Research Office (SERO) of the Ethiopian Public Health Institute (EPHI) with protocol number EPHI-IRB-108-2018. Written informed consent was obtained from each participant for the interview and blood sample collection during data collection. The consent forms described that participation is voluntary and might withdraw at any point during the study; furthermore, it included the study procedures, risks, and benefits of participating in the study.

Consent for publication

Not applicable

Availability of data and materials

The study data and materials can be obtained from the Ethiopian Public Health Institute (EPHI) upon request.

Competing interests

The authors declare that they have no competing interests.

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