ORIGINAL ARTICLE

SEROPREVALENCE OF SYPHILIS AMONG FEMALE COMMERCIAL SEX WORKERS IN HAWASSA, ETHIOPIA: A CROSSECTIONAL STUDY

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ABSTRACT

Introduction: *Syphilis is an important public health problem worldwide. Female commercial sex workers are disproportionately affected by syphilis. There is scarce data on the prevalence of syphilis among female sex workers in Ethiopia. The objective of this study was to identify the seroprevalence of syphilis and associated factors among female commercial sex workers.*

Methods: *Institution-based cross-sectional study was conducted in Hawassa city among 381 female Commercial sex workers from July 5 to November 25, 2018. Background data were collected using a structured questionnaire. Blood samples were collected from participants; plasma was prepared and tested for the antibody produced against T. pallidum using the syphilis test strip. Data were analyzed using SPSS version 21. A logistic regression model was used to assess factors associated with seroprevalence of syphilis.*

Results: *Most of the participants belong to the age group 20–24 years; most of them were single and reside in an urban area, Seroprevalence of syphilis among female commercial sex workers was 4.2% (95% CI: 2.4-6.3). None of the factors assessed were significantly associated with the seroprevalence of syphilis.*

Conclusions: *Relatively low seroprevalence of syphilis was found in the present study requiring large-scale study to identify whether the low rate is a reflection of the global trend or program-related success involving this marginalized segment of society.*

Keywords: *Syphilis, Female commercial Sex workers, Seroprevalence Ethiopia*

INTRODUCTION

Syphilis, caused by spirochete *Treponema pallidum,* is an important public health problem worldwide. Syphilis is transmitted through close contact such as sexual contact and from a mother to fetus during pregnancy or birth and result in stillbirth and infant death in about 40% of cases [1]. Syphilis causes significant morbidity and mortality among adults, infants, and young children. The infection is usually asymptomatic but can cause ulceration in the genital area that could enhance the transmission of sexually transmitted diseases [2].

Even though the burden of syphilis is declining, the prevalence of syphilis remains high in most African countries with an estimated prevalence of 3.24 [3]. The prevalence of syphilis varies based on the study period, study population, and across different countries. Most importantly, all segments of society are not equally affected by syphilis. Some groups such as female commercial sex workers (FCSW), pregnant women, and Human Immuno Deficiency Virus/ Acquired Immuno Deficiency Syndrome (HIV/AIDS) patients are disproportionately affected by syphilis as compared to the general population [4, 5].

According to the report of the World Health Organization (WHO), the prevalence of syphilis among FCSWs was >5% in ten countries [6]. Whereas, countries such as Somaliland (3.1%) [7] and Kenya (3.3%) [8] reported a prevalence of less than 10%. A high prevalence of syphilis among FSWs from Uganda (21%) [9] and Addis Ababa, Ethiopia (52.4 [10] was reposted.

In Ethiopia, antenatal-based surveillance of HIV and syphilis is carried out by Ethiopian Public Health Institute (EPHI). EPHI reported inconsistent prevalence of syphilis over different years: the prevalence of syphilis was 2.7% and 2.3% in 2007 and 2009 respectively [11]. The prevalence increased from 1% in 2012 to 1.2% in 2014 [12]. The participants of the survey were only pregnant women who visited the antenatal care clinics.

There are several studies that attempted to measure the prevalence of syphilis among blood donors [13, 14] and pregnant women in Ethiopia [15, 16]. According to Kebede *et al.* (17), syphilis is considered as one of the public health important diseases in Ethiopia; however, there are few published data indicating the burden of syphilis among FCSWs in Ethiopia [10].

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As to the Authors knowledge, there is no study that addressed this issue in the Southern parts of Ethiopia. Having data on the prevalence of syphilis among FCSWs will help to strengthen existing prevention methods or design other suitable mechanisms to prevent and control the dissemination of syphilis. The aim of this study was to investigate the seroprevalence of syphilis and associated factors among FCSWs in Hawassa City, Ethiopia.

METHODS

Study design and period

An Institution-based cross-sectional study was conducted from July 5 to November 25, 2018.

Study area

This study was conducted in Hawassa City, Ethiopia at an integrated service on health and development organization (ISHDO) private clinic. Hawassa is found 275 Km from Addis Ababa, the capital of Ethiopia. The total population of the city is 328,283. ISHDO is one of the non-governmental clinics which is dedicated in providing health-related services for FCSWs residing in Hawassa area.

Variables of the study

Dependent variable: *T. pallidum* antibody test result.
Independent Variables: Marital status, educational status, place of residence, use of condom, frequency of condom use, use of stimulant, history of genital ulcer, place of sex.

Study population

Female Commercial sex workers who work in Hawassa area and obtain health and social-related services from the ISHDO clinic.

Operational definition

Female sex worker: Women who receive money or goods in exchange for sexual services.

Sample size determination and sampling technique

The sample size was determined using single proportion formula by considering 50% prevalence of syphilis, with a 95% confidence interval, 5% margin of error, and using correction formula (since the number of FSWs was less than 10,000). Based on the above assumptions, the total sample size was 381. To recruit participants, a systematic random sampling technique was used. Assuming a five-month study period, a total of 620 FCSWs were expected to visit ISHDO clinic according to the clinic plan and the past five month's performance report. To determine the sample interval, the estimated value (n=640) was divided by the sample size (n=381), which would be 1.7 (K~2). The first participant was selected by using lottery methods. Then onwards, every second participant was included until the sample size is reached. The participants were approached at the ISHDO clinic.

The blood sample was collected and transported to the Microbiology laboratory of Hawassa University Comprehensive Specialized Hospital.

Eligibility criteria

Female Commercial Sex Workers aged greater than 16yrs and who were willing to participate were included in the study. FCSWs that were not voluntary were excluded from the study.

Data collection

Before data collection, study participants were informed about the study: procedures to be carried out, benefits, risks, rights, and confidentiality. The background data were collected from FSWs after obtaining written informed consent using a structured questionnaire. From all study participants, 5 ml of blood was collected in test tubes with an anticoagulant. The whole blood was centrifuged at 5000 revolutions/minute for 10 minutes to prepare plasma. Antibodies to *T. pallidum* were confirmed by using a syphilis test strip (Gaungzhou wondfo biotech China). The sensitivity and specificity of the test strip were 100% and 98% respectively. In brief, three drops of plasma were added to the sample pad of the strip; the result was read and recorded after 10 minutes. The distinct red line on the control and test regions indicated a positive test result.

As part of quality control, the questionnaire was translated from English to Amharic and then translated back to English to check the consistency. The questionnaire was pretested on 5% of the total sample size. During the study, data were checked daily for completeness. For laboratory work, the manufacturer's manual was followed carefully. The test kit was checked by using known positive and negative controls before using for the study.

Data analysis

SPSS version 21 software was used for data analysis; results were summarized and presented in tables and text. The logistic regression model was used to determine predictors of syphilis infection. A *p*-value of less than 0.05 was considered statistically significant.

Ethics approval and consent to participate

Ethical clearance was obtained from Hawassa University College of Medicine and Health Sciences institutional review board (IRB) with the reference number IRB026/10. Permission was requested and obtained from the study site (ISHDO clinics). Study participants were recruited after informed written consent was obtained. They were informed not to participate or might leave the study at any time. Confidentiality was kept by using codes instead of names that could relate to the participants

Results

In this study, 381 FSWs participated with a 100% response rate. Most of the participants were single, reside in an urban area, use condoms, and have no history of a genital ulcer (Table **1 & 2**). The mean age and SD of participants was 22.6 ± 3 years.

Table 1. Sociodemographic and behavioral characteristic of Female Sex worker at Hawassa, Ethiopia, July 5 to November 25, 2018 (N=381).

Variables		**Frequency, n (%)**
Age in year	15-19	91 (23.9)
	20-24	174 (45.6)
	25-29	90 (23.6)
	30-34	17 (4.5)
	35-40	9 (2.4)
Marital status	Married	11 (2.9)
	Single	289 (75.9)
	Widowed	37 (9.7)
	Divorce	44 (11.5)
Educational status	No formal education	75 (19.7)
	Formal education	306 (80.3)
Residence	Rural	139 (36.5)
	Urban	242 (63.5)

Table 2. Sexual behaviors and clinical features of Female Sex worker at Hawassa, Ethiopia, July 5 to November 25, 2018 (N=381).

Variables		**Frequency, n (%)**
Condom use during sex	Yes	367 (96.3)
	No	14 (3.7)
Frequency of condom use	Always	303 (82.6)
	Sometimes	53 (14.4)
	Rarely	11 (2.9)
Reason for not using condom	Satisfy customer	4 (28.6)
	To get more money	8 (57.1)
	Negligence	2 (14.3)
History of genital ulcer	Yes	99 (26.0)
	No	282 (74.0)
Steady partner	Yes	103 (27.0)
	No	278 (73.0)
Place of work(sex)	Hotel	172 (45.1)
	Street	160 (42’0)
	Home	48 (12.6)
	Any place	1 (0.3)

Seroprevalence of syphilis

Out of 381 FSWs tested, 16(4.2%) 95% CI: (2.4, 6.3) were positive for *T. pallidum* antibody. None of the factors assessed were significantly associated with of seroprevalence of syphilis (p>0.05) (Table **3**).

Table 3. Factors associated with seroprevalence of syphilis among Female Sex Workers at Hawassa, Ethiopia, July 5 to November

Variables		T. pallidum antibody test result		COR (95% CI)	p-value
		Positive n (%)	Negative n (%)		
Marital status	Married	1 (9.1)	10 (90.9)	1	1
	Single	11 (3.8)	278 (96.2)	2.5(0.29-21.6)	0.39
	Widowed	1 (2.7)	36 (97.3)	3.6(0.21-62.7)	0.38
	Divorced	3 (6.8)	41 (93.2)	1.4(0.13-14.6)	0.79
Educational status	No formal education	2 (2.7)	73 (97.3)	1.8(0.39-7.89)	0.47
	Formal education	14 (4.6)	292 (95.4)	1	
Place of residence	Rural	6 (4.3)	133 (95.7)	0.9(0.34-2.7)	0.9
	Urban	10 (4.1)	232 (95.9)	1	1
Do you use condom	Yes	15 (4.1)	352 (95.9)	1	1
	No	1 (7.1)	13 (92.9)	0.5(0.07-4.52)	0.51
How often do you use condom	Always	12 (3.8)	303 (96.2)	1	1
	Sometimes	3 (5.5)	52 (94.5)	0.69(0.19-2.52)	0.57
	Rarely	1 (9.1)	10 (90.9)	0.39(0.05-3.35)	0.39
Reason for not using condom regularly	To satisfy customer	2 (10.5)	17 (89.5)		
	To get more money	2 (4.8)	40 (95.2)		
	Negligence	-	8 (100)		
Use of stimulant	Yes	11 (4.6)	230 (95.4)	1.24(0.42-3.66)	0.69
	No	5 (3.7)	130 (96.3)	1	1
History of genital ulcer	Yes	5 (5.1)	94 (94.9)	1.3(0.44-3.87)	0.63
	No	11 (3.9)	271 (96.1)	1	1
Steady partner	Yes	5 (4.9)	98 (95.1)	1	1
	No	11 (4)	267 (96)	0.81(0.27-2.38)	0.69
Place of sex	Hotel	9 (5.2)	163 (94.8)		
	Street	5 (3.1)	155 (96.9)		
	Home	2 (4.2)	46 (95.8)		
	Any place	-	1 (100)		

DISCUSSION

Female Sex workers are prone to syphilis, one of the sexually transmitted diseases, as compared to the general population because of the nature of their work. The seroprevalence of syphilis among FSW identified in this study was 4.2% which is in line with a report from Burkina Faso (5.6%) [18]. In contrast to our study, high prevalence of syphilis among FSWs was reported from several countries such as Addis Ababa Ethiopia (52.4%) [10], Argentina (45.7%) [19], Rwanda (51.1%) [20], Brazil (14%) [21], China (7.5-8.8%) [22]. The finding of the current study is higher than the study conducted in Togo (2.2%, 0.8%) [23, 24]. The difference observed could be due to the study design, laboratory methods used and period with an earlier study reporting higher prevalence than recent studies. [25]. The other reasons are laboratory methods used and sample size used.

Relatively, the prevalence of syphilis is well studied among blood donors and pregnant women in Ethiopia. The prevalence of syphilis detected in this study is in line with the prevalence of syphilis reported among blood donors [13, 14] and HIV/AIDS patients [15, 16] reported from Ethiopia. Our finding is low compared to the previous reports of syphilis among FSWs from Ethiopia [10]; however, it is difficult to make a substantial comment on the status of our finding whether it is high or low since there are no similar studies from Ethiopia. We noted the importance of addressing the magnitude of syphilis among FSWs at a large scale in Ethiopia. Even though none of the factors assessed were significantly associated with the prevalence of syphilis, the high prevalence was noted among those who place sexual activity was a hotel, those who had a genital ulcer, and those who did not use condoms. The absence of association could be due to a small sample or a limitation of quantitative study. Future qualitative studies will possibly identify the protective and/ or exposing risk factors to the high-risk population like FCSW to Syphilis.

Limitations of the study*:* There are limited studies to compare our findings with others. the study carries a risk to recall bias and some sensitive information may not be revealed by participants. the design of the study and. The low power of the study was additional limitation of the study.

Strength of the study*:* In this study, we tried to assess the magnitude of syphilis among segments of the population who are prone to sexually transmitted diseases

Conclusions

Syphilis is one of the public health important diseases in Ethiopia. In this study, a relatively low seroprevalence of syphilis was found among FSWs in Hawassa. None of the factors were significantly associated with the seroprevalence of syphilis. Large-scale studies incorporating mixed methods will yield not only the prevalence but the determinants for the low prevalence in High- risk populations.

Abbreviations

FSW: Female Sex Worker, HIV/AIDS: Human Immuno Deficiency Virus/Acquired Immuno Deficiency Syndrome, WHO: World Health Organization, RPR: Rapid Plasma Reagin, ISHDO: integrated service on health and development organization

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Competing interests

The authors declare that this manuscript was approved by all authors in its current form and that no competing interest exists.

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