

Sero-prevalence of Hepatitis B Surface Antigen and Associated Factors Among Female Sex Workers in Hawassa, Ethiopia, 2019

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Research

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Abstract

Background

Hepatitis B virus infection is one of the most serious infections and is a major public health problem. Female Sex Workers (FSWs) are considered to be at soaring risk for transmission and acquisition of HBV due to exposure to multiple sexual partners and barriers to the negotiation of consistent condom use. HBV screening services are not widely available in Ethiopia particularly for high risk groups such as persons with multiple sex workers. Hence, this study aimed to assess Sero-prevalence of HBVsAg and associated factors among FSWs in southern Ethiopia.

Method

A cross-sectional study was conducted from November to February 2019 at Hawassa city in ISHDO confidential clinic on 383 FSWs. *A consecutive sampling technique* was used to select study participants using standardized questionnaire. Data were entered to SPSS version 20.0 and analyzed for different variables using Logistic regression. HBsAg was detected from plasma samples using ELISA method.

Results

The prevalence of HBV among FSWs was 9.2%(95%CI:6.3–12.1). The condom use, condom breakage during sex, use of stimulants, duration of prostitute, history of STI, history of genital ulcer, the number of clients used per day, sex during menses, sexual assault, common use of sharp material and the history of abortion were one of the common factors associated with HBV among FSWs.

Conclusion

The prevalence of HBV among FSWs in this study area was high. Condom use, history of genital ulcer, sexes during menses and sharp material sharing is highly associated with HBV infection among FSWs and emphasis should be given.

Plain English Summary

Hepatitis B virus infection is one of the most serious infections and is a major public health problem. Africa has the second largest number of chronic HBV carriers after Asia and is considered as a region of high endemicity. HBV prevalence is highest in the adult population of the Western Pacific Region and Africa. Female Sex Workers (FSWs) are considered to be at soaring risk for transmission and acquisition of HBV due to exposure to multiple sexual partners and barriers to the negotiation of consistent condom use.

Of the 381 study participants who tested for Hepatitis B virus (HBV), 35(9.2%) were positive for hepatitis B surface antigen (HBsAg) test which is more prevalent than other study population. Condom use, history of genital ulcer, sexes during menses and sharp material sharing is highly associated with HBV infection among FSWs. Therefore, efforts by both governmental and non-governmental organizations should be made to give emphasis on diagnosis and treatment of STIs, educate the community on risky sexual behaviors. Further survey should be done on larger sample size and with different study design.

Background

Hepatitis B virus (HBV) is a DNA virus belonging to the Hepadnaviridae family. It is a virus that infects the liver.^{1,2} HBV was discovered in 1965 when Blumberg and co-workers found the Hepatitis surface antigen which was originally called the Australia.³

As the World Health Organization (WHO) global health impact report of viral hepatitis more than 240 and 150 million populations were affected by chronic liver disease due to HBV and HCV respectively.² Africa has the second largest number of chronic HBV carriers after Asia and is considered as a region of high endemicity.¹

HBV prevalence is highest in the adult population of the Western Pacific Region and Africa, where 6.2% and 6.1% respectively. In the Eastern Mediterranean Region, South-East Asia, Europe and population of the Americas, an estimated 3.3%, 2.0%, 1.6% and 0.7% of the general population are infected, respectively.⁴

It is mentioned that Africa is one of the continents with the highest prevalence of HBV and Ethiopia being a member of this continent shares this burden.²

HBV is most commonly spread through exposure to infected blood and various body fluids, as well as through saliva, menstrual, vaginal, and seminal fluids and reuse of needles and syringes either in healthcare settings or among persons who inject drugs. Besides, the infection can occur during medical, surgical and dental procedures, through tattooing, or through the use of razors and similar objects that are contaminated with infected blood.⁴

The prevalence of HBV among Female sex workers was 28.9% in Gondar, Ethiopia,⁵ 6% in Makelle, Ethiopia,⁶ 4.20% in Republic of Congo,⁷ 17.1% in Nigeria,⁸ 23.6% in São Paulo, Brazil,⁹ 10.7% in China.¹⁰

The risk factors associated with HBV among female sex workers were, workplace of sex, inconsistent condom use, and use of the drug.⁶ The limited economic options, having many dependents, marital disruption, low education status and hazardous alcohol use and co-infection with other sexual transmitted infections⁹ were common factors associated with HBV infection. Also living in the city,⁹ drug abuse and anal sex,¹¹ uses of cracked condom were risk factors.⁹ Moreover, a history of multiple sex partners and women who have experienced child sexual abuse^{12,13} constitutes the potential risk factors.¹⁴ Therefore, this study aimed to determine the seroprevalence and associated factors of HBV among adolescent and young adult Female sex workers in Hawassa, integrated services on Health development (ISHDO) project confidential clinic.

Methods

Study design and population

The study was conducted at integrated services on Health development (ISHDO) project confidential clinic in Hawassa town in southern Ethiopia. It is one of the nongovernmental institutions founded to support marginalized populations to give ISHDO. Hawassa is the capital city of the South region, located on the shores of Lake Hawassa in the Great Rift Valley, 275 km South of Addis Ababa. Hawassa is a good tourist destination and recreational area of the south region. The town is locally called “Fikir Ketema” which means a lovely town. The study was conducted from July 1–November 31st 2019.

A cross-sectional study was conducted on adolescent and young adult Female sex workers. All adolescent and young adult female sex workers in the Hawassa town were the source of the population. About 383 female sex workers were included from eight sub-cities. All Kebeles female sex workers were pre-registered in the registration

book. They are usually picked by special assigned ex-sex workers, namely: “Demand creator” by moving home to home and brought them to their special clinic. In this study, all Female sex workers who are living in the town and who had been working as a commercial sex worker for at least 3 months have participated. The age greater than 16 years old female sex workers were included. However, female sex workers who were living outside the town and who live less than 3 months in the city were not included in this study

Specimen collection

Three up to five milliliters (3–5 ml) of whole blood was drawn to obtain plasma and stored at -20°C in the upper compartment of the refrigerator until it tested. HBsAg was detected from plasma samples by using AiD™ antibody sandwich HBsAg ELISA method (WANTAI HBV diagnostics AiD™ HBsAg ELISA). The test was conducted following manufacturer’s instructions and the Microplates read at a wavelength of 450 nm using the Enzyme linked immune assay (ELISA) reader. The presence or absence of HBsAg was determined by relating the absorbance of the unknown sample to the cut-off value.

Statistical analysis

Data were entered and cleaned using Epi-Data version 3.1 and exported into SPSS version 21. Binary logistic regression analysis was being performed accordingly. A p-value of less than 0.05 considered as statistical significance. The pretest was performed on 5% of the total sample size, to assure the consistency and quality of data.

Result

Socio-demographic characteristics

Out of a total of 383 enrolled subjects, 381(99.5%) were completed information from the questionnaire and also recruited for laboratory blood tests. About 45.7% of the participants were 20–24 ages. The mean (Mean \pm SD) age was 22.63 ± 4.3 and the median age was 22. The age range was between 16 and 40. More than three fourth of the group is single and very few 2.9% were married. The majority of (63.5%) of the respondents were from urban. About 306(80.3%) of the study participants were attended formal education, whereas 53.5% of the participants were 5th -8th grade. More than 35% of the study participants have the monthly income range of 1501 to 3000 Ethiopian Birr with a mean and mode of 1992.70 and 1000.00 ETB respectively (Table 1).

Table 1
 socio-demographic characteristics of study participants 2019 (n = 381)

Variables		Frequency	Percent
Age in years	16–19	91	23.9
	20–24	174	45.7
	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
	Divorced	44	11.5
Educational Status	No formal education	75	19.7
	1–4	47	12.3
	5–8	204	53.5
	9–12	52	13.6
	Above 12th	3	.8
Residence	Rural	139	36.5
	Urban	242	63.5
Religion	Protestant	201	52.8
	Orthodox	164	43.0
	Muslim	7	1.8
	Catholic	9	2.4
Living status	Depend on family	295	77.4
	Had another job	75	19.7
	Other specify	11	2.9
Dependent people	Yes	187	49.1
	No	194	50.9
Dependent Size	No dependents	194	50.9
	1–2	141	37.0
	2–4	46	12.1
Average Monthly Income in ETB*	501–1000	104	27.3
ETB; Ethiopian Birr			

Variables	Frequency	Percent
1001–1500	87	22.8
1501–3000	136	35.7
3001–7000	54	14.2
ETB; Ethiopian Birr		

About 45.1% of the sex workers were doing their sex at the hotel. Despite the condom utilization rates of the study participant were 96.3%, the breakage rate of the condom was 27.1%. However, 64% of them are washed with water and have no further action. Few of them are not using a condom at all (3.7%) to get extra money. The alcohol consumption and injecting drugs/stimulants before the sex rate was 83.2% and 63.0% respectively (Table 2).

Table 2
sexual behavior of the study participants 2019 (n = 381)

Variables		Frequency	Percent
Place of sex	Hotel based	172	45.1
	Street based	160	42.0
	Home based	48	12.6
	Any type	1	.3
Condom utilization during sex	Yes	240	63.0
	No	141	37.0
Frequency of condom utilization	Always	185	48.6
	Sometimes	43	11.3
	Rarely	12	3.1
Reason for not using condom	To satisfy customers	57	15.0
	To get more money	74	19.4
	Negligence	10	2.6
Breakage of condom during sex	Yes	67	17.6
	No	173	45.4
Action of breakage of condom during sex	Went to health facility	10	2.6
	Nothing	23	6.0
	Washing with water	34	8.9
Alcohol consumption	Yes	308	80.8
	No	73	19.2
Frequency of alcohol consumption	Always	74	19.4
	Sometimes having sex	156	40.9
	Rarely	78	20.5
Utilization of injectable drugs/ stimulants before sex	Yes	243	63.8
	No	138	36.2
Type of stimulants/injectable drugs	Khat only	162	42.5
	Khat and cigarette	15	3.9
	Khat and Shisha	40	10.5
	Shisha only	26	6.8
Duration of prostitute commitment	< 1 years	65	17.1
STI; Sexual transmitted infection; HBV; Hepatitis B virus			

Variables		Frequency	Percent
	2–5 years	249	65.4
	> 6 years	67	17.6
Sexual direction/position	vaginal sex only	287	75.3
	vaginal and anal	39	10.2
	vaginal and oral	55	14.4
HBV vaccination	Yes	1	.3
	No	380	99.7
History of STI infection	Yes	100	26.2
	No	281	73.8
Type of STI infection	Syphilis	18	4.7
	Gonorrhea	82	21.5
History of Genital ulcer	Yes	105	27.6
	No	276	72.4
Action on Genital ulcer	Went to a health facility	77	20.2
	treat with herbal treatment	23	6.0
	nothing did	5	1.3
Presence of steady partner	Yes	103	27.0
	No	278	73.0
Use of condom with steady partner	Yes	55	14.4
	No	48	12.6
Number of clients accommodated per day	< 5	224	58.8
	≥ 5	157	41.2
Sex during menses	Yes	11	2.9
	No	370	97.1
A habit of sexual abuse/ harassment	Yes	44	11.5
	No	337	88.5
Have you ever received Blood transfusion?	Yes	10	2.6
	No	371	97.4
Sharp material for common use (tattooing)	Yes	30	7.9
	No	351	92.1

STI; Sexual transmitted infection; HBV; Hepatitis B virus

Variables		Frequency	Percent
History of Abortion	Yes	36	9.4
	No	345	90.6
Place of abortion	Health facility	11	30.6
	Traditionally	25	69.4
HBV status	Positive	35	9.2
	Negative	346	90.8
STI; Sexual transmitted infection; HBV; Hepatitis B virus			

In this study, 65.4% of the Female sex workers involved for 2–5 years usually using vaginal sex only. However, a few of them (10.2%) used vaginal and anal sex. Almost none of them have not vaccinated with HBV vaccination.

The history of STI among Female sex workers was 24.7% and have more than 81% of them usually infected with gonorrhea. Few of them have sex during menses (2.9%). In this study, the habit of sexual abuse/harassment, common sharp material utilization (tattooing) and history of abortion were 11.5%, 7.9%, and 9.4% respectively.

Prevalence and determinants of HBV

Of the 381 study participants who tested for HBV, 35(9.2%) were positive for HBsAg test.

Table 3

Factors associated with HBV among females sex workers at Hawassa City, Southern Ethiopia, 2019 (n = 381)

Variables		HBV (+) N (%)	HBV(-) N (%)	COR (95% CI)	p-value	AOR (95% CI)	p-value
Age in years	16–19	5(14.3)	86(24.6)	2.15(0.22, 20.73)	0.06	0.47(0.05, 4.49)	0.33
	20–24	16(45.7)	158(45.7)	1.23(0.15, 10.51)		0.81(0.09, 6.90)	
	25–29	10(28.6)	80(23.6)	1.0(0.11, 8.85)		1.0(0.11, 8.85)	
	30–34	3(8.6)	14(4.0)	0.58(0.05, 6.59)		1.71(0.15, 19.34)	
	35–40	1(2.9)	8(2.3)	1		1	
Marital status	Married	1(2.90)	10(2.9)	1	0.21	1	0.07
	Single	26(74.3)	263(76.0)	1.01 (0.13, 8.22)		1.00(0.10, 9.96)	
	Widowed	4(11.4)	33(9.5)	0.83(0.82,8.25)		1.01(0.34, 3.05)	
	Divorced	4(11.4)	40(11.6)	1.0(0.10, 9.96)		0.83(0.19, 3.55)	
Educational Status	No formal education	7(20.0)	68(19.7)	1.19(0.38, 3.76)	0.09	0.84(0.27, 2.66)	0.103
	1–4	3(8.6)	44(12.7)	1.79(0.42, 7.61)		0.56(0.13, 2.36)	
	5–8	19(54.3)	185(53.5)	1.19(0.45, 3.15)		0.84(0.32, 2.21)	
	9 and above	6(17.1)	49(14.2)	1		1	
Residence	Rural	5(14.3)	124(35.8)	1	0.015	1	0.022
	Urban	30(85.7)	222(64.2)	0.29(0.11, 0.79)		0.74(0.37, 1.51)	
Living status depend on	Family	31(88.6)	188(54.3)	1	0.001	0.98(0.43, 2.25)	0.14
	Not on family	4(11.4)	158(54.7)	6.51(2.25,18.85)		1	
Having dependent people	Yes	28(80.0)	159(46.0)	1	0.00	1	0.12
	No	7(20.0)	187(54.0)	4.70(2.00, 11.06)		1.28(0.43,3.84)*	
Monthly Income	501–1000	8(22.9)	90(26.0)	0.99(0.20, 2.39)	0.23		0.25
	1001–1500	15(42.9)	62(17.9)	0.69(0.08, 0.81)			
	1501–3000	8(22.9)	129(37.3)	0.25(0.29, 3.42)			
	3001–7000	4(11.4)	65(18.8)	1			

** Significant at $p < 0.005$, * significant at $p < 0.05$; AOR, adjusted odds ratio; COR, crude odds ratio; CI, confidence interval; OR, odds ratio

Variables		HBV (+) N (%)	HBV(-) N (%)	COR (95% CI)	p-value	AOR (95% CI)	p-value
Dependent Size	No dependents	7(20.0)	187(54.0)	1	0.00	0.94(0.34, 2.61)	0.08
	1-2	23(65.7)	118(34.1)	0.19(0.80, 0.46)		0.55(0.17, 1.84)	
	2-4	5(14.3)	41(11.8)	0.31(0.09, 1.02)		1	
Condom use	Yes	10(28.6)	230(66.5)	1	0.00	1	0.01*
	No	25(71.4)	116(33.5)	4.96(2.30, 10.67)		6.38(2.04, 18.51)	
Condom Breakage during sex (n = 240)	Yes	6(60.0)	61(26.5)	4.16(1.13, 15.23)	0.03	2.10 (0.95,4.62)	0.03*
	No	4(40.0)	169(73.5)	1		1	
Alcohol consumption	Yes	21(60.0)	287(82.9)	3.24(1.56, 6.74)	0.00	1.21(0.45, 3.26)	0.14
	No	14(40.0)	59(17.1)	1		1	
Use of stimulant	Yes	29(82.9)	214(61.8)	2.98(1.21, 7.37)	0.013	3.25(1.59, 18.63)	0.018*
	No	6(17.1)	132(38.2)	1		1	
Duration of prostitution service	< 1	3(8.6)	62(17.9)	4.74(1.30, 17.34)	0.00	1	0.02*
	2-5	18(51.4)	223(64.5)	2.84(1.34, 6.04)		2.03(0.49, 8.50)	
	> 6	14(40.0)	61(17.6)	1		0.84(0.33, 2.14)	
Type of sex usually used	Vaginal only	24(68.6)	263(76.0)	1	0.08	1.20(0.34, 4.26)	0.98
	Vaginal and anal	5(14.3)	34(9.8)	0.62(0.22, 1.73)		0.75(0.29, 1.92)	
	Vaginal and oral	6(17.1)	49(14.2)	0.75(0.29, 1.92)		1	
Vaccinated	Yes	1(2.9)	1(0.3)	1	0.18	1	0.23
	No	34(97.1)	345(99.7)	10.15(0.62, 165.88)		0.99(0.06, 1.61)	
History of STI	Yes	20(57.1)	80(23.1)	4.43(2.17, 9.06)	0.00	2.15(1.02, 6.93)*	0.011*
	No	15(42.9)	266(76.9)	1		1	
History of Genital ulcer	Yes	18(51.4)	87(25.1)	3.15(1.56, 6.39)	0.00	4.64(1.31, 11.35)	0.004**
	No	17(48.6)	259(74.9)	1		1	

** Significant at p < 0.005, * significant at p < 0.05; AOR, adjusted odds ratio; COR, crude odds ratio; CI, confidence interval; OR, odds ratio

Variables		HBV (+) N (%)	HBV(-) N (%)	COR (95% CI)	p-value	AOR (95% CI)	p-value
Number of clients used per day	< 5	9(25.7)	202(58.4)	1	0.00	1	0.018*
	≥ 5	26(74.3)	144(41.6)	4.05(1.84, 8.91)		3.25(1.59, 7.47)	
Sexes during menses	Yes	4(11.4)	7(2.0)	6.25(1.7, 22.53)	0.00	5.85(1.29,21.44)	0.002**
	No	31(88.6)	339(98.0)	1		1	
Sexual Assault	Yes	9(25.7)	35(10.1)	3.08(1.34, 7.09)	0.00	2.93(1.23,9.01)	0.007**
	No	26(74.3)	311(89.9)	1		1	
Blood received	Yes	2(5.7)	8(2.3)	1	0.12	1	0.08
	No	33(94.3)	338(97.7)	2.56(0.52, 12.56)		0.39(0.08, 1.92)	
Use of sharp material	Yes	8(22.9)	22(6.4)	4.36(1.78, 10.73)	0.00	4.98(1.34,10.95)	0.008**
	No	27(77.1)	324(93.6)	1		1	
History of Abortion	Yes	9(25.7)	30(8.7)	3.65(1.67, 8.49)	0.00	2.46(1.18, 12.19)	0.00**
	No	26(74.3)	316(91.3)	1		1	

** Significant at p < 0.005, * significant at p < 0.05; AOR, adjusted odds ratio; COR, crude odds ratio; CI, confidence interval; OR, odds ratio

The condom use, condom breakage during sex, use of stimulants, duration of prostitute, History of STI, history of genital ulcer, the number of clients used per day, sex during menses, sexual assault, a common use of sharp material and the history of abortion were one of the common factors associated with HBV among Female sex workers (Table 3).

In binary logistic regression analysis, common use of Condom use, (AOR = 6.38, CI 2.04–18.51), Condom breakage during sex, (AOR = 2.10, CI 0.95–4.65), Use of stimulants, (AOR = 1.25, CI 0.59–2.63), History of STI, (AOR = 2.15, CI 1.02–6.93), History of Genital ulcer, (AOR = 4.64, CI 1.31–11.35), Number of clients used per day, (AOR = 3.25, CI 1.59–7.47), sexes during menses (AOR = 5.85, CI (1.29–21.44), sexual assault (AOR = 2.93, CI 1.23–9.01), sharp material sharing, (AOR = 4.98, CI 1.34–10.95) and History of abortion, (AOR = 2.46, CI 1.18, 12.19), remained statistically significant factors associated with HBV infection.

Discussion

Globally the prevalence of HBV infection can be divided into high (>8%), intermediate (2–8%) and low (<2%). Hence as the prevalence of HBV among Female sex workers in this study area found to be 9.2%, the prevalence is labeled as high occurrence.

This study revealed that the overall prevalence of HBV among female sex workers in hawass city was 9.2% (CI: 95% 6.3–12.1). This is lower than the study conducted in Gondar which was 11.9%,⁵ Nigeria 17.1%,⁸ Cameroon 36%,¹⁵

Argentina 14.4%,¹⁶ Shanghai, China 12.3%,¹⁷ in Goiânia, Brazil 17.1%¹⁸ and Southern Brazil 23.1%.¹⁹ On the other hand this study is higher than the study conducted in Mekelle, Ethiopia 6%,⁶ Iran 1.2%,²⁰ Rwanda 2.5%,²¹ Congo 7.3%,⁷ Italy 3.5%,²² Venezuela 3.8%,²³ and Afghanistan 6.54%.¹¹ This variation of findings across various studies might be due to diagnostic tools and reporting biases, differences in socio-demographic, differences in socio economic environments. Prevalence estimates also are likely to be influenced by stigma and discrimination and also study settings. Also unemployment status of the females might be enforced to engage in risky sexual services.¹¹ Also, the history of previous vaccination, high prevalence of HBV among general population, use of illegal injecting drugs, consumption of alcohol, breaking of the condom during sex, a long period of prostitute engagement, anal sex and the presence of other sexual transmitted infections among female sex workers may be contributed.^{24,25}

The major determinants of HBV were, low adherence to the condom use, history of genital ulcer, history of sexual transmitted infections, sexes during menses, sexual assault and shared use of sharp materials were statistically significant ($p < 0.05$). This is similar to the study conducted in Nigeria.⁸

In agreement with WHO, 2014 Prevention and Treatment of HIV and other Sexually Transmitted Infections for Sex Workers in Low and Middle-income Countries and studies result from Teresina-PI, Northeastern Brazil, India and Afghanistan²⁶⁻²⁹ this study indicated number of clients (> 5 clients (sexual partner) per week) significantly associated with HBV [AOR = 3.25, (1.59,7.47)]. The possible explanation may be multiple clients produce greater vulnerability to risks for low adherence to the use of condoms in all sexual relations. Also, clients of sex workers may practice risky behaviors like injectable drug use etc., thus increase the risk of acquiring STIs including hepatitis B virus.

Studies indicated that History of STI were predictors of exposure to HBV.^{18,20,30} Consistently, result of this study reflected the odds of participants who have history of STI which were more than 2 times to be positive as compared with participants who don't have [AOR = 2.15, (1.02,6.93)]. The most common history of STI was Neisseria gonorrhea and syphilis. Also genital ulcers were seen among 27.6% participants. These infections can cause inflammation and ulcer around the genital area. Thus, it may increase the risk of becoming infected with HBV.

In this study, educational status, history of blood transfusion and alcohol consumption were not statically significant association with HBV as other studies done in Teresina-PI, Northeastern Brazil among sex workers, in three Afghan cities among female sex workers, in Mekelle among commercial sex workers and in Tehran, Iran among female sex workers found out.^{6,9,20,27,28}

Even though the female sex workers who did not vaccinated previously for HBV were more in number for HBV infection than those who vaccinated, there is no statistical significant association in this study. However, similar studies were done in Argentina shown that none vaccinated people developed HBV infection more likely than vaccinated peoples.¹⁶ This indicates that vaccination is one of the prevention mechanisms of HBV infection.

According to this study, those who have previous sexual transmitted infection especially syphilis were statistically significant with the infection of HBV which is similar to the study done in, Iran and other different countries.^{18, 20, 30} Also Female sex workers who are not avoiding sex during menses were more than five times affected by HBV infection which is inconsistent with the study of Mekelle, Ethiopia.⁶ This study also showed that previous sexual assaulted female sex workers had more than two times the probability to develop HBV infection than those of not harassed. This correlates with studies from North America and South Africa have shown that women who have experienced sexual abuse are more likely to acquire HBV infection.^{12,13}

As study done in Northeastern Brazil ²⁷ sharing of sharp materials for tattooing and another purpose is significantly influencing HBV infection among female sex workers ($p < 0.05$) in this study area. Also history of genital ulcer and the habit of unsafe abortion was statistically significant among female sex workers to acquire HBV. ¹⁸

Also, age, marital status, residence, monthly income, presence of steady partners, and type of sex usually used has no statistically significant association in this study area. This is similar to the study of Mekelle, Ethiopia. ^{6,18}

Conclusion

The prevalence of HBV among FSWs in this study area was high. Condom use, history of genital ulcer, sexes during menses and sharp material sharing is highly associated with HBV infection among FSWs and emphasis should be given. Since this finding indicates HBV infection is more prevalent among FSWs, efforts by both governmental and non-governmental organizations should be made to give emphasis on diagnosis and treatment of STIs, educate the community on risky sexual behaviors. Further survey should be done on larger sample size and with different study design.

Abbreviations

ISHDO: integrated services on Health development; **HBV**: hepatitis B virus; **HBsAg**: Hepatitis B surface antigen test; **FSW**: Female sex workers; **STIs**: sexual transmitted infections; **AOR**: Adjusted odds ration; **COR**: crude odds ratio; **WHO**: World Health Organization

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the Hawassa University Institutional Review Board Committee. A permission letter was granted from the Southern Nation, Nationality and People Regional Health Bureau to respective health institutions. Written consent was obtained from each participant prior to data collection. After informing each respondent about the aim and purpose of the study, participants were asked for their voluntary participation. Those respondents were assured they could withdraw from the study anytime if they felt unhappy. They were also informed that all data obtained from them would be kept confidential by using codes instead of any personal identifiers.

Consent for publication

Not applicable

Availability of data and material

All data and materials in this manuscript could be deposited in publicly available repositories. All relevant data is included in the paper, the full data available from the Family Guidance Association (FGA) of the Southern Ethiopia, Hawassa.

Competing interests

The authors have declared that no competing interests exist.

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Author contributions

DD: Conceived and designed the study, analyzed the data, involved in manuscript preparation, Involved in protocol development and manuscripts write up. GHM, Conceived and designed the study, supervised the study, involved in analysis and manuscript preparation. All authors read and approved the final manuscript.

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