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Hepatitis B vaccination and its associated factors among health care workers working in Wolayita Sodo Hospitals, Southern Ethiopia: a cross-sectional study 1

Agegnehu Bante, Megbaru Debalkie, Asmare Getie, Biresaw Wassihun, Abera Mersha, Yimam Ahmed, Gedeno Kusse, Jemal Beketa, Jemal Seid and Mulugeta Abate

Full Length Research

Hepatitis B vaccination and its associated factors among health care workers working in Wolayita Sodo Hospitals, Southern Ethiopia: a cross-sectional study

Agegnehu Bante^{1*}, Megbaru Debalkie¹, Asmare Getie¹, Biresaw Wassihun², Abera Mersha¹, Yimam Ahmed¹, Gedeno Kusse¹, Jemal Beketa¹, Jemal Seid¹ and Mulugeta Abate¹

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Hepatitis B is the principal public health problem among diverse segments of inhabitants. However, attention is not given on its prevention strategy, especially among health care workers. Hence, the intention of this study was to assess hepatitis B virus vaccination status and associated factors among health care workers working in Wolayita Sodo hospitals, Southern Ethiopia. An institution based cross-sectional study was employed from May 10 to 25, 2018. A total of 370 participants was selected using simple random sampling. A self-administered questionnaire was used and the data were entered into EpiData 3.1 and exported to SPSS 22.0 for analysis. Both bivariate and multivariable analysis were applied and statistical significance was declared at P-value < 0.05. Of the participants, 62.7% (95% CI: 57.75, 67.65) received a full dose of the vaccine. Being female (AOR=1.87, 95 % CI: 1.16, 3.01), worked for four years and above (AOR=1.91 95% CI: 1.22, 3.13], working at ward and delivery (AOR=2.26, 95% CI: 1.41, 3.63), good knowledge (AOR=2.0, 95% CI: 1.20, 3.04) and favorable attitude (AOR=1.9, 95% CI: 1.17, 2.97) were statistically associated with vaccination. This study revealed that vaccination of healthcare providers was sub-optimal. Thus, boundless stress should be given to expand the vaccination coverage of the virus.

Key words: Hepatitis B virus, vaccination, healthcare workers, Ethiopia.

INTRODUCTION

Hepatitis B virus (HBV) is one of the smallest viruses known to infect humans (Hundie et al., 2017). It spreads through percutaneous or per mucosal revelation to infected blood or body fluids, primarily semen and vaginal fluids (Nigussie et al., 2013). The virus is more contagious than other bloodborne pathogens following percutaneous contact. The jeopardy of getting an infection from a single

needle stick injury is 30%, which is very high compared to hepatitis C virus (3%) and human immune virus (0.3%) (Kesieme et al., 2011).

Internationally, 291,992,000 individuals were infested by HBV in 2016; of these, merely 29 million were detected and 4.8 million received treatment. The WHO African Region and the Western Pacific Region are

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customarily affected (WHO, 2017). Death due to hepatitis is persistently amplified; 1.4 million deaths per year from acute infection and hepatitis-related liver cancer and cirrhosis which, is comparable to deaths due to HIV and tuberculosis; of those deaths, approximately 47% attributed due to HBV (WHO, 2016a). Likewise, around 257 million people were living with chronic HBV infection. HBV is also the second leading cause of carcinogens that causes malignancy next to tobacco (WHO, 2011). Of 360 million chronic infections about a million died every year due to HBV (Khan and Ross, 2013). By considering this, the World Health Assembly approved the global health sector strategy to eliminate viral hepatitis as a public health threat by 2030, with a target of reducing new infections by 90% and mortality by 65% (WHO, 2016a).

Healthcare workers (HCWs) are more liable to HBV exposure more often than the general population due to the environment of their career (Noubiap et al., 2014). WHO appraised that every year, 3 million HCWs experience percutaneous exposure to blood-borne pathogens, of these, 2 million are visible to HBV. Forty to sixty percent and < 10% of HBV infection among HCWs are attributed to professional threats in developing and developed countries respectively (Riou et al., 2016). Askarian and colleagues reported that the commonness and lifespan exposure of HBV infection among HCWs in tertiary hospitals are 8 and 48%, respectively (Askarian et al., 2011).

Ethiopia is one of the highly hepatitis affected country ranked as a medium to high endemicity for this hepatotropic virus (Negero et al., 2011). Studies conducted among different segments of the population in Ethiopia showed that HBV is a major public health problem in the country (Metaferia et al., 2016; Umare et al., 2016). Although vaccination of HCWs is recognized as a critical issue to control the disease burden and reduce the risk of nosocomial infection, attainment of the suggested vaccination rates among health care providers remains challenging (Byrd et al., 2013). The National Foundation for Infectious Diseases (NFID) reported that despite the presence of an effective (> 95%) vaccine, a higher number of individuals are still high risk for HBV (NFID, 2018).

Obedience with vaccination is poor among HCWs in various settings, particularly in developing countries (Ziglam et al., 2013). WHO estimates that only 18 to 39% of HCWs were vaccinated in low and middle-income countries as compared to 67 to 79% in high-income countries (Ouedraogo et al., 2013). Previous studies showed that HBV vaccination coverage in Ethiopia ranged from 4 to 12.9% (Abebaw et al., 2017; Abeje and Azage, 2015; Feleke, 2016; Mesfin and Kibret, 2013). Even though the Ethiopian ministry of health starts to vaccinate health care providers and other high-risk population groups, vaccination coverage among HCWs is still very low and its progress is not satisfactory to achieve the goal of HBV elimination by 2030 (WHO,

2016b). Despite amply of evidence available worldwide, there is a scarcity of proof about the HBV vaccination and its associated factors in Southern Ethiopia. Therefore, the intent of this study was to assess HBV vaccination and its associated factors among HCWs working in Wolayita Sodo hospitals, Southern Ethiopia.

MATERIALS AND METHODS

Study setting, design and period

An institution-based cross-sectional study was employed from May 10 to 25, 2018 to assess hepatitis B virus vaccination and its associated factors among health care workers working in Wolayita Sodo Hospitals, Southern Ethiopia. Wolayita Sodo is located 396 Km away from the capital city of Ethiopia, Addis Ababa and 16 km far from the Regional capital, Hawassa. There were two hospitals; Wolayita Sodo University Teaching and Referral Hospital (WSUTRH) and Sodo Christian General Hospital (SCGH).

Study population

All HCWs working in WSUTRH and SCGH were the study population. HCWs who were not available in the hospitals due to maternity, annual or sick leave and students who were assigned for practical attachment were excluded.

Sample size determination and sampling

The sample size for this study was calculated using single population proportion formula by considering Proportion of HCWs receiving the complete series of HBV vaccine 35.8% (Yimer et al., 2017), $Z=1.96$ at 95% CI, 5 % margin of error and 5% non-response rate. Then, the final sample size was 370. The sample was allocated proportionally to each hospital based on the number of HCWs working in each hospital. Hence, 219 and 151 HCWs were involved from WSUTRH and Sodo Christian hospital respectively. The simple random sampling technique was used by taking the list of HCWs as a sampling frame.

Data collection tool

A structured self-administered questioners form was used to gather information about socio-demographic characteristics, knowledge about HBV and its vaccination, attitude and HBV vaccination status of HCWs. To assess the knowledge of HCWs about HBV and its vaccination; 10 questions about routes of transmission, natural history, diagnosis and prevention methods of HBV and 12 questions about HBV vaccine were used. The attitude of the HCWs about HBV infection and its vaccine was assessed using 9 Likert scale (1 (strongly disagree) to 5 (strongly agree) questions.

Data collectors and data collection procedure

Four trained BSC nurses and two public health professionals were recruited as a data collector and supervisor respectively. The data collection team received inclusive training about techniques of data collection and briefed on each question included in the data collection tool. Then, data collector provides the questioner for each study participant to fill by themselves and they collect it after checking for completeness within 30 min. Day to day supervision

was carried out during the whole period of data collection by the supervisors and investigators.

Operational definitions

Vaccination status

Participants were dichotomized into 'Fully vaccinated' and 'Not fully vaccinated'. HCWs was considered as 'Fully vaccinated' when they received three or more doses of hepatitis B vaccine (Abebaw et al., 2017).

Knowledge of HCWs about HBV infection and its vaccination

The HCWs was queried to reply to each question with 'Yes' or 'No'. Each correct response was given a score of '1' while an incorrect answer was given a score of '0' both for HBV infection and its vaccine. Participants who responded appropriately for at least 70% of knowledge related questions were categorized as knowledgeable (Abebaw et al., 2017).

The attitude of HCWs

Participants who have responded positively for greater than or equal to the mean score of attitude-related questions were categorized as having a "Favorable" attitude (Akibu et al., 2018).

Data quality control

Further modification of the data collection tool was considered after pretest among 18 HCWs from Arba Minch general hospital. One day training about the whole process of the data collection was given for the data collectors and supervisors. Since the data collection technique was self-administered, to minimize recall bias the participants were given some cues to remember whether they took the vaccine or not. Investigators were checked on the spot and review all the questionnaires to ensure completeness and consistency of the information collected. Double data entry was done by two data clerks and the consistency of the entered data was cross-checked by comparing the two separately entered data.

Data processing and analysis

The collected data were checked visually by the investigators, then the data were coded, entered and cleaned using EpiData version 3.1 software and exported to SPSS version 22.0 for analysis. Simple frequencies, mean, standard deviation and range were used to describe the characteristics of participants. During analysis, the 'Yes or No responses of each knowledge question were recorded as '1' for correct responses and '0' for an incorrect answer. Then, based on the total score obtained knowledge of HCWs was categorized into 'Knowledgeable' and 'Not knowledgeable'. A total score of 7 out of 10 and 9 out of 12 were categorized as knowledgeable on HBV and its vaccine respectively. Likewise, the attitude of the HCWs was categorized as 'favorable' and 'unfavorable' after calculating the mean score; those who scored ≥ 35 (mean score) were categorized as 'favorable attitude'. The information was then presented using frequencies, summary measures, tables and figures.

Bivariate analysis was used to see the association between each explanatory variable and the outcome variable. Variables with a P-value of ≤ 0.25 on the bivariate analysis were included in the multivariable logistic regression model. Multi-collinearity was

checked using the variance inflation factor and standard error. Variables with VIF >10 and SE >2 were dropped from the multivariable analysis. Hosmer-Lemeshow's test was insignificant and Omnibus tests were significant which indicate the model was fitted. Adjusted OR with 95% CI was estimated to identify the covariates associated with HBV vaccination. The level of statistical significance was declared at p-value < 0.05 .

Ethical clearance

The study obtained ethical clearance letter from Arba Minch University, College of Medicine and Health Sciences, Institutional Review Board (IRB). Then, permission was secured from the respective hospital administrators. Study participants were clearly informed about the objectives of the study, risk, benefits and the rights of the participants. The participants were informed to withdraw from the study if they are not interested even after data collection is started. Moreover, written consent was obtained from each study participant before the commencement of data collection. To maintain the confidentiality of information gathered from each study participant, code numbers were used throughout the study. Participants were also informed that the information they provide do not disclosed to the third party.

RESULTS

Socio-demographic characteristics of HCWs

A total of 370 HCWs were participated in this study making a response rate of 100%. The mean age of the participants was 30.2 years with an SD of ± 4.3 and a range of 35 years (20-55). More than half (52%) of the participants were within the age group of 20-29 years. Of the participants, 56% were male, and 62% were protestant. Slightly more than half (54%) of the participants were married. Nearly half (47%) were qualified in nursing (Table 1).

Knowledge about HBV

Two-thirds (64%) and three-quarter (74%) of the HCWs replied correctly about HBV ways of transmission and prevention strategies respectively. All most all (99.5%) of the participants agreed that HBV is prevented through vaccination (Table 2 and Figure 1). Overall, 83.2% of the HCWs were knowledgeable about hepatitis B virus.

Knowledge about HBV vaccination

Of the participants, 356 (96%) retorted that there is an effective vaccine for HBV. The majority, 88% of the HCWs reacted that HBV vaccine should be given as part of workstation protection. Furthermore, 96% of the HCWS believed that HBV vaccine is suggested for all HCWs (Table 3). Overall 234 (63.2%) of the participants were knowledgeable about HBV vaccination.

Table 1. Socio-demographic characteristics of participants at Wolayita Sodo hospitals, Southern Ethiopia, 2018 (N= 370).

Variable		Frequency	Percentage
Age group	20-29	191	51.6
	30-39	157	42.4
	≥ 40	22	6.0
Sex	Male	214	57.8
	Female	156	42.2
Ethnicity	SNNPR ¹	269	72.7
	Amhara	47	12.7
	Oromo	24	6.5
	Tigre	9	2.4
	Other ²	21	5.7
Religion	Protestant	230	62.2
	Orthodox	105	28.4
	Muslim	20	5.4
	Other ³	15	4.0
Marital status	Single	159	43.0
	Married	200	54.0
	Other ⁴	11	3.0
Qualification	Nurse	174	47.0
	Midwifery	77	20.8
	Lab technician	53	14.3
	Physician	27	7.3
	Public health	19	5.1
	Anesthesia	5	1.4
	Other ⁵	15	4.1
Working department	Emergency	49	13.2
	OPD	50	13.5
	Delivery	71	19.2
	Operation Room	16	4.3
	Ward	136	36.8
	Laboratory	39	10.5
	Other ⁶	9	2.4
Work experience (in completed years)	≤ 4	145	39.2
	5-9	206	55.7
	≥ 10	19	5.2

¹Southern nation nationalities and peoples region; ²harari, Addis Ababa, Dire Dawa; ³catholic, ⁴Adventist, ⁵divorced, separated widowed; ⁶ophthalmic professionals, orthopedists; ⁷eye unit, family planning, antenatal care unit.

Attitude of HCWs about HBV and its vaccination

Among the participants, 84% approved that hepatitis is a serious public health problem. 92% of the participants, decided that their job puts them at risk for HBV infection. Most, 96% of the participants declared that taking the HBV vaccine is necessary for them (Table 4). Generally, 208 (56.2%) of the HCWs were a favorable attitude about

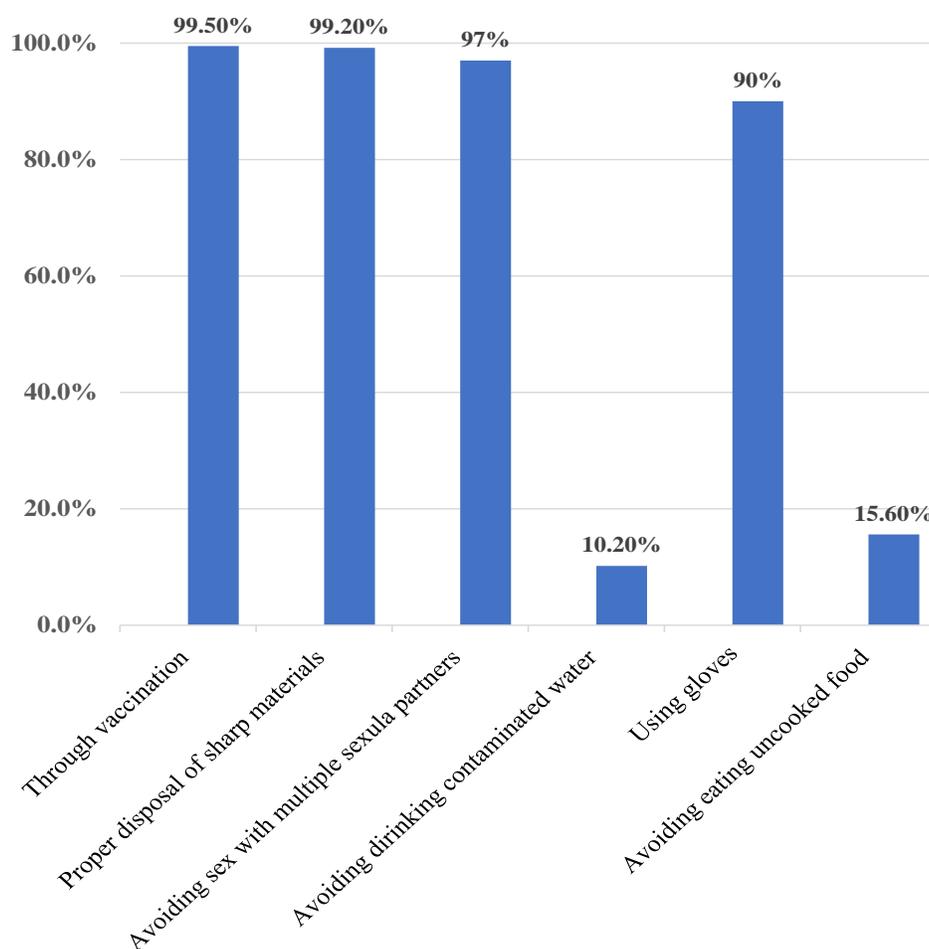
HBV vaccine.

Vaccination status of HCWs

Out of the participants, 307 (83.0%) received HBV vaccine; of these, 32 (10.4%) received only the first dose of the vaccine (Figure 2). Overall, 62.70% (95% CI:

Table 2. Knowledge of health care workers about hepatitis B virus at Wolayita Sodo hospitals, Southern Ethiopia, 2018 (N= 370).

Item	Correct; N (%)
One can get hepatitis B infection through needle stick injury	337(91.1)
Hepatitis B infection can be prevented by Vaccination	357(96.5)
Hepatitis B virus can be found in semen or vaginal fluid of an infected person	330(89.2)
Hepatitis B infected person may be asymptomatic for a long time	316(85.4)
Every person exposed to the hepatitis B virus will not develop acute hepatitis immediately	192(51.9)
Hepatitis B virus is highly infectious	341(92.2)
Only a small proportion of the world population is infected with hepatitis B virus	197(53.2)
Hepatitis B virus mainly affects the liver	359(97.0)
How can hepatitis virus be transmitted from one person to the other?	238(64.3)
What are the ways of hepatitis B infection prevention?	274(74.1)

**Figure 1.** Health care workers response to the ways of hepatitis B virus prevention at Wolayita Sodo hospitals, Southern Ethiopia, 2018 (N= 370).

57.75%, 67.65%)) of the participants were fully vaccinated for HBV. Among those participants who did not vaccinate; 38% were due to the absence of the vaccine in their work setting (Figure 3).

Factors associated with HBV vaccination

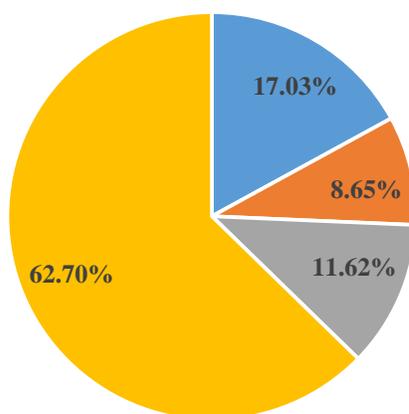
After controlling confounding factors using multivariable analysis five variables: Sex, service year, department,

Table 3. Knowledge of health care workers about hepatitis B virus vaccine at Wolayita Sodo hospitals, Southern Ethiopia, 2018 (N= 370).

Item	Correct; N (%)
There is an effective vaccine to prevent hepatitis B infection	356(96.2)
Hepatitis B vaccine is highly effective in preventing hepatitis B infection if given within 48 h after exposure	265(71.6)
Hepatitis B vaccine can be given as post-exposure prophylaxis	260(70.3)
Hepatitis B vaccine is not contraindicated for immune-compromised patients	250(67.6)
Hepatitis B vaccine is not effective to treat patients with acute hepatitis B infection	238(64.3)
Hepatitis B vaccine should be given to healthcare workers as part of workplace safety	327(88.4)
A full course of hepatitis B vaccine may give lifelong immunity but for Health professionals, one further booster after 5 years of the first dose is recommended	273(73.8)
After taking full dose vaccination of hepatitis B, there is a need for a blood test to confirm immunity against hepatitis B	207(55.9)
Full dose hepatitis B vaccine provides 100% protection for 90% of adults	265(71.6)
Full dose hepatitis B vaccine protects against HBV for at least 15 years	300(81.1)
HB vaccine does not cause problems if given to people who are already immune	216(58.4)
Hepatitis B vaccine is recommended for all healthcare workers	356(95.9)

Table 4. Attitude of health care workers about the hepatitis B virus and its vaccine at Wolayita Sodo hospitals, Southern Ethiopia, 2018 (N= 370).

Item	Favorable; N (%)
Hepatitis is a serious public health problem	311(84.1)
Your job puts you at greater risk of HBV infection	340(91.9)
It is necessary for you to receive the hepatitis B vaccine	354(95.7)
Hepatitis B vaccine is safe	314(84.9)
After exposure to contagious fluid/material, the vaccine reduces the likelihood of being HBV positive	208(56.2)
HBV positive HCPs should not be involved in exposure-prone invasive procedures	156(42.2)
The vaccine is not important if the exposure is not with the patient blood of known HBV positive	169(45.7)
There should be the vaccine guideline in work areas	299(80.8)
Training of the vaccine is important for a behavioral change	338(91.4)



■ Not vaccinated at all ■ One times ■ Two times ■ Three times

Figure 2. Vaccination status of health care workers working in Wolayita Sodo hospitals, Southern Ethiopia, 2018 (N= 370).

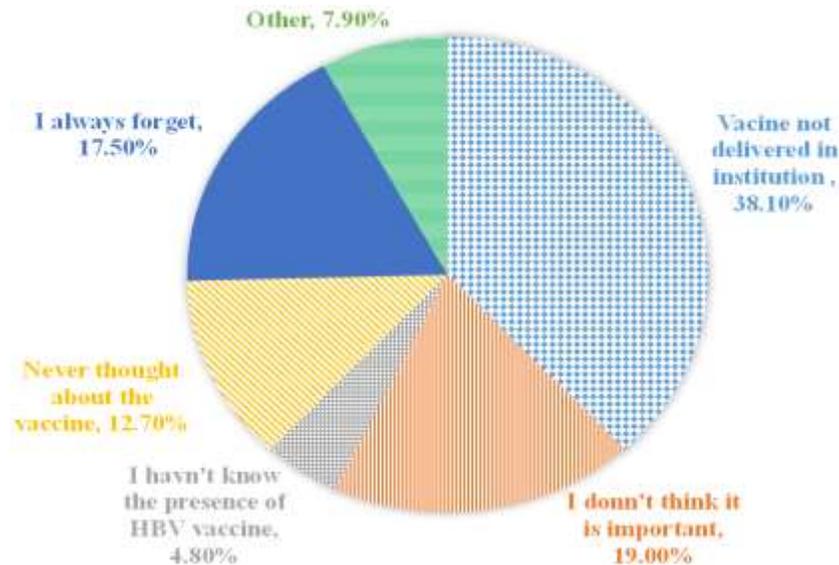


Figure 3. Reasons of health care providers for not being vaccinated for hepatitis B virus at Wolayita Sodo hospitals, Southern Ethiopia, 2018 (n=63).

knowledge, and attitude were significantly associated with vaccination (Table 5).

Female participants were 2 times [AOR=1.87 95 % (1.16, 3.01)] more likely to be fully vaccinated. Those participants who worked greater than four years were 2 times [AOR= 1.91 (95% CI: 1.22, 3.13)] more likely to be fully vaccinated compared to those who worked four years and below. Similarly, those participants who were working at ward and delivery room were 2 times [AOR= 2.26 (95 % CI: 1.41, 3.63)] more likely to be fully Vaccinated compared to those working in other units. Health care providers who had good knowledge and favorable attitude about HBV vaccine were two [AOR=2.0 (95% CI: 1.20, 3.04)] and two [AOR=1.9 (95 % CI: 1.17, 2.97)] times more likely to take all the recommended doses of hepatitis.

DISCUSSION

Hepatitis B virus infection is the major public health problem in the world, particularly its prevalence is very high in African and Asian countries (Abate and Wolde, 2016; Abera et al., 2017; Riou et al., 2016; Umare et al., 2016). Pieces of evidence from different parts of Ethiopia showed that HBV infection is the major public health problem in the general population (Abeje and Azage, 2015; Aberra et al., 2017; Ayalew et al., 2016; Feleke, 2016; Metaferia et al., 2016; Mulu et al., 2016). Due to the nature of their work HCWs are more prone to HBV infection from the general population. Every year, in sub-Saharan Africa more than half a million HCWs are infected with HBV infection (Abebaw et al., 2017). Vaccination against HBV and knowledge about the virus

results in the reduction of the infection rate (WHO, 2017).

This study revealed that 62.70% (95% CI: 57.75%, 67.65%) were fully vaccinated. This is higher than similar studies conducted in Ethiopia; Sashemenie (12.9%), Harar (4.5%), Bahir Dar (5.4%), Amhara region (4%) (Abebaw et al., 2017; Abeje and Azage, 2015; Feleke, 2016; Mesfin and Kibret, 2013). Similarly, this result is higher than the study conducted in Georgia (12%), Nigeria (36%), Iran (45%), and Pakistan (53%) (Obi and Ofili, 2013; Saad et al., 2013; Topuridze et al., 2010). This discrepancy could be due to the emphasis given for hepatitis B infection; nowadays the problem is steadily raised throughout the world particularly in developing countries including Ethiopia. Furthermore, the health care providers working at different level with different qualification have adequate information about the disease and willing to take the vaccine. In addition, there is a significant time gap between this study and the previous studies which are conducted 3 to 6 years back that contributes to this variation.

The result of this study is lower than the studies conducted in Kuwait (84%) (Ahmed and Alanee, 2012). This discrepancy might be due to the difference in the socioeconomic status, demographic characteristics of the participants and availability of the vaccine with an affordable cost in these countries. Furthermore, the immunization protocol difference in these countries might contribute to this discrepancy.

In this study, female participants were two times more likely to be fully vaccinated. This is in line with the study conducted in Sashemenie, Ethiopia (Abebaw et al., 2017). This may be probably due to the physiological vulnerability of women. In addition, women give great emphasis on their health. Furthermore, women who

Table 5. Bivariable and multivariable analysis results for factors associated with hepatitis B virus vaccination among health care workers working in Wolayita hospitals, Southern Ethiopia, 2018 (N=370).

Variable	Fully vaccinated		COR (95% CI)	p-value	AOR (95% CI)	P-value
	Yes N (%)	No N (%)				
Sex						
Male	121 (56.5)	93 (43.5)	1		1	
Female	111 (71.2)	45 (28.8)	2.0 (1.22, 2.94)	0.004	1.87 (1.16, 3.01)	0.01
Qualification						
Nursing	121 (69.5)	53 (30.5)	1.7 (1.14, 2.69)	0.011	1.46 (0.91, 2.33)	0.118
Other ¹	111 (56.6)	85 (43.4)	1		1	
Service year						
≤ 4	77 (53.7)	67 (46.5)	1		1	
> 4	155 (68.6)	71 (31.4)	1.9 (1.23, 2.92)	0.004	1.91 (1.22, 3.13)*	0.005
Marital status						
Married	136 (68.0)	64 (32.0)	1.6 (1.07, 2.50)	0.023	1.37 (0.86, 2.17)	
Other ²	96 (56.5)	74 (43.5)	1		1	
Working department						
Ward and delivery	149 (72.0)	58 (28.0)	2.5 (1.61, 3.81)	0.000	2.26 (1.41, 3.63)*	0.001
Other ³	83 (50.9)	80 (49.1)	1		1	
Knowledge about HBV vaccine						
Low knowledgeable	72 (52.9)	64 (47.1)	1		1	
Knowledgeable	160 (68.4)	74 (31.6)	1.9 (1.24, 2.97)	0.003	2.0 (1.20, 3.04)*	0.006
Attitude						
Unfavorable	93 (51.4)	69 (42.6)	1		1	
Favorable	139 (66.8)	69 (33.2)	1.5(0.98, 2.29)	0.064	1.90 (1.17, 2.97)*	0.009

*Statistically significant at $P < 0.05$; ¹other: Midwifery, physicians, public health, anesthesia, etc. ²other: Single, divorced, and widowed; ³emergency, operative room, OPD, laboratory and others.

attend health facilities and get an adequate explanation about the vaccination that improves their health-seeking behavior including HBV vaccination.

This study revealed that increment in service year is associated with full vaccination. Those study participants who work at least for 5 years were two times more likely to be vaccinated as compared to those who give service for less than or equal to 4 years. Despite it is not statistically significant, this result is in line with the study conducted in Nigeria (Obi and Ofili, 2013). This could be due to the fact that as service year increases the HCWs observe and face different occupational injuries and hepatitis cases which initiate themselves to take the vaccine. Furthermore, in Ethiopia till now there is no trend for vaccination of the health care providers before and after recruitment to work. In addition, to cover the cost of the vaccine working for some years has been needed especially for mid and low-level HCWs. The above-mentioned reasons may contribute for the dalliance of vaccination.

Those HCWs working in the delivery room and ward were two times more likely to be vaccinated as compared compared to those who worked in the outpatient department, emergency and others. There is no study that supports this evidence but it might be due to the fact that labor, delivery, and wards are the working departments where the health care providers and the clients close contact and overcrowded areas that increase the rate of transmission of the disease.

In this study, 63.2% of the study participants were knowledgeable about HBV vaccination. This is in line with the study conducted in Bahir Dar where 62% of the HCWs were knowledgeable about HBV vaccination (Abeje and Azage, 2015). However, this result is lower than the study conducted in Gondar university hospital where 73% of the study participants were knowledgeable about hepatitis B virus transmission, progress and vaccination (Ayalew et al., 2016). This study also revealed that those participants who were knowledgeable about HBV vaccination were two times more likely to be

fully vaccinated. This is could be due to the fact that if an individual is clearly aware of the disease, its mode of transmission, and prevention mechanisms, the probability of adhering with the solution is very high.

In the current study, 56% of the study participants had favorable attitude about HBV vaccination. Those participants who had favorable attitude were two times more likely to receive a full dose of HBV. This is in line with previous studies despite they did not calculate the overall attitude; majority of the questions used to measure the attitude of the health care providers about hepatitis B virus and its vaccination (Ahmed and Alanee, 2012; Akibu et al., 2018). This might be developed secondary to considering their job as hazardous and or risky, adequate information about the vaccine and considering it as one of the safety to prevent themselves from the disease. Generally, this study tries to determine the HBV vaccination status, knowledge and attitude of HCWs about HBV and its vaccination, and factors associated with full vaccination status using a comprehensive tool adopted from different literatures.

Conclusion

Vaccination of health care workers against HBV was low at Wolayita Sodo Hospitals, Southern Ethiopia. Receiving a complete series of hepatitis B vaccine varied by sex, the length of years in service, working department, knowledge, and attitude of the health care providers about hepatitis B vaccination. Hospital administrators in collaboration with the ministry of health and other stakeholders must implement policies and education practices, facilitating hepatitis B virus vaccination coverage among health care workers.

ABBREVIATIONS

HBV, Hepatitis B Virus, **HCWs**, Health Care Workers, **WHO**, World Health Organization.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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