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Hepatitis B vaccination coverage among health care workers in rural Kerala

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ABSTRACT

Background: Hepatitis B is one of the most important blood borne infection, the health care workers may acquire while providing care to the patients. The overall aim of this study was to estimate the Hepatitis B vaccine coverage and its determinants among health care workers.

Methods: This cross-sectional study was done in a rural tertiary care hospital in Palakkad district, of Kerala. We particularly looked for self-reported hepatitis B vaccination coverage and its determinants, using self-administered pretested questionnaire in 410 health workers. We calculated the proportions and looked for association between the various independent variables and dependent variables for vaccination coverage.

Results: Out of 410 study participants, 119 (29%) of them were males and 291 (71%) of them were females. The mean age of the participant was 31.3 years and the range was between 19 to 70 years. 365 (89%) were vaccinated with atleast one dose of Hepatitis B Vaccine. Of these 306 (74.6%) had received all the 3 doses of vaccine, as per schedule. Gender and years of experience was not associated with the Hepatitis B vaccination status. However, variables like educational status, professional background was associated with hepatitis B vaccine coverage.

Conclusions: The coverage of hepatitis B vaccine was high. Among those with incomplete vaccination few of them were waiting for completing the vaccination schedule in near future. Good hospital policies like vaccinating the new medical students and new employees were the main factors responsible for high vaccination coverage among the health care workers in our study.

Keywords: Hepatitis B, Vaccination, Health care worker, Kerala, India

INTRODUCTION

Hepatitis B virus (HBV) is a DNA virus of the family hepadnaviridae which could be responsible for acute and/or chronic pathology in the liver. Globally, in 2015, an estimated 257 million people were living with chronic HBV infection, and 71 million people with chronic HCV infection. Viral hepatitis caused 1.34 million deaths in 2015, a number comparable to deaths caused by

tuberculosis and higher than those caused by HIV. However, the number of deaths due to viral hepatitis is increasing over time, while mortality caused by tuberculosis and HIV is declining. Most viral hepatitis deaths in 2015 were due to chronic liver disease (720 000 deaths due to cirrhosis) and primary liver cancer (470 000 deaths due to hepatocellular carcinoma).

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In 2015, the global prevalence of HBV infection in the general population was 3.5%. Among those born before the hepatitis B vaccine became available, the proportion of persons living with chronic HBV infection remains high.¹

Hepatitis B prevalence is highest in the World Health Organization (WHO) Western Pacific Region and the WHO African Region, where 6.2% and 6.1% of the adult population is infected respectively. In the WHO Eastern Mediterranean Region, the WHO South-East Asia Region and the WHO European Region, an estimated 3.3%, 2.0% and 1.6% of the general population is infected, respectively. And in the WHO Region of the Americas, 0.7% of the population are infected. Thus, Hepatitis B infection is one of the major public health problems globally.²

Hepatitis B infection is also a leading cause of morbidity and mortality, not only because of the acute illness but also due to its chronic sequelae like chronic hepatitis, cirrhosis and hepatocellular carcinoma, and accounting for more than a million deaths annually worldwide.³

In India, hepatitis B surface antigen (HBsAg) prevalence among general population ranges from 2% to 6%, which places India in an intermediate HBV endemicity zone.⁴ With 50 million cases, India is also the second largest global pool of chronic HBV infections.⁵

Health professionals play a central and critical role in improving access and quality health care for the population. They provide essential services that promote health, prevent diseases and deliver health care services to individuals, families and communities based on the primary health care approach.⁶

However, Health care workers (HCWs) are at risk of exposure to HBV from infected patients and if infected are similarly at risk of transmitting HBV to patients.⁷ It has been reported that about 10% of the health care workers (HCWs) in India have acquired HBV infection.⁸

HBV infection can be prevented by following a simple and available vaccination schedule. HBV vaccine is the first anticancer vaccine which has outstanding record of safety and effectiveness. It is 95% effective in preventing children and adults from developing chronic infection.⁹

Hepatitis B vaccination was widely implemented in United States of America (USA), HBV infection was recognized as a common occupational risk among HCW. Routine Hepatitis B vaccination of HCW and the use of standard precautions have resulted in a 98% decline in HBV infections from 1983 through 2010 among HCWs in USA.¹⁰

Thus, vaccination among the health care workers is essential to protect themselves and protect patients. In this study, we want to estimate, self-reported hepatitis B

vaccination coverage and its determinants in a rural tertiary care hospital in Kerala.

METHODS

Study design

The cross-sectional hospital-based study was conducted in Rural Medical College which is located around 40 km west from Palakkad district headquarter.

Sample size

The WHO non – serial publication "The sample size determination" 1993 was relied upon. A table on sample size calculation at page no. 27, was the basis of sample size determination. For the cross-sectional study, the sample size worked out to be 384. The assumption used to estimate the sample size are as follows.

Prevalence (P) of 50% (anticipated vaccine coverage among HCW), as we don't know the actual coverage and Relative precision of 0.1 (10%) i.e (the results of the study to be around 10% of the true value) and Confidence interval = 95%. Approximately 410 HCW (all available during the data collection) were interviewed to check the Hepatitis vaccine coverage.

Study participants

The study population consisted of HCW working in Medical College from all departments like doctors, interns, nurses, laboratory technicians, housekeeping staffs and any staff involved in providing care to patients.

Inclusion criteria

HCWs willing to participate and ready to give written consent were included in this study.

Exclusion criteria

HCWs not willing to participate and not willing to give written consent were excluded from this study.

Study period

The data was collected in October 2019 and all the eligible participant present during these days were approached for this study.

Data collection and data entry

A self-administered, pre-tested, semi-structured questionnaire consisting of designation, age, gender of respondent, status of hepatitis B vaccination and reasons for incomplete immunization (if applicable) were. The questionnaire was given to all eligible participants. The questionnaire was field tested and based on the findings of

the pretest and the responses of the questionnaire were finalized.

The permission for data collection was taken from the principal of the institution.

Data quality control and statistical analysis

The data from the questionnaire sheet was entered in EPICOLLECT 5 database using smartphone and analysis was done by using Microsoft Excel and Statistical package for social sciences (SPSS) version 17. Proportions (Percentages) were calculated on excel sheet. For assessing difference between proportions, Pearson's chi-square test was used as a test of significance.

Ethical statement

The study was submitted to the scientific committee of the institute and was approved. During the data collection, objectives of the study were explained to all the respondents and a written consent was obtained from each respondent. Respondents were also assured of confidentiality. It was informed that their own status of hepatitis B would not be disclosed to anybody, if they were positive. Unvaccinated participants were asked to take vaccine from the nearby PHC. To ensure voluntary uptake of vaccine. Thus, all participants who are not vaccinated will be get vaccinated.

Operational definitions

Healthcare worker

Health care worker is defined as any paid or unpaid person working in health care institute who has the potential for exposure to patients and/or to the infectious materials, including body substances, contaminated environmental surfaces or by any other mode of transmission.

Complete HBV vaccination

If all three doses, as per recommended schedule was taken by the participants. (i.e "zero"-first dose, second dose, after 1 month of first dose and third dose, 6 months after the 1st dose). This status was considered as complete HBV vaccination.

Incomplete HBV vaccination

Missing any of the three doses (0, or 1 or 6 months) of HBV vaccine was considered as incomplete vaccination.

Not vaccinated: HCW who had not taken even one dose for HBV vaccine were considered as not vaccinated.

Protective antibody titers

All HCWs should have serologic testing 1–2 months following the final dose of the hepatitis B vaccine series. An anti-HBs serologic test result of >10 mIU/mL indicates immunity towards HBV. No further routine doses or testing is indicated if HCW have protective antibody titres.

RESULTS

Socio demographic status

Out of 410 study participants, 119 (29%) of them were males and 291 (71%) of them were females. The mean age of the participant was 31.3 years and the range was from 19 to 70 years. Majority 205 (50%) of the study participants were in age group of 26 to 50 years, followed by in 19 to 25 years 69 (43.4%), and rest beyond 50 years (Table 1).

More than half of the study participants 225 (54.9%) were married and rest 184 (44.9%) were unmarried.

Table 1: Socio demographic status of the study participants (n=410).

Variable	Frequency (N) Total	Percentage
Gender		
Male	119	29
Female	291	71
Age category (years)		
0 to 25	178	43.4
26 to 50	205	50
51 and above	27	6.6
Marital status		
Married	225	54.9
Unmarried	184	44.9
Others	1	0.2
Religion		
Christian	74	18
Hindu	282	68.8
Muslim	52	12.7

Continued.

Variable	Frequency (N) Total	Percentage
Others	2	0.5
Qualification		
Up to higher secondary education	81	19.8
Graduates	208	50.7
Post graduates	121	29.5
Total	410	100
Designation		
Interns	118	28.8
Doctors	77	18.8
Nurses	120	29.3
Technicians	29	7.1
Attendants and house keeping staff	66	16.1
Total	410	100
Years of experience		
Less than 1-year of experience	57	13.9
1 to 5 years of experience	244	59.5
6 to 21 years	109	26.6
Total	410	100
Department		
Outpatient and in patient	230	56.1
Emergency, intensive care, labour room, operation theatre and dialysis unit	43	10.5
Others (Radiology/ Laboratories/ other teaching departments)	137	33.4

Table 2: Uptake of Hepatitis B vaccine and its completeness.

Variable and responses	Frequency (N)	Percentage
Ever tested for Hepatitis B Virus Infection*		
Yes	158	38.5
No	239	58.3
Don't know	13	3.2
Ever been vaccinated for Hepatitis B vaccine*		
Yes	365	89
No	45	11
Number of doses of vaccine taken, as reported by		
participants		
One dose (incomplete vaccination)	7	1.9
Two doses (incomplete vaccination)	52	14.2
Three doses (complete vaccination)	306	83.8
Total	365	100
Place of vaccination (Complete Vaccination)		
Government	50	16.3
Private	256	86.6
Total	306	100
Year of vaccination	Frequency (N)	Percentage (%)
Within recent 5 years	121	33.2
Within 6 to 10 years	124	34.0
More than 10 years	44	12.0
Don't remember year of vaccination	76	20.8
	365	100

By designation 116 were interns (28%), followed by nurses (29.3%) and (59.5 %), had 1 to 5 years of experience followed by more than 5 years (26.6 %) of experience.

Uptake of Hepatitis B vaccine and its completeness

Out of 410 participants, only 158 (38.5%) had tested for hepatitis B infection. About 13 (3.2%) don't know whether

they are tested or not. In this study, 365 (83.5%) were vaccinated with atleast one dose of HB vaccine. Of this 7 (1.7%) had taken only one dose, 52 (12.7%) had taken 2 doses and 306 (74.6%) had received all the 3 doses as per schedule (Table 2).

Reason for incomplete and not taking vaccine for hepatitis B

Out of 59 participants with incomplete vaccination the most common reason reported by participants was, that they had forgotten to take the vaccine 20 (42.4%), followed by 17 (32.2%) waiting for next dose, 11 (18.6%) being busy and felt protected by only two doses (3.4%).

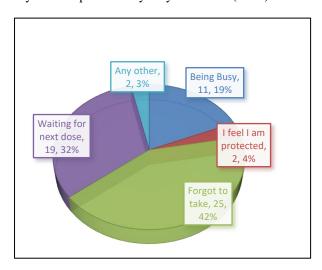


Figure 1: Reason for incomplete vaccination (n=59).

Out of 45 unvaccinated participants, 16 (35.6%) were not aware of the vaccine, 8 (17.8%) said it was not available through government channels and 10 (22.2%) did not gave much importance to vaccine.

Uptake of booster doses

Out of 306 participants who had completed the vaccination, 67 (21.9%) had taken booster doses of Hepatitis B vaccination, of which 15 (3.7%) had tested for

checking the antibody titer levels and all 15 (100%) had protective level of antibody titers (Table 3).

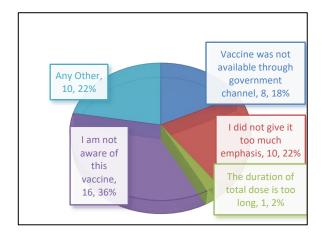


Figure 2: Reasons for not taking hepatitis B vaccination (n=45).

Table 3: Uptake of booster doses and test for antibody titer levels.

Variable	Frequency (N)	Percentage		
No. of participants who h	ad taken boos	ter dose/s of		
Hepatitis B vaccine				
Yes	67	21.9		
No	239	78.1		
Total	306	100		
No. of participants report	No. of participants reporting being tested for			
antibody titre towards Ho	epatitis B anti	gen		
Yes	15	4.9		
No	291	95.1		
Total	306	100		
Levels of antibody titre towards Hepatitis B				
Protected level of antibodies (>10 mIU/ml)	15	100		
Low level of antibodies				
(not protected) (<10	0	0		
mIU/ml)				
Total	15	100		

Table 5: Association between independent variables and hepatitis B vaccination status.

X7 • 11	Vaccinated for l	Vaccinated for Hepatitis B			
Variables	Yes (n=365)	No (n=45)	Total	X 2 and p value (2-sided)	
Gender					
Male	107 (89.9)	12 (10.1)	119	0.136, 0.712	
Female	258 (88.7)	33 (11.3)	291		
Age group (years)					
0 to 25	164 (92.1)	14 (7.9)	178	5.57, 0.062	
26 to 50	180 (87.8)	25 (12.2)	205		
51 and above	21 (77.8)	6 (22.2)	27		
Education					
Up to Higher Secondary	59 (72.8)	22 (27.2)	81	31.16, 0.0	

Continued.

¥7	Vaccinated for Hepatitis B			
Variables	Yes (n=365)	No (n=45)	Total	X 2 and p value (2-sided)
Graduates	199 (95.7)	9 (4.3)	208	
Post Graduates	107 (88.4)	14 (11.6)	121	
Profession				
Doctor	178 (94.2)	11 (5.8)	189	57.87, 0.0
Nurse	123 (96.9)	4 (3.1)	127	
Lab Technician	22 (75.9)	7 (24.1)	29	
Others	42 (64.6)	23 (35.4)	65	
Working Department				
In and Outpatient care	220 (95.7)	10 (4.3)	230	36.2, 0.0
Emergency, intensive care, labour room, operation theatre and dialysis unit	41 (95.3)	2 (4.7)	43	
Laboratory, Radiology and other Departments	104 (75.9)	33 (24.1)	137	
Work Experience				
Less than 1-year experience	48 (84.2)	9 (15.8)	57	0.336, 2.17
1 to 5 years of experience	217 (88.9)	27 (11.1)	244	
6 to 21 years	100 (91.7)	9 (8.3)	109	

DISCUSSION

The study showed that the uptake of Hepatitis B vaccine among the HCW was good, more than three four of the HCWs had completed the vaccination and only 11% were unvaccinated. More than 50% of HCWs have taken vaccination in the present institute indicating, good hospital policy for vaccinating and protecting the HCWs against, Hepatitis B infection. Gender and years of experience were not associated with the Hepatitis B vaccination status. However, variables like educational status, professional background were the significantly associated with more vaccine uptake.

Similar study done in tertiary health care center among 50 health care workers in Calicut district of Kerala reported coverage of 34.6% complete Hepatitis B vaccination. This was very low coverage compared to our study. Other studies in North Kerala among the of the health care workers the prevalence of Hepatitis B was found to be zero and however the prevalence of Hepatitis C was 0.79% (anti HCV positive). Another study in Kerala, found the similar results of zero prevalence of HBV infection and 0.8% of HCV prevalence among HCWs. 15

A similar study done in Rewa, Madhya Pradesh, central India by Pathak et al, it was found that the rate of acceptance of vaccination was higher (75%) in females as compared to males (62%). ¹⁶ However, in our study, we did not find any difference in vaccination status among female and male participant. In same study out of 408 health-care workers 173 (42.4%) had received partial or full course of vaccination against hepatitis B. However, the prevalence of vaccination in our study the partial or full vaccination coverage was 89%, which is two times of Pathak et al study.

The estimate of hepatitis B vaccination coverage in health-care workers in our study was better than HCWs study at AIIMS New Delhi published in year 2011, out of 446 HCWs, only 224 (50%) HCWs were fully vaccinated, and 28 (6%) had received incomplete vaccination.¹⁷

Our estimate of 74.6% (complete vaccination), is better than another study at G.B. Pant Hospital, Delhi. In this study out of 2162 HCWs, 1198 (55.4%) were vaccinated against hepatitis B and studies conducted in similar settings in Mangalore revealed that 57.1% of their HCW's had taken all three doses and the 93.8% who had taken only a single dose and were not protected against HBV infection.¹⁸

Studies done in Ethiopia, among HCW had very low coverage of hepatitis B vaccine (4%).¹⁹

However, government of India has launched National viral hepatitis control program, in year 2018.²⁰ Under this program, there is provision of screening of pregnant women for HBsAg in areas where institutional deliveries are <80% to ensure their referral for institutional delivery for birth dose of Hepatitis B vaccination. The program also covers, and free screening, diagnosis and treatment for both hepatitis B and C which will be made available at all levels of health care in a phased manner. This program also ensures mandatory vaccination of all healthcare workers. Thus, India is stepping towards, adoption of the resolution on the 2030 Agenda for Sustainable Development towards ending Hepatitis B in India.²¹

Limitation of study

The present study is a cross-sectional study; such studies are carried out either at a single point in time or over a short

period. Thus, associations identified in these studies should not be considered a causal relationship. i.e study does not confirm the definitive cause-and-effect relationship. In this study there is also a very small possibility of recall bias among the study participants because of the self-reported vaccination status. However, more than 50% have been vaccinated in this institute, which is one of the mandatory vaccinations, thus, we consider the information shared by the participants is authentic. HCWs on long leave and absent from workplace on the date of data collections are not included in this study.

CONCLUSION

The uptake of hepatitis B vaccine was high among HCW. Among those with incomplete vaccination status, one third were waiting for completing the scheduled vaccination in near future. Good hospital policies like vaccinating the new medical students and all new employees were the main factors responsible for high vaccination coverage among the health care workers in our study.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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