



Original article

Health care workers and Hepatitis B prevention: Perceptions and practices in a tertiary care hospital in coastal Karnataka

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ABSTRACT

Background: Hepatitis B Virus (HBV) infection is a major global health problem affecting approximately 10% of the world's population. In India around 40–65% of HBV infections are seen among healthcare workers and are attributed to percutaneous occupational exposures. In the background of this context the present study assessed the knowledge, attitude and practices towards transmission and prevention of Hepatitis B infection among the Health Care Workers (HCWs) in a tertiary care teaching hospital.

Methods: This was a cross sectional study wherein 361 HCWs across cadre, were randomly recruited from the hospital. Participants included consultants, junior residents, nursing personnel, laboratory technicians and housekeeping staff. Information pertaining to perceptions and practices of HCWs towards Hepatitis B infection was recorded and analyzed using SPSS version 15.0.

Results: On the whole, the participants exhibited good knowledge regarding hepatitis B transmission and prevention. A small proportion (3.6%) reported misconception such as contaminated food and water as probable transmission routes. Nearly 58 (16.1%) of the participants were unvaccinated. This included mostly the housekeeping staff and a few nurses. Higher educational status and younger age were found to be significant predictors in adhering to appropriate disease prevention practices.

Conclusions: There appears to be inadequate adherence to safe workplace guidelines among the housekeeping staff and certain paramedical functionaries warranting periodic training and monitoring. Establishment of a safe workplace monitoring unit within the hospital could be a step in this direction.

1. Introduction

Hepatitis B virus (HBV) infection is an important public health problem and an estimated one-third of the world's population is reported to be infected with it.^{1,2} It is a major occupational hazard among health care workers (HCWs) with a four-fold higher risk of infection due to their constant exposure to blood, blood products and other body fluids as well as the risk of needle-stick injuries.^{3,4} Global estimates state that of the 3 million that experience percutaneous exposure to blood borne pathogens annually, nearly 2 million have HBV.⁵

In low and middle income (LMIC) countries, 40–65% of HBV infections among healthcare workers are linked to percutaneous occupational exposure, while the corresponding risk in developed countries is as low as 10%.⁶ The high susceptibility among HCWs to HBV infection in LMICs has also been alluded to inadequate vaccination coverage and

lack of knowledge about post exposure prophylactic measures.⁷ Prevailing practices such as careless handling of contaminated objects, reusing of inadequately sterilized medical equipment and improper waste disposal system further compound the problem.⁸

Adhering to universal precautions, proper sterilization of medical equipment, appropriate hospital waste management and vaccination prevents health care workers from getting infected.^{9,10} These preventive practices play a major role in achieving the global vision of elimination of viral hepatitis as a major public health threat by 2030 as envisaged by the United Nations, Sustainable Development Goals (SDG). Although a safe and effective vaccine against HBV has been available for approximately 20 years there are no national policies and guidelines advocating and supporting mandatory HBV immunization among health care workers, the group at highest risk of getting the infection.^{6,11}

Having enough knowledge and proper attitudes toward the infection

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is crucial in preventing the occupational exposures. However, knowledge, attitude, and practices regarding transmission of HBV infection and its preventive measures vary among HCWs and is evidently inadequate in most developing countries.^{1,12,13} This study aims to understand this difference and also determine the knowledge, attitude and practice towards hepatitis B vaccination among health care workers in a tertiary care hospital.

2. Methods

This was a cross sectional study carried out among the staff working at a tertiary care teaching hospital situated in a coastal province of Karnataka. The study population comprised of consultants, residents, nurses, laboratory technicians and house-keeping staff working across various departments of the hospital.

Estimating the knowledge regarding hepatitis B transmission and prevention to be 65% from literature,^{14,15} for an absolute precision of 5% at 95% level of confidence, the minimum required sample was 361. Considering health care personnel employed for more than a year in the hospital as the sampling frame, the required numbers from each cadre of health staff were chosen based on probability proportionate to size. Accordingly, these many number of HCWs, were randomly approached by the investigators for recruiting them into the study. Appointments were sought from the eligible participants prior to approaching them in order that they were not interrupted during their busy work schedule. Confidentiality was maintained by according the participants a coded identity.

Ethical clearance was obtained from the Institutional ethics committee (IEC:275/2018) and due permissions were sought from the institutional heads prior to commencement of the study. Purpose of the study and its objectives, were clearly explained to all the participants, prior to obtaining a written informed consent from them.

A pre-tested, structured questionnaire was used as the data collection tool. The questionnaire was structured to gather information regarding HCWs knowledge that included questions assessing participant's understanding about disease epidemiology including modes of transmission and associated complications. The attitude questions dealt with issues concerning source of infection, usage of preventive measures, disease curability and prevention by vaccination. The practice questions assessed whether the participants followed universal precautions while handling patients and their biological samples. Further information regarding vaccination status against hepatitis B was recorded including serological evaluation for antibody titres post vaccination.

Data was analyzed using SPSS version 15.0. Questions falling into the three domains of knowledge, attitude and practice were scored either one or zero, for a correct and wrong response respectively. The scores were summed under each domain and median scores were calculated. Participants were accordingly classified to have adequate or poor knowledge, positive or negative attitude and good or poor practices towards HBV.

Univariate and multivariate logistic regression analysis was carried out to identify the predictors and the association is expressed in terms of odds ratio with 95% confidence interval.

3. Results

Nearly 400 HCWs were approached to achieve the required sample size of 361 (response rate of 90%). Consenting participants were recruited based on the requirement in each cadre and accordingly 44.5% nurses (161), 28% housekeeping staff (100), 17% residents (60), 9% consultants (34) and 6 lab technicians were enrolled into the study. Nearly three fourth (70.3%) of the study participants were in the age range of 18–37 years and a good proportion (84.2%) of the participants were females. About half (50.1%) of the study participants reported to have been in employment for five or more years in the current facility.

Table 1 describes level of knowledge, attitude and practices towards

Table 1

Level of knowledge, attitude and practice among HCWs towards HBV transmission and prevention (n = 361).

Profession	Knowledge n (%)		Attitude n (%)		Practice n (%)	
	Poor	Adequate	Negative	Positive	Poor	Good
Doctors	–	94 (100)	–	94 (100)	–	94 (100)
Paramedics ^a	–	167 (100)	11 (6.6)	156 (93.4)	1 (0.6)	166 (99.4)
Housekeeping	8 (8)	92 (92)	49 (49)	51 (51)	33 (33)	67 (67)

^a Paramedics includes staff nurse and laboratory technicians.

HBV transmission and prevention. Overall knowledge among study participants was adequate (96.1%). Encouragingly over 90% were correctly aware about different routes of hepatitis B transmission and only a small proportion (3.6%) reported misconception such as contaminated food and water as probable transmission routes. These were primarily the housekeeping staff, who by and large have a lower level of education compared to the others. A majority (84%) of the HCWs were aware that in a hospital setting patients and their biological fluids are the common source of HBV infection. Nearly three fourth (64.5%) believed hepatitis B to be a bigger killer than HIV, malaria or TB. Although almost all of them knew about the vaccine, nearly 13% failed to identify the correct dosing schedule. While most of them 36 (76.6%) were the housekeeping staff, surprisingly 10 (21.3%) nurses and 1 (2.1%) laboratory technician also exhibited limited knowledge with regards to the dosing schedule.

In line with a positive attitude towards HBV transmission and prevention (96.4%) more than three-quarter of the participants (89.4%) opined that hepatitis B is still a major public health problem in India and vaccination against the same is necessary for all HCWs. Yet 29 (8%) participants were uncertain about the need for vaccination and 8 (2.2%) disagreed that vaccination is necessary. Once again it was the housekeeping staff who were found to be in disagreement with vaccination. While 64.8% of the participants perceived that infection control guidelines protect them from being infected, notably a third of them, were not clear about the guidelines. A good number of the HCWs (65.7%), mainly doctors and nurses felt that there was inadequate signage displaying post exposure prophylactic measures at the work place. This they believed was an important measure to enable HCWs to seek immediate help in the event of a needle stick injury or accidental exposure to biological samples from patients. It must be emphasized that none of the study participants encountered blood or needle stick injury in the past one year.

Although HBV vaccination is mandated for healthcare workers as per the hospital infection control guidelines, nearly 58 (16.1%) of the participants reported to be unvaccinated. A good proportion of these were the housekeeping staff (82.8%) but surprisingly 9 nurses and one lab technician were also found to be unvaccinated. Fear of injection, and vaccine skepticism were the reasons stated for this. On the bright side 112 (37%) of the vaccinated HCWs had their post vaccination immune status evaluated and almost 94% reported protective antibody titres.

Multivariate analysis revealed higher educational status to be significantly associated with heightened awareness. Additionally, higher educational status and being young were significant determinants of safe workplace practice. These findings are illustrated in Table 2.

4. Discussion

Majority of the study respondents demonstrated satisfactory level of awareness, attitude and practice (>90%) regarding Hepatitis B transmission and prevention and this is in agreement with many studies from India and across the globe.^{7,16–19} These findings are however at variance

Table 2
Factors associated with Knowledge, Attitude and Practice regarding transmission and prevention of Hepatitis B among HCWs

Variable	Knowledge		AOR(CI) ^a	Attitude		AOR(CI)	Practice		AOR(CI)
	Poor	Good		Negative	Positive		Poor	Good	
Age									
<30	76 (38.6)	121 (61.4)	0.63 (0.3-1.4)	74 (37.6)	123 (62.4)	0.8 (0.4-1.6)	69 (35.0)	128 (65.0)	2.4 (1.1-5.6)^b
≥30	84 (51.2)	80 (48.8)	1	80 (48.8)	84 (51.2)	1	97 (59.1)	67 (40.9)	1
Gender									
Male	4 (7.0)	53 (93.0)	2.0 (0.4-1.4)	3 (5.3)	54 (94.7)	2.1 (0.4-9.9)	10 (17.5)	47 (82.5)	0.4 (0.1-1.8)
Female	156(51.3)	148 (48.7)	1	151 (49.7)	153 (50.3)	1	156(51.3)	148 (48.7)	1
Profession									
Doctors	-	94 (100.0)	-	-	94 (100)	-	5 (5.3)	89 (94.7)	-
Paramedics	82 (49.1)	85 (50.9)	4.8 (2.6-9.0)^b	92 (55.1)	75 (44.9)	1.4 (0.9-2.6)	75 (44.9)	92 (55.1)	7.2 (3.6-14.3)^b
Housekeeping	78 (78.0)	22 (22.0)	1	62 (62.0)	38 (38.0)	1	86 (86.0)	14 (14.0)	1
Experience									
<5	65 (35.9)	116 (64.1)	0.8 (0.4-1.7)	61 (33.7)	120 (66.3)	1.0 (0.5-2.1)	68 (37.6)	113 (62.4)	0.3 (0.1-0.7)
≥5	95 (52.8)	85 (47.2)	1	93 (51.7)	87 (48.3)	1	98 (54.4)	82 (45.6)	1

^a AOR (CI)- Adjusted Odds Ratio (Confidence Interval)

^b p<0.05

(58–65%) with study findings of Chao et al. and Mursy et al. who reported suboptimal knowledge regarding transmission and prevention of HBV among health care and public health professionals. The authors maintained that lack of training among the HCWs regarding infection prevention measures was the primary reason for low level of awareness.^{20,21}

Notwithstanding the adequate awareness among the participants of this study a small proportion (3.6%) exhibited misconception regarding modes of transmission of HBV. A similar finding was observed in a study from Vietnam, where one third of HCWs wrongly believed that HBV can be transmitted through eating and sharing food.²² This misconception particularly among the housekeeping staff as in the present study underscores the need for accessible scientific sources of information.²³

Although a safe and effective vaccine against HBV has been available for nearly two decades, awareness about the vaccine among certain HCWs were deficient. Similar findings have been observed from other parts of the country and has been reported to have a direct link to unvaccinated status of the participants.²⁴ On a more positive note, majority (89.4%) of the study participants knew the seriousness of the disease and the associated complications which is very fundamental as far as the elimination of HBV is concerned. This is in sync with findings from a study from Ethiopia.²⁵

A notable proportion (10%) of HCWs in our study showed uncertainty about the role of Hepatitis B vaccine in disease prevention. This was in concordance with a study from Northern Vietnam by Pham et al. where only 50% of the study participants felt safe to take the vaccine for prevention of infection.²² This calls to attention the need to understand reasons for vaccine hesitancy and interventions that would enhance vaccine acceptance among them.

Sustainable solutions to elimination of HBV is establishing a safe working environment that emphasizes infection control measures at workplace including displaying of post exposure prophylaxis measures, safe handling of sharps, prompt reporting of needle stick injuries and universal precautions. In reflection to this, nearly three-fourth study participants felt the need to improve and adhere to the infection control measures at workplace and this was in harmony with a study by Kashyap et al. from Delhi.²⁶ Exposure to body fluids through needle stick injuries can increase HCWs risk of acquiring blood borne infection if precautionary measures are not adhered to. Literature reports the risk of exposure to needle stick injuries (NSIs) among HCWs to be 25–65%.²⁷ None of the participants in our study reported exposure to NSI in the last one year. Although this is an encouraging observation, there are chances of underreporting or the affected individual not being a part of the study sample.

Reports estimate a vaccination gap of 20–40% among HCWs either in the form of incomplete vaccination status or vaccination coverage with regard to hepatitis B vaccine in spite of WHO recommendation on

routine immunization with hepatitis B vaccination among HCW.^{2,28} Our study concurs with these findings with nearly one fifth (16%) of the study participants reporting an unvaccinated status. Reportedly the hepatitis b vaccination coverage is substantially low among health workers from developing countries like China (60%) and Africa (24.7%). In contrast the counties like Australia, Belgium, Canada, Germany, Ireland, Poland, Sweden and United states report a higher vaccination coverage (>95%). This observed distinction in vaccination coverage is probably due to the national policy on mandatory vaccination of health care workers in developed countries and lack of this policy in developing nations.^{29,30} This draws attention to the need for vaccine mandate policy particularly against HBV during HCW recruitments and at regular intervals based on the risk of exposure. Studies have demonstrated a greater sero-conversion (80–90%) immediate post vaccination with hepatitis B vaccine and a decline over time.³¹ Barash et al. in their study observed that 40% of the study participants had their antibody titres evaluated with more than three fourth (77%) demonstrating protective titres over a time. These findings are in agreement with that of the present study.³²

Higher educational status predictably, was found to be associated with heightened awareness and favorable practices in this study. These findings support the observations by Afihene et al. and Ayalew et al. who have highlighted the role of educational programmes in improving the perceptions and practices among HCWs.^{1,7}

Present study done among key population identifies the gap in the preventive practices with respect to hepatitis B. There is wide disparity that exists with respect to knowledge, attitude and practices between doctors, nurses versus housekeeping staff that necessitates focused measures to bring improvement in their practice with respect to hepatitis B prevention. Though the study participants demonstrated a good knowledge regarding transmission and prevention of hepatitis B, a considerable proportion remained unvaccinated. The findings of this study provide the necessary information to implement appropriate systems such as establishing safe workplace monitoring unit and vaccine management system which involves provision of free vaccination and evaluation of immune status post vaccination for improving the full vaccination coverage.

The study has certain limitations. Based as it is, on self-reported cross-sectional study findings, we cannot rule out the possibility of bias in estimating actual practices and compliance. Although the study identified a difference in attitude and practice towards hepatitis B prevention among the various HCW cadre, it has not effectively captured the factors that determine this difference. A longitudinal design is required to help us establish these findings with more certainty.

5. Conclusion

The study findings show the existence of vaccine hesitancy among a section of healthcare workers in this setting. There is an urgent requirement to address this issue. Periodic training in the form of workshops and symposiums dedicated to the theme of safe workplace practice could create the necessary awareness and reinforce the need to comply with standard guidelines. Establishing a safe workplace monitoring unit and vaccine management system within the university healthcare institutions and hospitals could be a step in this direction.

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CRedit authorship contribution statement

Eshwari K: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Validation, Writing – original draft. **Shivani Shenoy:** Data curation, Formal analysis, Writing – original draft. **Suma Nair:** Conceptualization, Formal analysis, Funding acquisition, Methodology, Supervision, Validation, Visualization, Writing – review & editing.

Declaration of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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