ASIAN JOURNAL OF PHARMACEUTICAL AND CLINICAL RESEARCH

INNOVARE ACADEMIC SCIENCES
Knowledge to Innovation

Vol 18, Issue 2, 2025

Online - 2455-3891
Print - 0974-2441

Research Article

ASSESSMENT OF KNOWLEDGE TOWARD PREVENTION OF HEPATITIS B INFECTION AND VACCINATION STATUS AMONG HEALTH CARE WORKERS AT A TERTIARY CARE CENTRE IN EASTERN INDIA

SUBHA SANKHA KUNDU, MOUMITA KUNDU*, MUKESH KUMAR, DHAVAL PAREKH, ANAND KISHORE

Department of Community Medicine, KPC Medical College and Hospital, Kolkata, West Bengal, India.
***Corresponding author: Moumita Kundu; Email: rode.mou7@gmail.com**

Received: 15 December 2024, Revised and Accepted: 27 January 2025

ABSTRACT

Objectives: The present study aims to assess the knowledge about Hepatitis B infection of healthcare workers (HCWs) and their vaccination status.

Methods: This was a cross-sectional descriptive study, carried out over a period of 4 months, at a tertiary care hospital in Eastern India. The study enrolled 151 HCWs, including nurses and paramedical staff employed on either a permanent or contractual basis. Participants were selected randomly, and data were obtained using a structured, pre-tested data collection tool. The questionnaire included sections to capture sociodemographic details, assess knowledge about Hepatitis B virus (HBV) infection, determine vaccination status, and identify reasons for partial or lack of vaccination.

Results: Among the 151 participants, 29.8% were nurses, and 70.2% were auxiliary health workers, including laboratory technicians, administrative staff, housekeeping staff, ward attendants, and ambulance drivers. While all nurses exhibited complete knowledge across all domains of HBV awareness, only 14% of auxiliary health workers knew the causative organism and 9% were aware of prevention strategies. Vaccination coverage was suboptimal, with 48.3% fully vaccinated, 30.5% partially vaccinated, and 21.2% unvaccinated. Unvaccinated participants cited a lack of awareness (62.5%) and perceived irrelevance (31.3%) as major barriers. Among partially vaccinated participants, 65.2% were unaware of their vaccination schedule.

Conclusion: Significant gaps in HBV-related knowledge and vaccination coverage persist among auxiliary health workers, highlighting the need for targeted educational programs and routine workplace vaccination initiatives. Enhancing awareness about vaccination schedules and ensuring easy access to vaccines are critical steps to mitigate HBV transmission risks in healthcare settings and protect HCWs.

Keywords: Hepatitis B, Healthcare workers, Vaccination coverage, Universal precautions, Occupational hazard.

 DOI: http://dx.doi.org/10.22159/ajpcr.2025v18i2.53677. Journal homepage: https://innovareacademics.in/journals/index.php/ajpcr

INTRODUCTION

With an estimated 254 million people living with a chronic Hepatitis B virus (HBV) infection as of 2022 and 1.2 million new cases reported each year, hepatitis B infection continues to be a serious worldwide health concern [1]. Often referred to as the "silent killer" or "silent epidemic," Hepatitis B contributes significantly to global morbidity and mortality [2]. India, which contributes 10–15% of the worldwide burden, faces unique challenges in addressing this public health concern, with an estimated prevalence ranging from 2 to 8% among the general population [3,4].

Due to occupational exposure to blood and bodily fluids, healthcare workers (HCWs) are significantly more likely to contract HBV; in fact, their risk is estimated to be 4 times higher than that of the general population [5,6]. Hepatitis B, however, is a preventable disease, with vaccination serving as a safe, widely accessible, and highly effective method of protection [1]. Minimizing the spread of HBV requires adherence to universal precautions, including using gloves, sterilizing medical equipment, managing hospital waste efficiently, and ensuring vaccination coverage [7]. Furthermore, post-exposure prophylaxis is a proven strategy to prevent HBV infection after unintentionally coming into contact with tainted blood or bodily fluids [7].

Research indicates that adherence to universal precautionary practices among HCWs – such as utilizing protective eyewear, wearing gloves during phlebotomy, and disposing of needles properly – remains inadequate, highlighting the need for improved compliance [8]. Compliance with injection safety protocols has been reported to range between 6% and 22.6% [9]. In addition, paramedical personnel face a greater risk of HBV transmission than doctors, largely due to lower vaccination coverage and inadequate implementation of safety measures [10,11].

In resource-constrained settings such as India, characterized by diverse socioeconomic conditions, varying healthcare infrastructure, and disparities in access to education and resources, inadequate training, limited availability of vaccines, and suboptimal adherence to infection control protocols exacerbate the risk of HBV transmission in healthcare settings. Understanding the existing gaps in knowledge and practices among HCWs is therefore crucial for designing targeted interventions to mitigate the risks associated with HBV. Furthermore, this research addresses a critical gap in the literature, as studies focusing on the knowledge, attitude, and practices of HCWs in Eastern India remain scarce. Therefore, the present study aims to assess the knowledge about Hepatitis B infection of HCWs and their vaccination status.

METHODS

Study design and setting

This observational, cross-sectional study was conducted at a tertiary care center in Eastern India between September 2023 and December 2023, following approval from the Institutional Ethics Committee. The study adheres to the STROBE guidelines for reporting observational research.

Study participants

The study targeted nurses and paramedical staff employed in the hospital, either on a permanent or contractual basis. Participants were

included after explaining the study's purpose, assuring anonymity, and obtaining informed written consent. Individuals with a past history of HBV or Hepatitis C virus infection were excluded from participation.

Sample size and sampling technique

Using findings from Siraj *et al.* [12], which reported a 29% vaccination rate among paramedical staff, the sample size was calculated using the formula: $n=\{(Z_{1-\alpha/2})^2. p\times q\}/d^2$, where, $Z_{1-\alpha/2}=2.58$ for 99% confidence limit, p=proportion of vaccinated individuals among paramedical staffs=0.29, q=1-p=0.71, d=0.10. The calculated value was 137, and after considering 10% absenteeism, the minimum sample size required was 151.

Participants were selected from the study population through simple random sampling using a random number table method.

Study procedure

Data collection was conducted using a self-administered, pre-tested, structured questionnaire, divided into three sections:

- Section A: Collected sociodemographic details.
- Section B: Assessed participants' knowledge of HBV, covering domains such as the cause of the disease, methods of transmission, affected organs, treatment options, and vaccination knowledge. This section was designed to evaluate participants' understanding of HBV epidemiology, modes of spread, and complications.
- Section C: Gathered information about participants' vaccination status against HBV. Participants were categorized as:
  - Fully vaccinated: Received three doses of the hepatitis B vaccine as per the 0, 1, and 6-month schedule
  - Partially vaccinated: Received fewer than three doses
  - Unvaccinated: Did not receive any dose of the vaccine. Fully and partially vaccinated participants provided details of the facility where they received the vaccine, while unvaccinated participants stated their reasons for non-vaccination.

Data analysis

Data were entered into Microsoft Excel 2016 and analyzed using Statistical Package for the Social Sciences version 16.0. Results were presented through tables, graphs, and diagrams. Continuous variables were expressed as mean ± standard deviation, while categorical variables were represented as relative frequencies and percentages.

RESULTS

A total of 151 healthcare workers were included in the study, among which 106 were auxiliary health workers and 45 nurses. Auxiliary health workers included laboratory technicians, administrative staff, housekeeping staff including sweepers, laundry pickers and waste collectors, ward attendants, and ambulance drivers. The sociodemographic characteristics of the study participants are given in Table 1.

It was observed that all of the nurses had an overall awareness regarding Hepatitis B infection. Whereas, astonishingly among the 106 auxiliary health workers, 14% had correct knowledge regarding causative organisms, 21% had knowledge regarding the transmission of disease, 14% had knowledge regarding organs affected, 9% were aware about the various modes of prevention of Hepatitis B. While 74% of the auxiliary health workers knew that there is a treatment for Hepatitis B and 24% had proper knowledge regarding complications of Hepatitis B (Table 2).

The proportion of study participants who were fully vaccinated was 48.3% (n=73); 30.5% (n=46) were partially vaccinated and 21.2% (n=32) were not vaccinated at all. Among the nurses, almost all of them were found to be fully vaccinated while all the ambulance drivers were unvaccinated (Table 3).

Out of the 119 study participants who were either fully or partially vaccinated, 76 received the vaccine at a government facility (63.9%), while the remaining 43 participants were administered the vaccine from any private facility (Fig. 1). None of them reported for workplace vaccination.

Table 1: Sociodemographic profile of the participants

Characteristics	Categories	Frequency	Percentage
Type of health worker	Nurses	45	29.8
	Laboratory technicians	10	6.6
	Administrative staff	19	12.6
	Housekeeping staff	47	31.1
	Ward attendants	25	16.6
	Ambulance drivers	5	3.3
Gender	Male	63	41.7
	Female	88	58.3
Marital status	Married	73	48.3
	Unmarried	78	51.7
Years of work experience	<1 year	39	25.8
	1–3 years	54	35.8
	>3 years	58	38.4

Table 2: Distribution of the participants according to their knowledge on Hepatitis B

Knowledge domains	Nurses (n=45) (%)	Auxiliary health workers (n=106) (%)
Knowledge regarding the causative organism	45 (100)	15 (14)
Knowledge regarding the transmission of disease	45 (100)	22 (21)
Knowledge regarding the organs affected	45 (100)	15 (14)
Knowledge regarding the various modes of prevention of disease	45 (100)	10 (9)
Knowledge regarding the treatment of Hepatitis B	45 (100)	78 (74)
Knowledge regarding the complications of Hepatitis B	45 (100)	25 (24)

Upon enquiry among the 32 unvaccinated participants, the majority (n=20, 62.5%) reported that they were unaware of Hepatitis B vaccination, while 31.3% (n=10) did not seem necessary to take the vaccines and the remaining 2 participants (6.2%) reported that they were too busy and did not get time (Fig. 2).

Among those who were partially vaccinated, the majority (n=30, 65.2%) stated that they were unaware of their vaccine schedule, while 19.6% (n=9) reported that they missed their vaccine due dates due to busy schedules and lack of time and the remaining 7 participants (15.2%) mentioned unavailability of stock as the reason for not taking the subsequent dose of vaccine (Fig. 3).

DISCUSSION

HCWs are exposed to blood-borne infections, including HBV, which pose serious threats to their occupational health. Due to their early and frequent exposure to medical settings, they always have a high chance of acquiring HBV from infected people. To lower the risk of infection, health care workers must be well-informed, strictly adhere to universal precautions and hygiene protocols, and maintain timely vaccination schedules to ensure an adequate and effective antibody titer for sustained protection against HBV.

The results of this study shed light on the vaccination status and understanding of HCWs regarding HBV infection in a tertiary care setting in Eastern India. Despite Hepatitis B being a preventable disease with effective vaccination and adherence to universal precautions, significant gaps remain, especially among auxiliary health workers.

Table 3: Distribution of the participants according to their vaccination status

Type of health workers	Total	Fully vaccinated	Partially vaccinated		Not vaccinated
			Received 2 doses	Received 1 dose	
Nurses	45	45 (100.0)	-	-	-
Laboratory technicians	10	5 (50.0)	3 (30.0)	2 (20.0)	-
Administrative staff	19	3 (15.8)	5 (26.3)	4 (21.1)	7 (36.8)
Housekeeping staff	47	12 (25.5)	10 (21.3)	5 (10.6)	20 (42.6)
Ward attendants	25	8 (32.0)	7 (28.0)	10 (40.0)	-
Ambulance drivers	5	-	-	-	5 (100.0)
Total	151	73 (48.3)	25 (16.6)	21 (13.9)	32 (21.2)

Values in cells represent no. (%)

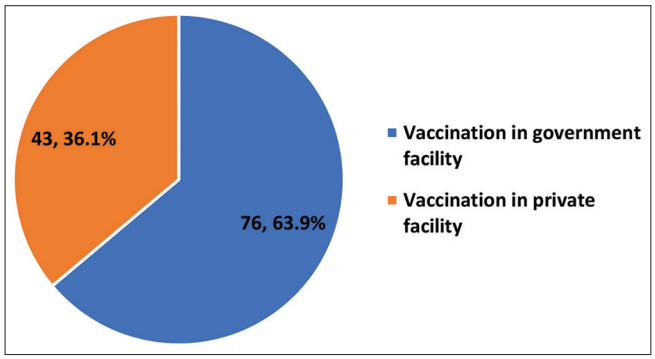

Fig. 1: Distribution of the vaccinated on the basis of vaccinating facilities

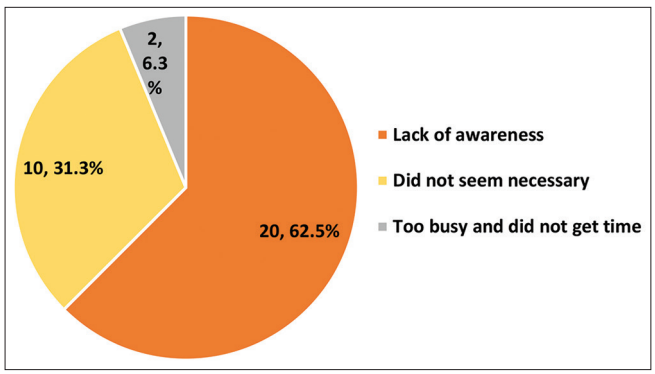

Fig. 2: Reason for not being vaccinated at all

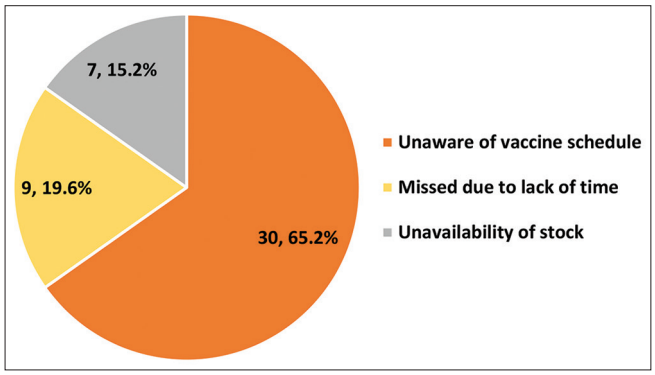

Fig. 3: Reasons for being partially vaccinated

The study highlights a stark contrast in knowledge levels between nurses and auxiliary health workers. While nurses demonstrated 100% awareness across all knowledge domains, auxiliary health workers had significantly lower awareness, particularly regarding the causative organism (14%), transmission modes (21%), affected organs (14%), and prevention strategies (9%). This disparity underscores the need for targeted educational interventions tailored to auxiliary health workers to bridge these gaps. Previous research has shown that doctors generally exhibit high levels of awareness, attitudes, and practices (>90%) concerning the transmission and prevention of Hepatitis B, as evidenced by numerous studies conducted in India and globally [7,8,13,14]. However, findings differ significantly when similar investigations focus on nurses and paramedical staff in hospital settings [15,16]. Studies by Chao *et al.* [17] and Mursy *et al.* [18] revealed that healthcare and public health professionals had limited knowledge about HBV transmission and prevention. The authors highlighted that inadequate training on infection prevention measures among HCWs was the main contributing factor to this lack of awareness [19,20].

Vaccination status further revealed the vulnerability of certain subgroups. Although all nurses were fully vaccinated, only 48.3% of the overall participants achieved full vaccination status; 30.5% were partially vaccinated and 21.2% were unvaccinated. The study conducted in Jodhpur, by Batra *et al.* found that 49.6% of HCWs were fully vaccinated, 4.3% had received partial vaccination, and 46.12% had not been vaccinated [11].

In the present study, alarmingly, ambulance drivers were entirely unvaccinated, and a substantial proportion of housekeeping staff and administrative personnel either had incomplete vaccination or were unvaccinated. Besides nurses, who are in direct patient contact, housekeeping personnel are regularly exposed to body fluids, soiled linens, and biomedical waste, putting them at an increased risk of contracting HBV. As such, it is crucial to provide this group of HCWs with frequent, targeted training on safe work practices, along with ensuring they receive HBV vaccinations [21]. The low vaccination coverage, in our study, reflects a missed opportunity to protect HCWs, especially those in high-risk categories. It also poses a risk of HBV to the patients as well. The lack of workplace vaccination programs and reliance on external facilities for vaccine administration likely contributed to this shortfall, as evidenced by 63.9% of vaccinated participants receiving their doses at government facilities and none through workplace initiatives.

Even though the nation has a safe and effective HBV vaccine, some groups of HCWs are still not that aware about it. Similar observations have been made in other regions, where a lack of awareness has been directly linked to the participants' unvaccinated status [11].

The primary reasons for non-vaccination or partial vaccination among participants were a lack of awareness about the vaccine (62.5% of unvaccinated participants) and ignorance of the vaccine schedule (65.2% of partially vaccinated participants). These findings suggest that better dissemination of information about vaccination schedules and workplace-based vaccination campaigns could significantly enhance vaccination coverage.

The risk of HBV transmission is increased by inadequate adherence to universal precautions, such as wearing protective barriers and disposing of needles safely. This is consistent with past studies showing that HCWs in resource-constrained environments do not always follow

safety procedures to the fullest extent possible [8, 10-12]. A multifaceted strategy is needed to address these problems, including frequent training, vaccinations, accessible availability to PPE, post-exposure prophylactic measures, universal precautions, and institutional enforcement of infection control policies.

The following are the limitations of this study. First, the results might not apply to other regions or healthcare environments because the study was limited to a single tertiary care facility in Eastern India. Second, the representation of certain HCW categories, such as ambulance drivers and housekeeping staff, was limited, which might affect the robustness of subgroup analyses. Furthermore, the reliance on self-reported vaccination status without independent verification could introduce inaccuracies.

CONCLUSION

This study highlights the urgent need for comprehensive strategies to enhance HBV-related knowledge, vaccination rates, and adherence to universal precautions among HCWs, particularly auxiliary staff. Interventions should focus on awareness campaigns, workplace vaccination programs, and regular monitoring of infection control practices to ensure the safety and well-being of HCWs and their patients.

AUTHORS' CONTRIBUTIONS

Kundu SS: Conceptualization, design, data curation, writing, and original draft. Kundu M: Data curation, formal analysis, methodology, software, visualization, and writing-review and editing. Kumar M: Investigation, visualization, and writing-review and editing. Parekh D: Investigation, visualization, methodology, and writing-review and editing. Kishore A: Interpretation of results, and manuscript writing-review and editing. All authors read and approve the final manuscript.

CONFLICTS OF INTEREST

Authors declare no conflicts of interest.

FUNDING SOURCE

We acknowledge that no financial support was granted for this research.

REFERENCES

1. World Health Organization. Fact Sheet: Hepatitis B. World Health Organization. Available from: https://www.who.int/news-room/fact-sheets/detail/hepatitis-b [Last accessed on 2024 Dec 12].
2. Alghamdi M, Alghamdi AS, Aljedai A, Khathlan AA, Masri NA, Qutub A, *et al*. Revealing hepatitis B virus as a silent killer: A call-to-action for Saudi Arabia. Cureus. 2021;13(5):e14811. doi: 10.7759/cureus.14811, PMID: 34094765
3. Datta S. An overview of molecular epidemiology of hepatitis B virus (HBV) in India. Virol J. 2008;5:156. doi: 10.1186/1743-422X-5-156, PMID: 19099581
4. Abraham P. Viral hepatitis in India. Clin Lab Med. 2012;32(2):159-74. doi: 10.1016/j.cll.2012.03.003, PMID: 22726997
5. Ziraba AK, Bwogi J, Namale A, Wainaina CW, Mayanja-Kizza H. Sero-prevalence and risk factors for hepatitis B virus infection among health care workers in a tertiary hospital in Uganda. BMC Infect Dis. 2010;10:191. doi: 10.1186/1471-2334-10-191, PMID: 20587047
6. Jha AK, Chadha S, Bhalla P, Saini S. Hepatitis B infection in microbiology laboratory workers: Prevalence, vaccination, and immunity status. Hepat Res Treat. 2012;2012:520362. doi: 10.1155/2012/520362, PMID: 23304474
7. Abdela A, Woldu B, Haile K, Mathewos B, Deressa T. Assessment of knowledge, attitudes and practices toward prevention of hepatitis B virus infection among students of medicine and health sciences in Northwest Ethiopia. BMC Res Notes. 2016;9(1):410. doi: 10.1186/s13104-016-2216-y, PMID: 27543117
8. Shrestha SK, Bhattarai MD. Study of hepatitis B among different categories of health care workers. J Coll Physicians Surg Pak. 2006;16(2):108-11. PMID: 16499802
9. Talaat M, Kandeel A, El-Shoubary W, Bodenschatz C, Khairy I, Oun S, *et al*. Occupational exposure to needlestick injuries and hepatitis B vaccination coverage among health care workers in Egypt. Am J Infect Control. 2003;31(8):469-74. doi: 10.1016/j.ajic.2003.03.003, PMID: 14647109
10. Van Tuong P, Phuong TT, Anh BT, Nguyen TH. Assessment of injection safety in Ha Dong general hospital, Hanoi, in 2012. F1000Res. 2017;6:1003. doi: 10.12688/f1000research.11399.4, PMID: 29188014
11. Batra V, Goswami A, Dadhich S, Kothari D, Bhargava N. Hepatitis B immunization in healthcare workers. Ann Gastroenterol. 2015;28(2):276-80. PMID: 25830669
12. Siraj F, Fareed P, Mahajan N. Assessment of knowledge attitude and practice towards hepatitis B among health care workers in a tertiary care hospital. Int J Reprod Contracept Obstet Gynecol. 2016;5:58-61. doi: 10.18203/2320-1770.ijrcog20151601
13. Garg M, Sridhar B, Katyal V, Goyal S. Assessment of knowledge, attitude, and practices (KAP) toward hepatitis B infection, its prevention, and vaccination among health care workers. Cureus. 2023;15(5):e39747. doi: 10.7759/cureus.39747, PMID: 37398757
14. Benarji KA, Anitha A, Suresh B, Aparna V, Praveena A, Penumatsa LA. Knowledge and attitude of dental students toward hepatitis B virus and its vaccination - A cross-sectional study. J Oral Maxillofac Pathol. 2021;25(3):553. doi: 10.4103/jomfp.jomfp_387_21, PMID: 35281163
15. Reang T, Chakraborty T, Sarker M, Tripura A. A study of knowledge and practice regarding hepatitis B among nursing students attending tertiary care hospitals in Agartala city. Int J Res Med Sci. 2015;3:1641-9. doi: 10.18203/2320-6012.ijrms20150244
16. Zaveri J, Karia J. Knowledge, attitudes and practice of laboratory technicians regarding universal work precaution. Natl J Med Res. 2012;2(1):113-5.
17. Chao J, Chang ET, So SK. Hepatitis B and liver cancer knowledge and practices among healthcare and public health professionals in China: A cross-sectional study. BMC Public Health. 2010;10:98. doi: 10.1186/1471-2458-10-98, PMID: 20184740
18. Mursy SM, Mohamed SO. Knowledge, attitude, and practice towards hepatitis B infection among nurses and midwives in two maternity hospitals in Khartoum, Sudan. BMC Public Health. 2019;19(1):1597. doi: 10.1186/s12889-019-7982-8, PMID: 31783744
19. Sasapu S, Nethra KP, Kumar PS. Assessment of knowledge, attitudes, and practices in infection prevention and control among health-care workers at the government teaching hospital, Visakhapatnam. Asian J Pharm Clin Res. 2023;16(5):157-61. doi: 10.22159/ajpcr.2023.v16i5.46874
20. Choudhury J, Mahapatra A. Knowledge of hand hygiene practices among healthcare workers in neonatal and paediatric intensive care unit of a tertiary care hospital of Odisha. Asian J Pharm Clin Res. 2017;10(4):272-4. doi: 10.22159/ajpcr.2017.v10i4.16716
21. Nema S, Saraf A, Ayer S, Singh AK, Biswas D. Awareness and vaccination status of hepatitis B among health care workers in a tertiary care teaching hospital of Central India. Indian J Microbiol Res. 2021;8(2):152-6. doi: 10.18231/j.ijmr.2021.031