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Original Research Article

Assessment of hepatitis B vaccination status among healthcare workers in South Delhi: a cross-sectional study

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ABSTRACT

Background: Healthcare workers (HCWs) are at increased risk of hepatitis B virus (HBV) infection due to occupational exposure to blood and body fluids, particularly needle-stick injuries. Hepatitis B vaccination is a safe and effective preventive measure recommended for all HCWs.
Methods: A hospital-based cross-sectional study was conducted in 2018 among 539 healthcare workers using a structured questionnaire. Participants included doctors (including interns and postgraduate students), nurses, laboratory technicians, and other healthcare staff exposed to blood and body fluids during patient care. Vaccination status was categorized as complete (three doses), partial (one or two doses), and unvaccinated. Data were analyzed using descriptive statistics. Ethical clearance was obtained from the Institutional Ethics Committee.
Results: Among 539 participants, 379 (70.32%) were fully vaccinated, 115 (21.33%) were partially vaccinated, and 45 (8.34%) were unvaccinated. Vaccination coverage was highest among nurses (84.18%), followed by doctors and internees (69.79%) and laboratory technicians (63.46%). Coverage was lowest among other healthcare workers, with 41.07% unvaccinated.
Conclusions: Although most healthcare workers were vaccinated, gaps remain, particularly among supportive staff. Strengthening institutional vaccination policies and awareness programs is necessary to achieve complete coverage and reduce occupational risk of HBV infection.
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Keywords: Hepatitis B vaccines, Health personnel, Occupational exposure

INTRODUCTION

Hepatitis B virus (HBV) infection remains a major global public health challenge. According to the World Health Organization's Global Hepatitis Report 2024, an estimated 254 million people worldwide are living with chronic hepatitis B infection, and the disease is responsible for approximately 1.3 million deaths annually, a burden comparable to that of tuberculosis. Despite the availability of a safe and effective vaccine and expanded immunization programs, significant gaps in prevention and control persist globally.[1] India is classified within the intermediate endemicity zone for hepatitis B, with the prevalence of hepatitis B surface antigen (HBsAg) in the general population estimated to range between 2% and 8%. Approximately 50 million individuals in India are chronic HBV carriers, representing one of the largest national burdens of the disease.[1] Healthcare workers (HCWs) are at heightened risk of HBV infection due to frequent occupational exposure to blood and body fluids, particularly through needle stick injuries and other percutaneous exposures.[2,3]

The risk is especially pronounced in resource-limited settings where adherence to infection control practices may be suboptimal and vaccination coverage remains insufficient.[4] Introduced in 1982, hepatitis B vaccination is highly effective, providing 90-95% protection following completion of the recommended three-dose schedule.[5]

Post-vaccination serological testing is recommended to confirm adequate immune response among HCWs.[6] Despite clear international and national recommendations for universal immunization of healthcare workers, vaccination coverage remains suboptimal in many healthcare settings.[2] Limited data are available regarding hepatitis B vaccination coverage among healthcare workers in South Delhi. Therefore, the present study was conducted to assess the hepatitis B vaccination status among healthcare workers in a tertiary care institution of South Delhi.

METHODS

The present study was a hospital-based cross-sectional study conducted among healthcare workers in a tertiary care institution in South Delhi. The study was carried out in 2018 using a structured questionnaire. A total of 539 healthcare workers were included in the study after obtaining informed consent. All hospital staff whose work involved contact with patients' blood or other body fluids during the provision of care were included in the study. The participants comprised doctors (including interns and postgraduate students), nurses, laboratory technicians, and blood bank workers. Data were collected using a self-structured questionnaire consisting of both open-ended and close-ended questions. For the purpose of the study, vaccination status was categorized as follows:

Complete vaccination

Receipt of all three doses of the hepatitis B vaccine according to the recommended schedule (0,1 and 6 months).

Partial vaccination

Partial vaccination refers to receiving only one or two doses of the hepatitis B vaccine.

Unvaccinated

Not receiving any dose of the hepatitis B vaccine. Participation in the study was voluntary and informed consent was obtained from all participants. Ethical clearance for the study was obtained from the Institutional Ethics Committee. The collected data were entered into Microsoft Excel and analyzed using descriptive statistics such as frequency and percentage. Confidentiality of the participants was maintained throughout the study.

RESULTS

A total of 539 healthcare workers participated in the study, including doctors and internees, nurses, laboratory technicians, and other healthcare staff.

Vaccination status

Out of the total participants, 379 (70.32%) healthcare workers were completely vaccinated according to the recommended hepatitis B vaccination schedule. 115 (21.33%) participants were partially vaccinated, while 45 (8.34%) healthcare workers had not received any dose of the hepatitis B vaccine (Table 1).

Table 1: Distribution of subjects according to the vaccination status (n=539).

Vaccination status	Number of participants	Percentage (%)
Complete vaccination	379	70.32
Partial vaccination	115	21.33
No vaccination	45	8.34
Total	539	100

Table 2: Distribution of hepatitis B vaccination status among different categories of healthcare workers (n=539).

S. no.	Profession	No. of participants	Complete vaccination	Partial vaccination	No vaccination
1.	Doctors and internees	235	164 (69.79)	60 (25.53)	11(4.68)
2.	Nurses	196	165 (84.18)	27 (13.77)	4 (2.040)
3.	Lab technicians	52	33 (63.46)	12 (23.07)	7 (13.46)
4.	Others	56	17 (30.36)	16 (28.57)	23(41.07)

Vaccination Status According to Profession. The vaccination status varied among different categories of healthcare workers. Among doctors and internees, 164 (69.79%) were completely vaccinated, 60 (25.53%) were partially vaccinated, and 11 (4.68%) were not vaccinated. Among nurses, the vaccination coverage was highest, with 165 (84.18%) participants completely vaccinated, 27 (13.77%) partially vaccinated, and 4 (2.04%) not vaccinated. Among laboratory technicians, 33 (63.46%) were completely vaccinated, 12 (23.07%) were partially vaccinated, and 7 (13.46%) were not vaccinated. In contrast, vaccination coverage was lowest among other healthcare workers, including attendants and ward boys. In this group, only 17 (30.36%) participants were

completely vaccinated, while 16 (28.57%) were partially vaccinated and 23 (41.07%) were not vaccinated (Table 2). Overall, hepatitis B vaccination coverage was highest among nurses and lowest among other healthcare workers such as attendants and ward boys. A considerable proportion of healthcare workers were either partially vaccinated or unvaccinated, indicating gaps in vaccination coverage among certain professional groups.

DISCUSSION

In the present study, 70.32% of healthcare workers were completely vaccinated against hepatitis B, while 21.33% were partially vaccinated and 8.34% were unvaccinated. The proportion of fully vaccinated healthcare workers observed in the present study was higher than that reported by Pathak et al in North India and Batra et al, who reported complete vaccination coverage of 40% and 49.6%, respectively.[7,8] Mohanty et al from Odisha reported findings comparable to the present study, with 70% of healthcare workers being fully vaccinated.[9] Internationally, Yuan et al from China reported complete hepatitis B vaccination among 60% of healthcare workers, whereas Aaron et al from Tanzania observed considerably lower coverage (33.6%).[11] Among doctors and internees, 69.79% were completely vaccinated against hepatitis B. This finding was comparable to that reported by Soomar et al in Pakistan, where 64.9% of doctors had completed the hepatitis B vaccination schedule. Psarrou et al from Greece reported higher vaccination rates among doctors (77.3%) compared to other healthcare professionals.[12,13] Similarly, a meta-analysis conducted by Auta et al in African countries demonstrated higher vaccination coverage among doctors than other categories of healthcare workers, with 52.4% being fully vaccinated.[14]

Nurses demonstrated the highest hepatitis B vaccination coverage among all categories of healthcare workers, with 84.18% being completely vaccinated. This finding was comparable to that reported by Jain et al in Central India, where 82.8% of nursing staff were fully vaccinated.[15] In contrast, substantially lower coverage among nurses was reported by Sondarva et al from Gujarat, where only around 24% of nursing students were fully vaccinated, and by Gulzar et al from Kashmir, who observed vaccination among only 23.6% of nurses.[16,17] Soomar et al from Pakistan reported comparatively high vaccination coverage, with 75.2% of nurses being completely vaccinated.[18]

Laboratory technicians showed complete hepatitis B vaccination coverage of 63.46%, while 23.07% were partially vaccinated and 13.46% were unvaccinated. The proportion of fully vaccinated laboratory technicians observed in the present study was higher than that reported by Karigoudar et al from Karnataka, India, where 57.4% of laboratory technicians were fully vaccinated.[19] Similarly, Sankha et al from Eastern India reported complete vaccination among 50% of laboratory technicians. In contrast, Batra et al observed considerably lower vaccination among laboratory technicians, with only 24.2% being fully vaccinated and 75.8% remaining unvaccinated.[20,21] Internationally, Said et al from Tanzania reported complete vaccination among 54.6% of laboratory practitioners, whereas 21.5% remained unvaccinated.[22] Vaccination coverage was lowest among supportive healthcare workers, including attendants and ward boys, where only 30.36% were completely vaccinated, while 28.57% were partially vaccinated and 41.07% were unvaccinated. Similar findings have been reported in several studies demonstrating poor vaccination coverage among supportive healthcare staff. Jain et al from Central India reported that only 19.7% of ward boys were fully vaccinated, whereas 77.5% remained unvaccinated.[23] Likewise, Tomson et al from Kerala observed low vaccination among cleaning staff and attenders, with only around 30.5% being fully vaccinated and 42.4% remaining unvaccinated.[24] Internationally, Harun et al from Bangladesh reported hepatitis B vaccination among only 38.8% of cleaning staff, while Soomar et al from Pakistan reported comparatively higher complete vaccination among housekeeping staff (70.8%).[25,26]

The variation in hepatitis B vaccination coverage observed among different categories of healthcare workers in the present study may be attributed to differences in awareness, perceived occupational risk, accessibility to vaccination services, and institutional vaccination practices. Several studies have reported that good knowledge regarding hepatitis B infection and vaccination, regular infection-control training, and strong institutional policies are associated with higher vaccination uptake among healthcare workers. Yuan et al reported that healthcare workers employed in institutions providing free vaccination and vaccination management services had higher odds of completing the hepatitis B vaccination schedule.[27] Similarly, Senoo-Dogbey et al observed that infection-prevention training was significantly associated with completion of the three-dose vaccination schedule.[28]

On the other hand, lack of awareness, vaccine unavailability, cost, forgetfulness regarding subsequent doses, and low perception of occupational risk have been identified as important barriers to hepatitis B vaccination. Sankha et al from Eastern India reported that unvaccinated healthcare workers commonly cited lack of awareness and perceived irrelevance of vaccination as major reasons for non-vaccination.[29] Likewise, Aaron et al from Tanzania observed that many healthcare workers relied solely on standard precautions and did not consider vaccination essential for protection against hepatitis B infection.[30] These findings highlight the need for continuous awareness programs, improved accessibility to vaccination services, and implementation of institutional vaccination policies to improve hepatitis B vaccination coverage among all categories of healthcare workers.

Limitations

The present study has certain limitations. The study was conducted in a single institution, which may limit the generalizability of the findings. In addition, vaccination status was based on self-reported information from participants, which may be subject to recall bias.

CONCLUSION

The majority of healthcare workers were vaccinated against hepatitis B. However, vaccination coverage was comparatively low among other healthcare workers such as attendants and ward boys, where a considerable proportion of participants were either partially vaccinated or not vaccinated. These findings highlight the need to improve vaccination coverage among all categories of healthcare workers to reduce the risk of occupational hepatitis B infection.

Recommendations

Training programs should be conducted for all healthcare workers regarding hepatitis B infection, including the proper use of personal protective equipment and safe handling and disposal of potentially infectious materials, in order to reduce occupational risk. Efforts should be made to achieve 100% hepatitis B vaccination coverage among healthcare workers. This can be ensured by providing free vaccination facilities and implementing institutional policies that encourage or mandate vaccination for all healthcare workers.

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