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Hepatitis B Vaccination Drive Among Healthcare Workers: A Single-Centre Experience.

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Abstract

Background: Hepatitis B virus (HBV) infection is a notable occupational risk for healthcare workers (HCWs) with risk of chronic infection, cirrhosis, and hepatocellular carcinoma. Adherence to vaccination schedules among HCWs continues to be irregular in India despite -inational guidelines. In this study, vaccine uptake, adherence, and completion rates were evaluated during a planned vaccination drive with a multi-modal reminder strategy.

Methods: Retrospective observational study was carried out in a tertiary care hospital from May 2023 to November 2024. All HCWs who took at least one dose of Hep B vaccine during the campaign were enrolled. Vaccination records were obtained from institutional records. Reminder calls for follow-up doses were sent via email, SMS, WhatsApp, telephonic call, and departmental announcements. Outcomes assessed were number of immunized HCWs, completion rates for doses, dropouts despite reminders, and AEFI.

Results: 494 HCWs were enrolled, of which 45(9.1%) quit the job during the campaign, most being housekeeping staff (29.5%). Total of 370(74.9%) completed two doses or more, the highest being among doctors (89.7%) and lowest among housekeeping staff (60.3%). A total of 1,013 doses of vaccine (382 first dose, 340 second dose and 291 third dose) were given. The vaccination was not completed by 19 HCWs (3.8%) who were mainly from housekeeping. Adverse events occurred in few (0.6%) and were mild in intensity, affecting only the nursing staff.

Conclusion: While the vaccination campaign attained significant coverage, inequities remained between staff categories, especially among support staff. Targeted education, systematic reminder systems, and workplace policies are central to enhance compliance. Maintenance of a national HCW vaccination registry could enhance long-term monitoring and coverage.

Keywords: Hepatitis B, Vaccination Drive, Healthcare Workers

Introduction

Hepatitis B virus (HBV) infection is a global health problem healthcare worker (HCWs), with the potential for serious morbidity and mortality [1]. Hepatitis B virus (HBV) is a liver-targeting virus that does not directly kill infected cells but can establish long-term infection, potentially progressing to liver cirrhosis and hepatocellular carcinoma [2]. By 2019, approximately 296 million individuals globally were living with chronic hepatitis B infection. That same year, hepatitis B was responsible for nearly 820,000 deaths, primarily due to complications such as liver cirrhosis and hepatocellular carcinoma [1].

Limited awareness about viral hepatitis among healthcare workers (HCWs) may increase their vulnerability to infection and elevate the risk of transmitting the virus to their families and the broader community [3]. Healthcare workers (HCWs) face a heightened risk of both contracting and spreading infectious diseases. Immunizing HCWs is a critical preventive strategy that safeguards not only their health but also that of their patients, while contributing positively to the overall efficiency of the healthcare system. In India, the healthcare sector employs around 3.8 million HCWs, yet public awareness regarding national immunization guidelines remains relatively low [4].

The World Health Organization (WHO) has endorsed a global strategy to eliminate viral hepatitis as a public health threat by 2030. This initiative aims to achieve a 90% reduction in new infections and a 65% decrease in hepatitis-related mortality [5] India is classified as a country with intermediate endemicity for hepatitis B virus (HBV), with an estimated prevalence ranging between 2% and 4% in the general population. [6]. Various factors influence the uptake of vaccines among healthcare workers across different healthcare settings worldwide. These include limited knowledge and awareness, misconceptions, mistrust in vaccines, financial constraints, accessibility issues, and general vaccine hesitancy [7,8].

Therefore, this study aims to assess the Hep B vaccine uptake, schedule adherence, and completion rates among HCWs during a structured vaccination drive, while also evaluating the impact of a multi-modal reminder strategy and monitoring for adverse events following immunization.

2.Methods and Materials:

This retrospective observational study was conducted at a tertiary care health care centre, utilizing data collected from a structured Hep B vaccination drive conducted between May 2023 and November 2024. The objective of the drive was to ensure complete vaccination coverage among HCWs, in line with the Biomedical Waste Management Rules, 2016, which mandate Hep B immunization for all HCWs. The study population under all groups of HCWs working in the hospital during the study period and who received at least one Hep B vaccine dose as part of the drive. HCWs were defined to include doctors, nurses, housekeeping staff, laboratory technicians, administrative staff, and other allied personnel working within the hospital premises.

Data were retrospectively retrieved from the hospital's vaccination registry maintained by the Infection Prevention and Control Department, and Human Resource Department. The dataset contained demographic and occupational details (name, gender, designation, contact number), details of vaccination (dates of each dose administered), and documentation of adverse events following immunization (AEFI). HCWs who received any dose during the drive period were taken into analysis and vaccination status was being tracked throughout the campaign to determine schedule adherence and completion.

To improve compliance, particularly for the second and third doses of the three-dose Hep B vaccine schedule (0, 1, and 6 months), a comprehensive, multi-modal reminder strategy was employed. Reminders were disseminated via email alerts, SMS messages, and WhatsApp notifications using contact details collected during enrolment. Additionally, staff were reminded through regular telephonic follow-ups, posters displayed in staff punching machines, verbal reminders from department supervisors, and announcements made during routine hospital prayer meetings. These measures were implemented equally in all departments and categories of staff to consistent follow-up and engagement and to those who resigned from the organisation.

The primary outcomes assessed in the study were the number of HCWs immunized during the drive, the number of doses administered, completion rate of the three-dose Hep B vaccination regimen, dropout rates (failure to complete the full vaccination among initiators), and distribution of participation and completion rates by categories staff. The incidence and severity of any AEFI reported postvaccination or during each dose were also evaluated in the study. Data were entered and maintained in a secure Excel-based registry and analysed descriptively using counts and percentages to determine overall trends in vaccine uptake, compliance, and safety.

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3. Results:

Table 1: Vaccination Completion and Resignation Status Across Doses

Category of HCW	Total HCWs	% of Category Resigned	Resigned After 1st Dose	% of 1st Dose	Resigned After 2nd Dose	% of 2nd Dose	Completed Both Doses	% Completed
Doctors	29	5.90%	1	3.40%	2	6.90%	26	89.70%
Nursing	113	22.90%	11	9.70%	6	5.30%	96	85.00%
Food handlers	23	4.60%	0	0.00%	4	17.40%	19	82.60%
Others	143	28.90%	6	4.20%	16	11.20%	115	80.40%
Technician	40	8.10%	6	15.00%	6	15.00%	26	65.00%
Housekeeping	146	29.50%	21	14.40%	26	17.80%	88	60.30%
Total			**45**		**60**		**370**	

A total of 494 HCWs were screened for vaccination status completion. Out of these, 45 (9.1%) quit their jobs during the vaccination campaign. The highest rate of resignation was among the housekeeping personnel (29.5%), followed by those who were under the category of "others" (28.9%) and nursing staff (22.9%). Lower resignation rates were noted among doctors (5.9%), food handlers (4.6%), and technicians (8.1%). Resignation following the first dose of vaccine took place in 9.1% (n=45) of the participants, with housekeeping staff (14.4%) and technicians (15.0%) making the highest contributions. It is particularly worth mentioning that among food handlers, no resignations were noted following the first dose. Resignation following the second dose contributed to a further 60 participants, with highest rates once more experienced by housekeeping staff (17.8%) and technicians (15.0%). A total of 370 HCWs (74.9%) completed the two-dose vaccination series. Doctors reported the highest completion rate (89.7%), followed by nurses (85.0%) and food handlers (82.6%). The lowest completion rates, on the other hand, were reported among technicians (65.0%) and housekeeping staff (60.3%).

Table 2. Total Vaccination Doses Administered and ADR Reported

Dose Type	Number of Doses	ADR's Reported	ADR %
1st Dose	382	2	0.20%
2nd Dose	340	2	0.20%
3rd Dose	291	2	0.20%
Total	**1013**	**6**	**0.60%**

Table 2 represents the total number of Hep B vaccine doses administered across all eligible HCWs. A total of 1,013 doses were given, comprising 382 first doses, 340 second doses, and 291 third doses. The decrease in the number of doses from first to third reflects a combination of factors such as staff resignation, delayed eligibility, or vaccine hesitancy over time. Only two nurses reported adverse drug reactions (ADRs) following vaccination across all doses, accounting for a total of six ADRs, which represents an overall incidence of 0.6%. No ADRs were reported from other remaining staff categories. ADRs were mild while one required hospitalisation (Table 2).

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Table 3. Dropout Analysis Post-Vaccination Reminders		
Category	**Dropouts (n)**	**% of Total Dropouts**
Housekeeping	11	58.00%
Others	6	32.00%
Technicians	2	10.50%
Total	**19**	**3.8%** (of all contacted)

Table 3 presents the dropout analysis following vaccination reminders. Out of all HCWs, 19 individuals (3.8%) did not follow through with vaccination despite multiple reminders. The housekeeping staff had majority of these dropouts with 58%, followed by others (32%), and technicians (10.5%).

This distribution highlights that dropout rates were disproportionately higher in the housekeeping category, indicating potential barriers such as lack of awareness, vaccine hesitancy, or accessibility issues in this group.

Table 4. Category-wise Incomplete Vaccination		
Category	**Incomplete vaccination**	**% of Total**
Housekeeping	47	44.80%
Others	22	21.00%
Nurses	17	16.20%
Technicians	12	11.40%
Food Handlers	4	3.80%
Doctors	3	2.90%
Total	**105**	**100%**

Out of 105 vaccinated individuals, the largest proportion belonged to housekeeping staff (44.8%), followed by others (21%), nurses (16.2%), and technicians (11.4%). Very few vaccinations were reported among food handlers (3.8%) and doctors (2.9%). (Table 4).

Discussion:

HBV is a non-cytopathic, hepatotropic virus capable of establishing chronic infection, potentially resulting in cirrhosis and hepatocellular carcinoma. Over the past four decades, substantial progress has been made in elucidating the mechanisms of HBV gene expression and replication, along with the viral and host factors that determine infection outcomes [1]. A HCW is defined as any individual in a healthcare setting with potential exposure to patients or infectious materials. Conversely, healthcare personnel infected with the virus may pose a risk of transmission to patients, underscoring the importance of comprehensive infection control measures [8].

The current study identified that Doctors showed the greatest hepatitis B vaccination completion rate (89.7%) even though they had a relatively lower resignation rate (5.9%). Nurses presented a good performance in terms of outcomes, with an 85.0% completion rate and a moderate resignation rate (22.9%), showing effective compliance with vaccination. Food handlers recorded the lowest total resignation rate (4.6%) and had a high completion rate of vaccinations at 82.6%. Conversely, technicians (65.0%) and housekeeping staff (60.3%) had the least completion rates with relatively higher dropout rates (8.1% and 29.5%, respectively). (Table 1). A cross-sectional study in 2021 also reported similar occupational differences in vaccination coverage. The completion rate was highest among nurses (75.2%),

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followed by housekeeping staff (70.8%), doctors (64.9%), allied HCWs (58.3%), and laboratory staff (40.0%) [9]. These trends are similar to the observed disparities of the current study, especially the lower compliance among laboratory and allied staff. Similar patterns were observed in a Saudi Arabian study, which also found a 71.6% overall Hep B vaccine compliance rate among HCWs. Nurses exhibited the greatest compliance (79.5%; 492/619), followed by technicians (78.3%; 242/309), with doctors showing the lowest compliance (52.9%; 198/374), (P < .0001) [10]. Surprisingly, current study findings are put in contrast to this since the doctors in current study had highest completion rate. Nevertheless, within physician subgroups, compliance was significantly low among residents in accordance with previous study (P < .0001) [10]. These findings indicate that housekeeping and technician staff are most susceptible to vaccination dropout, frequently because of resignation, and ought to be the target of specific retention and vaccination efforts. Conversely, nursing staff seem to be a stable and compliant workforce in terms of both continued workforce and vaccine complacency.

The distribution of doses administered with the Hep B vaccine was also studied. Of the total 1,013 administered doses, 382 were first doses, 340 second doses, and 291 third doses (Table 2). This progressive decline highlights the importance of sustained follow-up and retention strategies to ensure completion of the full vaccination schedule. Surveillance records in Quzhou (2011–2023) reported a rate of AEFIs of 17.55 per 100,000 doses of Hep B vaccine, of which 98.73% were non-serious. Adverse events were predominantly related to the vaccine product, immunization anxiety, or coincidental, with 94.12% of product-related reactions happening within three days, usually as fever, local injection-site reaction, or rash [12]. Two nurses reported ADRs, comprising six mild events predominantly fever and local pain and mild haematoma giving a low overall rate of 0.6%. No ADRs were reported from the other categories of staff. This data suggests that adverse reactions to the vaccine were minimal and manageable, and that nursing staff may be more likely to report symptoms possibly due to greater medical awareness or vigilance.

A similar study in 2022 found uneven dropout rates among demographic categories, with young adults and specific socioeconomic status experiencing lower compliance [11]. In the present study, only 19 healthcare workers (3.8%) failed to complete their vaccination despite repeated reminders, resulting in a significant reduction in the dropout rate from 30% prior to the vaccination drive. The highest dropouts were found in housekeeping staff (58%), followed by others (32%) and technicians (10.5%) (Table 3). These results support the importance of such targeted strategies like personal communication, reminder systems, or logistical support aimed at particular staff categories to minimize dropout and overall vaccine coverage improvement. In the present study (Table 4), the majority of unvaccinated health care workers were housekeeping staff (44.8%), followed by others (21%), nurses (16.2%), and technicians (11.4%), with fewer among food handlers (3.8%) and doctors (2.9%). Comparable cross-sectional study from a tertiary care hospital, the analysis proved that the highest compliance was found in medical staff (77%), followed by paramedical staff (43%), while no compliance was found among the housekeeping staff [13].

Conclusion: This study underscores variation in Hep B vaccination adherence across healthcare worker groups, with support staff showing lower completion rates. Despite a favourable safety profile, missed doses and discontinuation after reminders suggest gaps in awareness and timely follow-up. Strengthening vaccination programs through targeted education, systematic reminders, and supportive workplace policies is essential to improve compliance and ensure consistent protection for all healthcare personnel. Establishing a national Hep B vaccination registry can further enhance vaccination coverage and monitoring for healthcare professionals.

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