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HEPATITIS B VACCINATION STATUS, KNOWLEDGE, ATTITUDES, AND OCCUPATIONAL RISK FACTORS AMONG HEALTHCARE WORKERS IN TERTIARY CARE HOSPITALS OF PESHAWAR, PAKISTAN

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ABSTRACT

Background: Hepatitis B virus presents a major problem as an occupational risk to healthcare workers (HCWs) in Pakistan, where the vaccination coverage rates do not reach the optimal levels despite the availability of an effective vaccine.
Purpose: The aim of the study is to identify the status of HCWs vaccinated against hepatitis B in three large tertiary care hospitals across Peshawar and further assess knowledge, perceptions, work-related variables, and obstacles to vaccination.
Materials and Methods: The study is a descriptive cross-sectional study that was carried out between May, 2024 to September, 2024. After conducting informed consent, actually 300 HCWs (doctors, nurses, technicians) of three tertiary hospitals of Peshawar were interviewed face to face using structured questionnaire. Descriptive statistics were employed in the analysis of data.
Findings: The average vaccination rate was 65.3 with the highest rate in nurses (76%), then doctors (64%) and technicians (44%). Threat of disease was the principal driving factor (52.3) and time shortage (48.1) was the major impediment. The level of knowledge was high (97%), and the positive attitude was present.
Conclusion: Vaccination coverage is medium and decreasing, with employment differences and logistics. Policies and educational programs are required to be mandatory to enhance uptake.

INTRODUCTION

Hepatitis B virus (HBV) infection has been one of the major threats to global public health because it is a chronic and acute liver inflammation leading to cirrhosis and hepatocellular carcinoma (1). The infection is caused by percutaneous or mucosal contact with infected blood and body fluids such as semen, vaginal secretions, and saliva (2). The recent estimates released by

the World Health Organization show that 254 million people lived with chronic HBV infection in 2022, and the largest HIV burden was seen in the African and Western Pacific regions (3). On average, annually approximately 1.3 million deaths are attributed to viral hepatitis, of which HBV and HCV are the most prevalent, making it the second major infectious cause of death, being on par with tuberculosis (4). The gaps in prevention strategies are highlighted by ongoing transmission through a safe and highly effective vaccine that was implemented in 1982, especially through perinatal infections and early childhood infection in endemic zones (5).

The occupational acquisition of HBV is especially susceptible to healthcare workers (HCWs) since they regularly deal with blood and carry out invasive procedures (6). A needlestick injury by an HBeAg-positive source has the potential to result in the transmission of HBV and this risk in unvaccinated individuals can be predominantly high in contrast to other bloodborne pathogens (7). HCWs are at risk of being infected with HBV four times more often than the general population, and in the past, the number of infected individuals has reached tens of thousands annually before the adoption of vaccination (8). Occupational exposures in low- and middle-income countries (LMICs) have a disproportionate role in HBV infections among HCWs, usually because of the lack of personal protective gear, poor sharps disposal, and poor vaccination coverage (9). High-risk populations such as HCWs are the priorities of the HBV vaccination programs of the World Health Organization (WHO) as the most effective preventive measure (10).

Pakistan has middle to high-HBV burden, and the country has chronic infections that impact approximately 3.8-5 million people, making the country as a high-burden country when it is compared with hepatitis C (11). HBV and HCV are combined to affect more than 13-14 million Pakistanis, which is caused by unsafe therapeutic injection, poor blood screening, as well as the common practice of unhygienic barber shaving (12). High population density and inadequate healthcare infrastructure make the analysis of transmission dynamics even more complex (13). The occupational risks among Pakistani HCWs are enhanced by excessive workloads, frequent cases of needlestick victims, and irregular use of universal precautionary measures in public facilities (14). In tertiary hospitals, surveys have revealed a varied level of vaccine-acceptance, with numerous gaps in full coverage (15).

The hepatitis B vaccine is highly safe and effective with long-term protection observed in more than 95 per cent of healthy adult population surviving the three doses (16). Infant immunization (with a timely dose at birth) has caused long-term reductions in chronic carriage rates in high-implementation locations, averting deaths and millions of subsequent infections (17). In the case of adult groups, particularly among HCWs, full-vaccination has a dramatic effect on eliminating the risk of occupational transmission and provides almost full protection against clinical disease (18). However, the vaccination rates among HCWs around the globe are poor, as they depend on the absence of awareness, logistic issues, perceived risk, and no mandatory policies (19). In Pakistan, the prevalent practice by private hospitals to make vaccination a pregnancy requirement has demonstrated higher rates, but in the government institutions, the practice is variable and, therefore, lower, so the policy should be reinforced urgently (20).

The proposed study will be a cross-sectional study in three large tertiary care hospitals located in Peshawar to determine the current status of hepatitis B vaccination in HCWs, analyze the knowledge, attitudes, occupational factors and barriers. The study will clarify these variables by explaining them in a high-risk professional group of people in an endemic area to guide specific interventions to improve the vaccination rate. In the long run, better occupational health of

the HCWs will not only lead to health protection but also reduce nosocomial transmission, contribute to HBV elimination nationally and globally by 2030.

Objectives

- ✓ To determine the hepatitis B vaccination status among healthcare workers in tertiary care hospitals of Peshawar.
- ✓ To assess the level of knowledge of healthcare workers regarding hepatitis B infection and its vaccination.
- ✓ To evaluate the attitudes of healthcare workers towards hepatitis B vaccination and preventive practices.
- ✓ To examine the association between knowledge and vaccination status among healthcare workers.
- ✓ To analyze the influence of occupational factors (profession, years of experience, and exposure risk) on hepatitis B vaccination status.
- ✓ To identify the frequency and nature of occupational exposure to hepatitis B among healthcare workers.
- ✓ To identify barriers and facilitators affecting hepatitis B vaccination uptake among healthcare workers.

MATERIALS AND METHODS

Study Design: Descriptive cross-sectional study.

Study Setting: Study Setting: The study was conducted in the three major tertiary care hospitals of Peshawar, Khyber Pakhtunkhwa, Pakistan.

Duration of the Study: May, 2024 to September, 2024

Inclusion Criteria: The research involved healthcare providers (doctors, nurses and lab technicians) with a permanent job in the sampled tertiary care hospitals and had direct contact with patients or biological substances. Participants were only enrolled when they made a voluntary informed consent whether in verbal or written information. All the medical, surgery, and allied specialties and healthcare workers with at least minimal clinical workloads were eligible to make sure that the occupational risk groups were represented.

Exclusion Criteria: The adverse selection of participants was based on the occupational risk of hepatitis B as they were administrative or support staff who lacked direct contact with patients or were not exposed to body fluids and blood during the study. Administrative or support staff on extended leave, maternity leave or temporary contracts were also excluded. The persons who refused to give consent or had partial answers to critical variables were excluded to ensure data integrity.

Methods

The pre-designed, structured questionnaire was used to conduct a descriptive, cross-sectional study based on the previous, validated, studies in hepatitis B vaccination among healthcare workers. The questionnaire included socio-demographic, occupational history, vaccine history (amount of doses received), hepatitis B exposure, an understanding and awareness of the virus and its vaccine, opinions on vaccination, motivation to or things that discourage vaccination, accessibility to vaccination, and recommendations on enhancing coverage. The data was collected using the convenience sampling method by trained investigators who used the face to face interview to interview the eligible healthcare workers in the identified hospitals. All the participants received verbal and written informed consent before being enrolled. Self-reported vaccination status, where possible, was examined by requesting vaccination cards. The responses were made anonymous to provide confidentiality. The data were analyzed and inputted in SPSS version 25. F frequencies and proportions were performed using descriptive statistics, and the chi-square tests were used to determine associations between variables.

RESULTS

The number of healthcare workers involved in the study totaled 300, the average age of 30.10 (SD 5.162), and the median age was 28. The average experience in the workplace was 4.89 years (median 4 years). The largest percentage (59.7) was represented by doctors, then there were nurses (29.7) and technicians (10.7). On the whole, hepatitis B vaccination was done on 65.3 percent of the participants, compared to 34.7 percent who were not vaccinated. The rates of vaccination coverage were also uneven with nurses reporting the highest rate (76), doctors (64), and technicians with the lowest rate (44).

Table 1: Vaccination Status by Occupation

Occupation	Vaccinated n (%)	Unvaccinated n (%)	Total n (%)
Doctors	114 (64.0)	65 (36.0)	179 (59.7)
Nurses	68 (76.0)	21 (24.0)	89 (29.7)
Technicians	14 (44.0)	18 (56.0)	32 (10.7)
Total	196 (65.3)	104 (34.7)	300 (100)

In the vaccinated participants, a high proportion of 41.2% of those who were vaccinated had taken the full series of three doses, 47.8% took two doses and 11% took a single dose. The awareness of hepatitis B threat was the main factor that prompted vaccination (52.3%), then the need to be vaccinated because of workplace (25.8%) and because of being exposed to hepatitis B (21.1%). Less popular causes were free availability of vaccines (17%), social influence (6%), and occupational hepatitis among coworkers (6%).

Table 2: Reasons for Getting Vaccinated (Multiple Responses Allowed)

Reason	n (%)
Awareness of hepatitis B threat	102 (52.3)
Workplace requirement	50 (25.8)
Prior exposure to hepatitis B	41 (21.1)
Free vaccine availability	33 (17.0)
Social influence	12 (6.0)
Occupational hepatitis in coworkers	12 (6.0)

The most common among unvaccinated participants was lack of time (48.1%), then was the perception that they did not need to vaccinate (27.9%), and finally lack of knowledge (17.3%). The level of knowledge was high, as 97% of the sample admitted the significance of the vaccination against hepatitis B and 75.3% admitted that they knew the recommended schedule. The feelings were overwhelmingly favorable: 73% highly supported the idea that the vaccine is the key to their safety, 70%

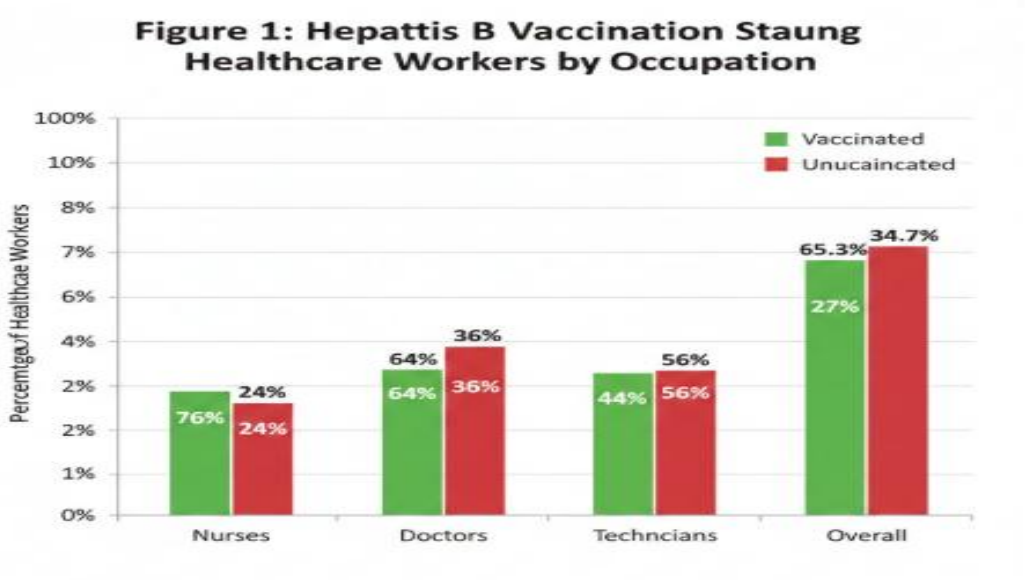
should be required at hospitals, and 55% said that the benefits should not be more than risks.

Table 3: Common Challenges in Accessing Hepatitis B Vaccine (Among Those Reporting Difficulties)

Challenge	n (%)
Vaccine shortage	103 (68.4)
Lengthy waiting times	41 (27.0)
Inconvenient location	22 (14.5)

Fifty-three point three percent of the respondents reported having been exposed to hepatitis B, with the highest percentage of 68 percent reported by nurses, 49 percent by doctors and 34 percent by technicians. Most frequently related processes with exposure included IV cannulation (24.3) and blood withdrawal (23%).

Figure 1: Hepatitis B Vaccination Status Among Healthcare Workers by Occupation



DISCUSSION

In a survey of healthcare workers (HCWs) in three large tertiary care hospitals in Peshawar, Pakistan, the overall coverage of hepatitis B vaccination was reported as high as 65.3, with the highest coverage of 76% being among the nurses, 64% among the doctors, and the lowest of 44% among the technicians (1). This rate of coverage shows the moderate uptake but indicates that the gaps in occupational protection remain. Others have noted similar tendencies in other regional researches where the knowledge and attitudes are mostly positive but lack universalization into universal vaccination (2). The rate is similar to other countries in the region, with 62.7% of HCWs in Herat in Afghanistan immunized (3) and in secondary care hospitals in Sindh, Pakistan, the proportion of full immunization was reported to be about two-thirds (4). Similar unfavorable scores among the medical sciences students in Iraq highlight the larger issue in the resource-limited educational and professional systems (5). This is however higher than rates noticed in some African jurisdictions, including lower rates in Dongola, Sudan (6), and surveys conducted countrywide in

Nigeria on which HCW uptake remains low (7).

It is also higher than the 36.9 per cent reported among nurses in Addis Ababa health centers, Ethiopia (8), systemic barriers are very important. This increased uptake in our study among nurses probably indicates that as they are more at risk in their occupation, which is supported by the fact that nurses who participated in our study reported the highest exposure rate of 68 to that of doctors (49) and technicians (34) (9). This working inequality is also in agreement with the results in Mozambique, where direct patient care positions are associated with increased awareness and immunization behavior (10). Perception of hepatitis B threat was the most common cause of vaccination (52.3%), as in line with the findings of literature highlighting risk perception as a key motivator among HCWs in Ethiopia (11) and Bangladesh (12). The share of positive attitudes was high, with 97% of respondents confirming the importance of vaccination and 73% of them reporting it to be critical when it comes to safety-which is a comparable level of knowledge as high-level cohorts in Serbia (13) and among medical students in Turkey (14) however, more than in certain Ethiopian groups (15). The positive attitudes in Nigerian settings are associated with implementation gaps (16).

Nevertheless, the time constraint (48.1 percent), non-necessity (27.9 percent), and knowledge gaps (17.3 percent) remained as barriers, which are similar to what were cited in the logistical challenges in Afghanistan (17) and financial/work-related demands in surveys of at-risk adults in Europe (18). The level of knowledge was high in general (97% identified importance) especially among doctors (100%), but technicians were lower in their understanding of schedules (31%), which also presents training differences observed across the developing world (19). Occupational hazards, similar to those reported in community-based studies in southern Ethiopia (20) were highlighted through exposure incidents (53.3%), predominantly through IV cannulation and blood withdrawal.

Recommendations were based on the priorities of educational courses (70%), compulsory/free vaccination (more than 50%), which has already demonstrated effectiveness in more coverage settings. Relatively, the reduced coverage in most LMICs denotes structural problems such as inadequacy of resources whereas gaps in coverage continue to exist even in Europe despite guidelines. We find that we are not optimally uptaken in the presence of high knowledge and positive attitudes with practical barriers being the limiting factor and vaccine hesitancy not being the primary factor. The multi-center design and use of the KAP assessment are the strengths of the study as they provide representative information on the tertiary public hospital setting. Nonetheless, there is a risk of recall bias in using self-reported information and convenience sampling can be a limiting factor in generalization. Future research may involve the use of serological tests to confirm.

CONCLUSION

The present cross-sectional study on 300 healthcare professionals in three large tertiary hospitals in Peshawar showed that the hepatitis B vaccination coverage amounted to 65.3% as a concern due to the decrease in vaccination coverage as reported before in comparison with other settings. The occupational differences among the professional groups were that nurses showed the most uptake (76%), with technicians showing the least (44%). The level of knowledge (97%) and attitude towards vaccination was high, but real obstacles to full immunization were temporal factors (lack of time), shortages of vaccines, and unavailability at workplace. The perceived risk is important and was encouraged by awareness of the threat of disease. To increase measures in preventing occupational HBV infection, hospitals ought to introduce mandatory immunization procedures, make vaccination available at

work places freely and easily accessible, and implement specific educational interventions especially among technicians. Enhancement of these provisions will protect medical personnel and also help decrease nosocomial transmission in Pakistan.

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