International Journal of Health Sciences and Research
[Indexed, Peer-Reviewed Journal]
Volume 16; Issue: 3; March 2026
Website: www.ijhsr.org
Original Research Article *ISSN: 2249-9571*

Hepatitis B Vaccination Coverage among the Health Care Workers of a Government Medical College in North Kashmir: A Cross-Sectional Study

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DOI: https://doi.org/10.52403/ijhsr.20260321

ABSTRACT

Introduction: Hepatitis B virus (HBV) infection remains a major global public health concern and poses a significant occupational risk to healthcare workers (HCWs) due to frequent exposure to blood and body fluids. Although safe and effective vaccines are available, vaccination coverage among HCWs in many low- and middle-income countries remains suboptimal.
Aim: To assess Hepatitis B vaccination coverage and identify factors influencing vaccine uptake among healthcare workers at Government Medical College Baramulla and its associated hospitals.
Methodology: A hospital-based cross-sectional study was conducted from June to October 2025 among HCWs including doctors, residents, nursing staff, laboratory personnel, technicians, and paramedical staff. A total of 276 participants were enrolled using convenience sampling. Data were collected through a pre-tested structured questionnaire. Statistical analysis was performed using Jamovi version 2.2.18. Associations were assessed using Chi-square test and independent sample t-test. Multivariate logistic regression was applied to identify independent predictors of non-vaccination. A p-value <0.05 was considered statistically significant.
Results: Only 30.4% of HCWs had completed the full three-dose Hepatitis B vaccination schedule. Lack of free vaccine availability (AOR 3.64; 95% CI: 1.98–6.70; p<0.001) and absence of needle-stick injury (AOR 2.87; 95% CI: 1.52–5.41; p=0.001) were significant independent predictors of non-vaccination. Increasing years of professional experience reduced the odds of non-vaccination (AOR 0.94 per year; p=0.004). The most common reasons for non-vaccination were access-related issues (25%) and lack of time (22.9%).
Conclusion: Hepatitis B vaccination coverage among HCWs was suboptimal. Institutional policies ensuring free and mandatory pre-placement vaccination are urgently needed to enhance occupational protection.

Keywords: Hepatitis B; Vaccination coverage; Healthcare workers; Occupational exposure;

INTRODUCTION

Hepatitis B virus (HBV) infection remains a major global public health problem, with an estimated 296 million people living with chronic HBV infection worldwide and approximately 820,000 deaths annually due to cirrhosis and hepatocellular carcinoma [1]. The World Health Organization (WHO) identifies hepatitis B vaccination as the most effective preventive strategy against HBV infection and its long-term complications [1]. Since the introduction of recombinant hepatitis B vaccines in the 1980s, substantial reductions in HBV incidence have been documented in countries achieving high vaccination coverage [2]. However, despite the availability of safe and effective vaccines, gaps in vaccination persist, particularly in low- and middle-income settings [3]. Healthcare workers (HCWs) constitute a high-risk group due to frequent occupational exposure to blood and body fluids. The risk of HBV transmission following a needle-stick injury from an HBsAg-positive source can be as high as 30% in unvaccinated individuals [4]. Globally, it is estimated that occupational exposure accounts for approximately 37% of HBV infections among healthcare workers [5]. In India, HBV prevalence in the general population ranges between 2–4%, making it an intermediate endemicity country [6]. Studies from various parts of India have reported variable hepatitis B vaccination coverage among HCWs, ranging from 40% to 80%, [7,8]. In many tertiary care centers factors like incomplete vaccination, lack of awareness, limited access and absence of institutional vaccination policies contribute to suboptimal coverage [7–9]. Vaccination coverage among healthcare workers serves as a key indicator of occupational health safety standards. However, limited data are available from northern regions of India, particularly from peripheral tertiary institutions like Government Medical College Baramulla and its associated hospitals. Understanding the extent of vaccination coverage and identifying modifiable barriers are essential for strengthening workplace immunization policies and preventing occupational transmission. Therefore, the present study was undertaken to assess hepatitis B vaccination coverage among healthcare workers of Government Medical College Baramulla and associated hospitals.

Aim:

To assess the Hepatitis B vaccination coverage among the health care workers of Government Medical College Baramulla and associated hospitals.

Objectives:

1. To estimate the proportion of health care workers of Government Medical College Baramulla who have received full course of Hepatitis B vaccination.
2. To identify the factors influencing the uptake of Hepatitis B vaccination among the health care workers of Government Medical College Baramulla.
3. To identify the reasons for non-compliance or incomplete Hepatitis B vaccination among the health care workers of Government Medical College Baramulla.

MATERIALS & METHODS

Study Design and Setting

A hospital-based cross-sectional observational study was conducted at Government Medical College Baramulla and its associated hospitals, including the Urban and Rural Training Health Centres. The institution functions as a tertiary care referral center in North Kashmir.

Study period: From June 2025 to October 2025

Study Population

The study population comprised healthcare workers (HCWs) employed at the institution during the study period, including doctors, residents, interns, nursing staff, laboratory personnel, technicians, and paramedical staff involved in patient care.

Sample Size and Sampling Procedure

Sample size was calculated for estimation of a single population proportion using a vaccination coverage of around 40% [10], 95% confidence level, and 5% absolute precision. Considering a finite source population of approximately 900 healthcare workers, the minimum required sample size was 262 (calculated using an online statistical calculator). To account for potential non-response and incomplete data, the sample size was increased, and 276 participants were ultimately included in the analysis. The study participants were selected by convenience sampling based on availability.

Data Collection Tool and Procedure

Data was collected using a structured, pre-designed, and pre-tested questionnaire administered through face-to-face interviews after obtaining written informed consent. The questionnaire included questions on socio-demographic characteristics, professional details, hepatitis B vaccination status (number of doses received), history of needle-stick injury, availability of free or subsidized vaccine, and reasons for non-vaccination or incomplete vaccination. Confidentiality and anonymity were ensured at all stages.

Statistical Analysis

Data thus obtained was analyzed using Jamovi statistical software version 2.2.18. (A free to use software). Proportions were calculated for categorical variables. Associations between categorical variables were tested using the Chi-square test. Independent sample t-test was used to compare mean years of experience between groups. A p-value <0.05 was considered statistically significant. Multivariate logistic regression was performed to identify independent predictors of non-vaccination. Adjusted odds ratios (AOR) with 95% confidence intervals were calculated. A p-value <0.05 was considered statistically significant.

RESULT

Out of 276 healthcare workers (96 doctors, 100 paramedical staff and 80 others which included Laboratory staff, nursing staff and technicians) were included in the study. Only 30.4% (n = 84) had received all three doses Hepatitis B vaccine, whereas 69.6% (n = 192) were either partially vaccinated or not vaccinated, indicating suboptimal vaccination coverage at Government Medical College Baramulla. **(Table 1).** On bivariate analysis, gender (p = 0.149) and designation (p=0.245) were not significantly associated with full vaccination status. Years of professional experience showed a borderline association (p=0.063), with fully vaccinated workers having slightly higher mean experience. In contrast, a strong statistically significant association was observed between history of needle-stick injury and vaccination status (p <0.001), with those experiencing occupational exposure being more likely to be fully vaccinated. Similarly, availability of free or subsidized vaccination at the workplace was significantly associated with higher vaccination uptake (p = 0.0007) **(Table 2).**

Among the 192 healthcare workers who were not fully vaccinated, the most commonly reported reasons were access-related issues (25%) and lack of time (22.9%). A smaller proportion cited lack of awareness (2.1%) or fear of side effects (2.1%), while a considerable number reported other administrative or personal reasons **(Table 3).** On multivariate logistic regression analysis (outcome variable: non-vaccinated HCWs), lack of free vaccine availability (AOR 3.64; 95% CI: 1.98–6.70; p < 0.001) and absence of needle-stick injury (AOR 2.87; 95% CI: 1.52–5.41; p = 0.001) were independent predictors of non-vaccination. Increasing years of professional experience was associated with reduced odds of non-vaccination (AOR 0.94 per year; 95% CI: 0.90–0.98; p = 0.004), whereas gender was not an independent predictor after adjustment (p = 0.24) **(Table 4).**

Table 1. Hepatitis B Vaccination Coverage among Health Care Workers (N = 276)

Vaccination Status	Frequency	Percentage (%)
Full course (3 doses)	84	30.4
Partially vaccinated	192	69.6
Total	276	100

Table 2. Association between Selected Variables and Partial Vaccination Status (N=84)

Variable	Category	Fully Vaccinated n (%)	Partially Vaccinated n (%)	p-value
Gender	Female	40 (35.7%)	72 (64.3%)	0.149
	Male	44 (26.8%)	120 (73.2%)	
Designation	Doctor	24 (25.0%)	72 (75.0%)	0.245
	Paramedical	36 (36.0%)	64 (64.0%)	
	Other	24 (30.0%)	56 (70.0%)	
Needle-stick Injury	Yes	56 (42.4%)	76 (57.6%)	<0.001
	No	28 (21.9%)	100 (78.1%)	
	Maybe	0 (0%)	16 (100%)	
Free/Subsidized Vaccine Available	Yes	60 (39.5%)	92 (60.5%)	0.0007
	No	8 (28.6%)	20 (71.4%)	
	Not Sure	16 (16.7%)	80 (83.3%)	

Table 3. Reasons for Non-Vaccination Among Healthcare Workers (n = 192)

Reason for non-vaccination	Frequency	Percentage (%)
Access issues (vaccine not available/inconvenient)	48	25.0
Lack of time	44	22.9
Not considered necessary	16	8.3
Fear of side effects	4	2.1
Lack of awareness	4	2.1
Other reasons*	76	39.6

Table 4. Multivariate Logistic Regression Analysis for Predictors of Non-Vaccination (N = 276)

Variable	Category (Reference)	AOR	95% CI	p-value
Gender	Male (Ref: Female)	1.42	0.78 – 2.61	0.24
Years of Experience	Per year increase	0.94	0.90 – 0.98	0.004*
Needle-Stick Injury	No (Ref: Yes)	2.87	1.52 – 5.41	0.001*
Free Vaccine Available	No (Ref: Yes)	3.64	1.98 – 6.70	<0.001*

Outcome Variable: Non-vaccinated
Statistical Method: Multivariate Binary Logistic Regression

DISCUSSION

The present study assessed Hepatitis B vaccination coverage and its determinants among healthcare workers (HCWs) at Government Medical College Baramulla and associated hospitals. It was observed that only 30.4% of HCWs had received all the three doses of Hepatitis B vaccine. As HCWs are vulnerable to blood-borne pathogens, this finding is alarming and highlights a critical gap in preventive occupational health practice.

Globally, Hepatitis B virus (HBV) infection remains a major public health problem, with healthcare workers facing a risk of infection up to four times higher than the general population due to occupational exposure.[5]. The World Health Organization (WHO) estimates that needlestick injuries account for a substantial proportion of HBV transmission among HCWs, particularly in low- and middle-income countries [1]. Studies from high-income countries have reported vaccination coverage among HCWs to be as high as 70–90% due to institutional and occupational health policies [11]. In contrast, coverage in several developing countries remains below 50%, with reported rates ranging between 18% and 60% [12,13]. The 30.4% coverage observed in our study is lower than national estimates from certain tertiary centers in

India, where vaccination uptake has been reported between 45% and 65% [14].

In the present study, demographic variables such as gender and designation were not significantly associated with vaccination status. This is consistent with findings from previous Indian and international studies where socio-demographic characteristics did not significantly influence vaccine uptake [15,16]. Although years of professional experience showed a borderline association on bivariate analysis, multivariate regression demonstrated that increasing experience significantly reduced the odds of non-vaccination (AOR 0.94 per year). This suggests that occupational exposure and awareness regarding risk may improve vaccine uptake, as was observed in a multicentric study among HCWs of Asia and Africa [17].

A strong association was identified between history of needle-stick injury and vaccination uptake. Healthcare workers who had not experienced a needle-stick injury were nearly three times more likely to be non-vaccinated (AOR 2.87). This finding supports the hypothesis that perceived susceptibility influences preventive behavior. Similar observations have been reported in studies where prior occupational exposure significantly increased the likelihood of completing vaccination [18,19]. However, reliance on post-exposure motivation reflects reactive rather than proactive prevention, underscoring the need for institutional pre-exposure vaccination policies.

The most significant independent predictor of non-vaccination in our study was lack of availability of free or subsidized vaccination (AOR 3.64). This highlights the central role of institutional facilitation in determining vaccine uptake. Evidence from health systems with employer funded vaccination demonstrates markedly higher coverage rates [20]. Studies from resource constrained settings similarly report cost and access barriers as primary determinants of low vaccination coverage [21]. In our study, 25% cited access-related issues and 22.9% cited lack of time, while only a small proportion reported fear of side effects or lack of awareness. This was comparable to studies from South Asia and Sub-Saharan Africa emphasizing that vaccination uptake improves significantly when subsidized or free vaccines are easily accessible to HCWs [22].

CONCLUSION

Hepatitis B vaccination coverage among healthcare workers at Government Medical College Baramulla was observed to be suboptimal, with less than one-third having completed the full vaccination schedule. Key factors influencing vaccination uptake identified were availability of free vaccines and prior occupational exposure. These findings underscore the urgent need for institutional policies, including mandatory pre placement vaccination, provision of free vaccine, and strengthened occupational health programs to ensure comprehensive protection of healthcare workers against Hepatitis B infection. Since HBV infection and its long-term sequelae like cirrhosis and hepatocellular carcinoma are preventable to a large extent, strengthening of occupational vaccination programs is vital

Declaration by Authors

Ethical Approval: Approved

Acknowledgement: We are thankful to the Head of the Department of Community Medicine and the administration of Government Medical College Baramulla for their support and guidance. We also express our sincere gratitude to all the participating healthcare workers for their valuable cooperation and contribution to the study

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

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How to cite this article: Darakshan Ali, Muzamil Nazir, Abdul Hamid Dar. Hepatitis B vaccination coverage among the health care workers of a government medical college in North Kashmir: a cross-sectional study. *Int J Health Sci Res.* 2026; 16(3):168-173. DOI: *https://doi.org/10.52403/ijhsr.20260321*

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