

The Status of Hepatitis B Vaccination Among Hemodialysis Patients at a Tertiary Care Hospital

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Hepatitis B
Vaccination
Among
Hemodialysis

Shad Muhammad, Arbab Muhammad Ali and Muhammad Ikram

ABSTRACT

Objective: To ascertain the immunization status for hepatitis B in patients with chronic renal disease who are reliant on dialysis.

Study Design: A cross-sectional study

Place and Duration of Study: This study was conducted at the Nephrology, department. Peshawar's Lady Reading Hospital, from July 1, 2021, to December 31, 2021.

Methods: Those receiving hemodialysis for chronic renal disease were included. The anti-HBS antibody titer in the patients' blood after three or four doses of the 20 microgram hepatitis B vaccine was used to validate the patients' hepatitis B vaccination status. A cut-off value of ≥ 10 IU/L was applied to the anti-HBS antibody titer.

Results: 109 patients in all were enrolled. The patients' ages varied from 20 to 60. The patients' average age was 49.80 ± 5.245 years. The male to female ratio was 1.6:1. Of the patients, 81 (74.3%) got three doses of the vaccine, while 28 (25.7%) received four doses. 56 patients (51.4%) had vaccination records.

Conclusion: CKD patients are less likely to develop ≥ 10 IU/L of anti-HBS antibodies after hepatitis vaccination. Patients who receive vaccination in the early course of the disease are more likely to develop better response.

Key Words: Chronic Kidney Disease, HBV vaccination, Hemodialysis

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INTRODUCTION

Because the kidneys play a critical role in eliminating harmful metabolic products—the buildup of which might have detrimental consequences on human health—maintaining renal function is essential to overall wellbeing.^[1] A patient with chronic kidney disease (CKD) has a glomerular filtration rate (GFR) of less than 60 mL/min per 1.73 m², a structural change in the renal parenchyma, and a loss of renal function that lasts longer than three months.^[2] Renal transplantation and peritoneal dialysis are additional options, even though hemodialysis is mostly provided in clinical settings as renal replacement treatment for patients with chronic kidney disease.^[3] Hepatitis B virus (HBV) infection is a major worldwide health hazard, with 150 million people living with its chronic carrier condition. Due to the fact that dialyzed patients are more

susceptible to blood and its products than the general population is, as well as the risk of contaminated hemodialysis equipment and supplies, the incidence of HBV is significantly higher in this group.^[4] HBV prevalence in CKD patients on hemodialysis has been shown to vary from 1.2 to 6.6%. According to current standards, hepatitis B immunization is advised for all patients with chronic kidney disease who are reliant on dialysis since it not only protects against hepatitis B but also improves patient survival. Despite the fact that chronic kidney disease (CKD) is an immunocompromised condition, there is currently a lack of good immunization against HBV among CKD patients, especially in underdeveloped nations.^[5] Amjad et al. observed that 19.9% of CKD patients who were on dialysis had received an HBV vaccination.^[6] A different research by Guimaraes et al, found that 59.2% of dialysis-dependent CKD patients had received an HBV vaccination.^[7] Patients with chronic renal disease have a relatively high prevalence of HBV infection. There is relatively little information on the frequency of HBV vaccinations in CKD patients receiving dialysis, despite current recommendations recommending immunization against HBV in all CKD patients. Furthermore, as no local research has been done on this topic recently, the findings of studies done on other groups cannot be extrapolated to our community. Consequently, I intended to ascertain the hepatitis B vaccination status among dialysis-dependent chronic kidney disease (CKD) patients based on the prevalence of HBV

Department of Nephrology, MTI, Lady Reading Hospital, Peshawar.

Correspondence: Muhammad Ikram, Assistant Professor, Nephrology, Lady Reading Hospital, Peshawar.

Contact No: 03339354462

Email: mikramakhunzada@gmail.com

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vaccinations in our community. The findings of my research will provide our local health officials up-to-date data on HBV vaccination rates among CKD patients, which will be useful for future planning.

METHODS

A cross-sectional study conducted at Peshawar's Lady Reading Hospital's nephrology department from July 1 to December 31, 2021. Sample size was calculated using the WHO sample size computation and the estimated frequency of hepatitis B vaccinations (p = 19.9%). 7.5% error, 95% confidence. Sequential sampling without probability. This study covered all 20–60-year-old dialysis patients. Patients with HIV, immunosuppressive medicines, blood dyscrasias, liver or renal illness, or congenital or acquired immunodeficiency problems. Cancer and transplants were excluded.

Both the LRH research department and ethics committee approved the recruitment of 109 eligible patients. Each patient provided informed consent, ensuring anonymity and no risk from this investigation. Age, gender, stadiometer height, and weighing scale weight in kilograms were recorded. After a comprehensive abdomen and general physical exam, the patient's medical history, dialysis dependence, CKD cause, and duration were noted. The patient's medical history was examined to ascertain their hepatitis B vaccination status, including dosages and time since immunization. Patients who got an HBV vaccination or had clear records were documented. The serum anti-HBs antibody titer was tested using ELISA to determine hepatitis B vaccination status. ELISA analysis was performed at the hospital laboratory within

30 minutes of sample collection to detect anti-HBs antibody titer. The operational criteria (serum anti-HBs antibody titer > 10 IU/L) were used to gather data on hepatitis B vaccination status. IBM-SPSS 22 was used to analyze the data.

RESULTS

Patients in this study had a mean age of 49.80 ± 5.245 years, weight of 45.22 ± 7.101 kg, BMI of 21.381 ± 1.020, and disease duration of 22.061 ± 2.511. A total of 56 (51.3%) patients with anti-HBs antibody titers ≥10micrograms were confirmed vaccinated, as shown in Table 1. Table 2 shows immunization status by gender, age, BMI, vaccine doses, and sickness duration.

Table No.1: Patients Demographics

		Frequency	%tage
Gender	Male	68	62.4
	Female	41	37.6
Age	30Y or >	74	67.9
	<30 Y	35	32.1
BMI (kg/m2)	20 kg/m2 or below	48	44
	More than 20 kg/m2	61	56
VACCINE DOSES	03 Doses	81	74.3
	04 Doses	28	25.7
DISEASE DURATION	24 months or more	77	70.6
	Less than 24 months	32	29.4
VACCINATION STATUS	Vaccinated	56	51.4
	Unvaccinated	53	48.6

Table No. 2: Results according to gender, age, BMI, vaccination dose and disease duration

	Gender		Age (yrs)		BMI (kg/m2)		Vaccine Doses		Disease Duration (Months)	
	Male (68)	Female (41)	≥ 40 years (74)	< 40 years (109)	≥ 20 (48)	< 20 (61)	03 doses (81)	04 doses (28)	≥ 24 months (77)	< 24 months (32)
N=109										
Vaccinated (56, 51.4%)	37 (54.4%)	19 (46.3%)	35 (47.3%)	21 (60%)	27 (56.2%)	29 (47.5%)	39 (48.1%)	17 (60.7%)	32 (41.5%)	24 (75.0%)
Unvaccinated (53, 48.6%)	31 (45.6%)	22 (53.7%)	39 (52.7%)	14 (40%)	21 (43.8%)	32 (52.5%)	42 (51.9%)	11 (39.3%)	45 (58.5%)	08 (25.0%)
p value	0.414		0.215		0.366		0.251		0.001	

DISCUSSION

Among CKD patients who had HBV immunization, 56 (51.3%) had anti-HBS antibody titers ≥10 micrograms. A minimum of 10 micrograms of anti-HBS antibody is suggested for hepatitis B prevention. No significant connection was found between HBV vaccination response and gender, age, BMI, or vaccine doses. Though more individuals who got 04 doses of anti-HBV vaccination developed antibodies than those who

received 03 doses, this response was not statistically significant (p = 251). Duration of sickness correlated with vaccination response (p = 0.001). Low response may be linked to immune system weakening as sickness duration increases.^[8] Hepatitis B vaccination rates in our country are low despite nephrology groups and the CDC's advice. Patients' low socioeconomic position may explain this. CKD patients' hepatitis B virus vaccination status is little investigated, however several studies have examined vaccine response in CKD

patients. An early 1990s UK survey found that just 5% of dialysis units consistently immunized patients.⁹ Vaccination rates in the US rose from 47% to 56% between 1997 and 2002.^[10] Our findings indicated 51.3% HBV-vaccinated patients. No local data was available to compare our findings. Compared to our findings, several emerging nations have superior immunization levels. Brazil had over 60% of CKD patients immunized against HBV, with 15% of them incompletely.^[11] Our findings are concerning since CKD patients are high-risk populations and vaccination is the best strategy to avoid HBV infection, coupled with segregation of HBV patients and their equipment and general infection management.^[5] This low immunization rate suggests that nephrologists and dialysis clinics seldom follow guidelines. The US Renal Data System 2011 Annual Data Report found that men started hemodialysis more than females in 2009. Maric also found that diabetic males are more likely to acquire CKD. We found similar results. Gender did not affect CKD patients' hepatitis B vaccination. As in earlier trials, most of our CKD patients were over 40. The mean age of CKD patients in India was 51 years, whereas in China it was 63.6 years.^[12, 13] We found no significant connection between vaccination status and patient age or CKD duration. While older age has been linked to reduced vaccination rates in the general population, we did not find any data on CKD patients' hepatitis B vaccination status.

In the UK, author found that most CKD patients are poor^[14]. HBV vaccination rate was substantially linked with socioeconomic status in our research; lower socioeconomic class patients had lower immunization rates. Author found comparable findings in the overall population.^[15] Lower- and lower-middle-class patients may not be able to afford hepatitis B vaccine or understand its importance.

CONCLUSION

Vaccination status (in terms of titer response to HBV vaccine, i.e. ≥ 10 IU/L) among chronic kidney disease patients is low. Compared to the conventional 03 doses, the response is better in patients who receive 04 doses. Patients in the early course of the disease are likely to show better response to HBV vaccines.

Author's Contribution:

Concept & Design of Study:	Shad Muhammad
Drafting:	Arbab Muhammad Ali, Muhammad Ikram
Data Analysis:	Muhammad Ikram
Revisiting Critically:	Shad Muhammad, Arbab Muhammad Ali
Final Approval of version:	Shad Muhammad

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