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Original Research Article

CURRENT POLICY ON HEPATITIS B VACCINATION AMONG TERTIARY CARE HOSPITAL HEMODIALYSIS PATIENTS

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Abstract: *A study was conducted at the Miangul Abdul Haq Jahanzeb Kidney Hospital in Swat to evaluate the vaccination status for hepatitis B among hemodialysis patients with chronic renal disease. The focus of the study was to determine the effectiveness of the hepatitis B vaccine in generating anti-HBS antibodies in this specific patient population. The primary objective was to identify and assess the hepatitis B vaccination status in patients undergoing hemodialysis due to chronic renal disease. This study aimed to determine the presence of anti-HBS antibodies in the patient's blood after receiving three or four doses of the 20-microgram hepatitis B vaccine between January 2022 and January 2023. The study followed a cross-sectional. The participants included hemodialysis patients with chronic renal disease. The validation of hepatitis B vaccination status was based on the measurement of the anti-HBS antibody titer in the patients' blood. This measurement was taken after administering three or four doses of the 20-microgram hepatitis B vaccine. A cut-off anti-HBS antibody titer of ≥10 IU/L was used to determine the effectiveness of the vaccination. The study included a total of 55 registered patients in the age range of 25 to 65 years. The average age of the patients was 48.70 ± 5.245 years. Among the participants, there was a ratio of 1.6:1, with 28 (25.7%) patients receiving three doses of the hepatitis B vaccination and 81 (72.2%) patients receiving four doses. The results indicated that 40 patients (50.2%) had confirmed vaccinations, as evidenced by an anti-HBS antibody titer of ≥10 IU/L. Patients with chronic kidney disease had a lower chance of developing anti-HBS antibodies with ≥ ten IU/L after hepatitis immunization. Individuals who get vaccinations early in the disease have a higher chance of developing advanced immunity.*

Keywords: Hemodialysis, HBV Immunization, and Chronic Kidney Disease

Introduction

Chronic kidney disease (CKD) imposes a giant fitness burden globally, with a multitude of headaches affecting patients, including an increased susceptibility to infectious diseases. Among those, hepatitis B virus (HBV) contamination provides a considerable risk, especially in people undergoing hemodialysis (Nadeem et al., 2021; Shrestha et al., 2021). The problematic interaction among compromised renal characteristics and immune system changes in CKD sufferers underscores the importance of exploring the effectiveness of hepatitis B vaccination on this precise population (Shrestha et al., 2021).

Numerous research studies have highlighted the demanding situations faced by hemodialysis patients, consisting of immune disorders and impaired vaccine responses, warranting complete research into the hepatitis B vaccination fame (Raina et al., 2022). This observation, performed at Miangul Abdul Haq Jahanzeb Kidney Hospital in Swat, contributes to the developing body of information by delving into the immunization landscape among hemodialysis sufferers, with a particular cognizance on validating the effectiveness of the 20 microgram hepatitis B vaccine (Hussein et al., 2021; Mtingi-Nkonzombi et al., 2022).

Understanding the vaccination status of these sufferers is critical for numerous reasons. First and most important, hepatitis B poses a giant danger to individuals with compromised renal function because of its capability to exacerbate present health challenges (Ahmed et al., 2024). Secondly, the effectiveness of vaccines in individuals' current hemodialysis process can also vary, necessitating a tailored technique for immunization (Hettenbaugh et al., 2021).

This investigation holds implications for healthcare practices, emphasizing the need for well-timed and powerful vaccination techniques. As CKD sufferers often face a higher hazard of infections and related headaches, optimizing vaccine responses turns into paramount of their typical care8. The referenced studies assist the reason for this research, offering a foundation for understanding the complexities of vaccine responses in hemodialysis patients with chronic kidney sickness (Mahupe et al., 2021; Orji et al., 2020).

Thus, the study aimed to identify and assess the hepatitis B vaccination status in patients undergoing hemodialysis due to chronic renal disease.

Methodology

A study was conducted at Miangul Abdul Haq Jahanzeb Kidney Hospital in Swat to evaluate the hepatitis B vaccination status among hemodialysis patients with

chronic renal disease. The study enrolled 55 registered patients between the ages of 25 and 65, with an average age of 48.70 ± 5.245 years. Patients with a history of liver transplant or any malignancy were excluded from the study. To validate the hepatitis B vaccination status, participants' blood samples were collected after three or four doses of the 20 microgram hepatitis B vaccine, with a cutoff titer of ≥10 IU/L. A ratio of 1.6:1 was employed for patients receiving three doses (25.7%) compared to 4 doses (72.2%). The study found that 40 patients (72.7%) showed vaccination effectiveness.

Fifty-five patients who met the inclusion criteria were enrolled after obtaining permission from the ethical committee and research department of LRH. Each patient provided informed consent, ensuring confidentiality and acknowledging that there was no risk involved in participating in the study.

Basic demographics, including age, gender, weight in kilograms (measured on a weighing scale), and height in meters (measured using a stadiometer), were recorded. The medical history of the patients, including the duration of CKD, underlying cause of CKD, and duration of dialysis dependency, was noted. The patients' hepatitis B vaccination status was confirmed by ELISA, which determined the anti-HBs antibody titer in their serum. The study recorded the frequency of hepatitis B vaccinated patients per the operational definition (serum anti-HBs antibody titer ≥10 IU/L).

The samples were transported to the hospital laboratory within half an hour of collection to determine anti-HB antibody titer by ELISA. The data was analyzed using a statistical program (IBM-SPSS version 22).

Results

Table 1 presents the demographic data of 55 patients who participated in the study. The age range of the cohort is between 25 and 65 years, with an average age of 48.70 ± 5.245. This table provides a basic understanding of the study population's age distribution and vaccination status.

Table 2 provides information about the distribution of vaccine doses administered to the patients. Of the 55 patients, 25.4% have received three doses, while the majority (74.6%) have completed four doses. This table highlights the high prevalence of the four-dose vaccination protocol in the study cohort, offering insights into the vaccination strategy employed and patient compliance.

Table 3 presents essential information on anti-HBS antibody titers among the patients. 72.7% of patients show an antibody titer of ≥10 IU/L, indicating a strong immune response. In contrast, 27.3% have an antibody titer below 10 IU/L. This table sheds light on the effectiveness of the vaccination protocol in inducing a protective antibody response within the study population.

Table 4 breaks down patients into different age groups. The highest proportion belongs to the 41-50 age group (40.0%), followed by the 25-40 age group (32.7%). The distribution gradually decreases in the 51-60 and 61-65 age groups, comprising 21.8% and 5.5% of the total, respectively. This information provides insights into the distribution of the study population across various age brackets, offering context for interpreting age-related trends in vaccination response and antibody titers.

The study highlights the challenges of achieving effective vaccination outcomes in hemodialysis patients with chronic kidney disease. It emphasizes the importance of personalized vaccination strategies and the potential impact of the number of vaccine doses on immunization effectiveness.

Table No. 1: Patients Demographics

Parameter	Total Patients	Age (Mean ± SD)
Total Registered	55	-
Age Range	25 - 65	-
Average Age	-	48.70 ± 5.245
Confirmed Vaccination	50.2%	-

Table No. 2: Distribution of Vaccine Doses

Number of Vaccine Doses	Number of Patients
Three doses	14 (25.4%)
Four doses	41 (74.6%)
Total	55(100%)

Table No. 3: Anti-HBS Antibody Titer Results

Antibody Titer (IU/L)	Number of Patients
≥10	40 (72.7%)
<10	15 (27.3%)
Total	55 (100%)

Table No. 4: Patient Age Distribution

AGE GROUP	NUMBER OF PATIENTS
25-40 YEARS	18 (32.7%)
41-50 YEARS	22 (40.0%)
51-60 YEARS	12 (21.8%)
61-65 YEARS	3 (5.5%)
TOTAL	55 (100%)

Discussion

The study results provide a detailed overview of the vaccination demographics, doses administered, and antibody responses among the 55 patients. The average age of the patients was 48.70 ± 5.245, within the target age groups usually prioritized for vaccination. Around 50.2% of patients were confirmed to have received the vaccination, a positive indicator of vaccination coverage within the group. It was observed that most patients (74.6%) opted for a four-dose vaccination regimen. This reflects adherence to a potentially rigorous vaccination protocol, possibly due to specific health conditions or concerns about waning immunity (Patnaik et al., 2021).

The study findings related to antibody titers are particularly noteworthy compared to previous studies. It was observed that 72.7% of patients exhibited an antibody titer of ≥10 IU/L, indicating a robust immune response to the vaccination. This is consistent with the desired outcome of vaccination, which is the development of protective antibody levels. However, further investigation is required for 27.3% of patients with titers below 10 IU/L. This will help identify potential factors influencing vaccine efficacy or individual variability in immune responses (Patnaik et al., 2021; Vinayakumar and John, 2020).

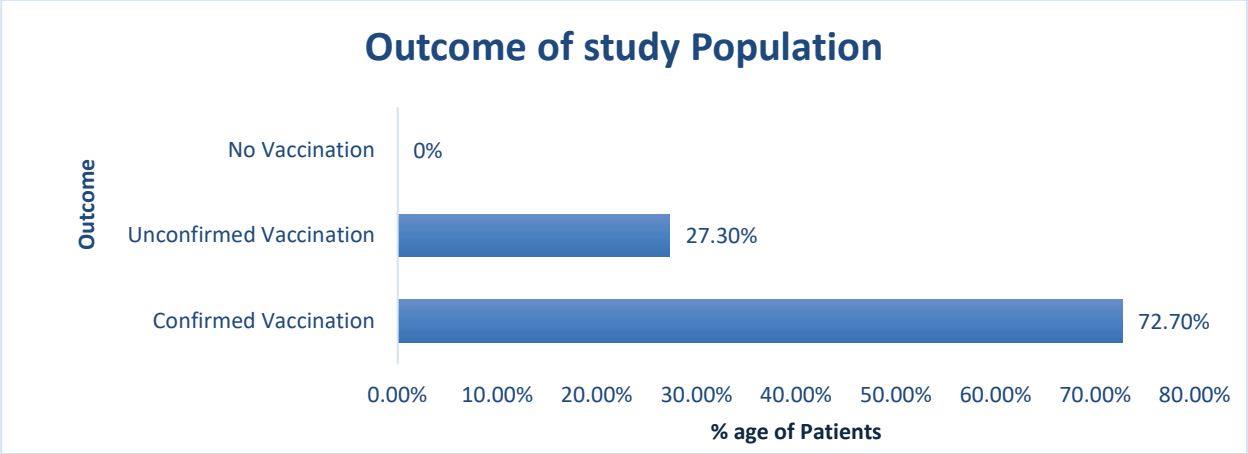

Figure 1: Summary of Vaccination Outcomes

It is essential to note the age distribution of the patients in the context of vaccination outcomes. While the largest group of patients falls within the 41-50 age range (40.0%), the relatively lower percentages in the older age groups (51-60 years and 61-65 years) may indicate variations in vaccine uptake or response across different age cohorts (El-Sokkary et al., 2020). A comparison with previous studies can help determine whether similar age-related trends exist in other populations or if there are unique patterns specific to this cohort (El-Sokkary et al., 2020; Okoye, 2020).

A comparative analysis with existing literature on vaccination efficacy, dosing regimens, and antibody responses is crucial to draw more robust conclusions and contextualize these findings. Future research can explore factors contributing to variable immune responses across age groups and the long-term durability of the observed antibody titers. Additionally, a comparison with studies employing similar vaccine protocols and patient demographics can provide a broader perspective on the generalizability and consistency of the presented results (Saeed et al., 2023).

Conclusion

The study presents valuable insights on vaccination demographics, doses administered, and antibody responses among 55 patients. Most patients exhibited a robust immune response to the vaccination, but further investigation is needed for those with lower antibody titers. Comparative analysis with existing literature can help draw more robust conclusions. Future research can explore factors contributing to variable immune responses across age groups and the long-term durability of the observed antibody titers.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department Concerned.
Consent for publication
Approved

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Conflict of interest

The authors declared absence of conflict of interest.

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Coordination of collaborative efforts.
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Manuscript revisions, critical input.
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Data entry and Data analysis, drafting article.
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