



## Development of Immunity to Hepatitis B Virus Following Hepatitis B Vaccination in Hemodialysis Patient

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### Abstract

**Background:** Hepatitis B infection is common in Dialysis population. Hemodialysis patients have high risk of hepatitis B virus transmission not only due to frequent blood or blood product transmission, decreased response to Hepatitis B vaccine and length on hemodialysis but also due to their immunosuppressed state. Hepatitis B vaccination has the potential to reduce the risk of HBsAg infection in dialysis units. Effective vaccination, blood donor screening, the use of erythropoietin and the isolation of HBV carriers have successfully regulated HBV infection in hemodialysis units (1). This study aims to assess the immunity to HBV & the seroconversion of HBsAg infection in hemodialysis unit. This retrospective observational study evaluated serological markers, hepatitis B vaccination status and co morbidities which can affect the immunity levels of patients undergoing hemodialysis. The patient's data were collected from laboratory investigations and patient record for analysis. Out of 153 CKD-5D patients on maintenance hemodialysis, 39 patients had anti HBs titer <10U/ml, 30 patients had anti HBs titer between 10-100U/ml, 38 patients had anti HBs titer between 100-1000 U/ml, 21 patients had anti HBs titer >1000U/ml and 24 patients didn't check their titer value. Hypertension was the common co morbidity followed by anaemia and diabetes mellitus.

**Keywords:-** Hepatitis B virus, chronic kidney disease, Hepatitis B vaccination, Hemodialysis.

### INTRODUCTION

Hepatitis B infection is considered as a health problem, It is predicted that there are more than twenty lacs people in world have serological proof of present infection.<sup>[1]</sup> Hepatitis B is a blood borne virus which is highly infectious

than other, it is an infectious disease caused by hepatitis B virus. Hepatitis B is mainly transmitted may be through infected mother to child, through percutaneous or through infected blood or body fluids, organ transplant and due to improper hemodialysis related technique and procedures.



During HD procedure, large amount of blood is exposed to infectious materials for long period through extracorporeal circulation. HD patients often have decreased serum hemoglobin level resulting in need for blood transfusion and more often hospitalization causing increased exposure to nosocomial infection as well as viral infection.<sup>[1]</sup> Therefore HBV is most frequently encountered in HD patients. A small amount of blood is enough for its transmission. The virus also remains infectious in dry surface.

Present recommendations says that hemodialysis patients should receive larger vaccine doses than normal kidney function individuals, 40 microgram of Engerix B at 0, 1, 2 and 6 months should be administered in these patients. Vaccine response should be monitored atleast once in two month after the last dose. If anti HBs is declined to <10U/ml it is recommended to administer booster dose.<sup>[2]</sup> Regular hemodialysis patients should be assessed for HBV every six month through serology test.<sup>[2]</sup>

## MATERIAL AND METHODS

This study was conducted on ESRD patients who were on maintenance hemodialysis for more than 3 months. This study was conducted in hemodialysis unit of Kasturba Hospital, Manipal which is located in Karnataka, India. Patients were selected using Convenience sampling. Subjects were selected as per accessibility. Patients selected were out patients on maintenance hemodialysis for more than three months in Dialysis unit of Kasturba Hospital, Manipal and Patients above 18 years of age. Patients excluded were pediatric patients, peritoneal dialysis patients, HBsAg

positive patients & mentally challenged patients.

This was cross sectional observational study conducted in dialysis unit of Kasturba Hospital, Manipal. Patients diagnosed to CKD who were on maintenance hemodialysis if fulfilling the inclusion criteria were included in this study.

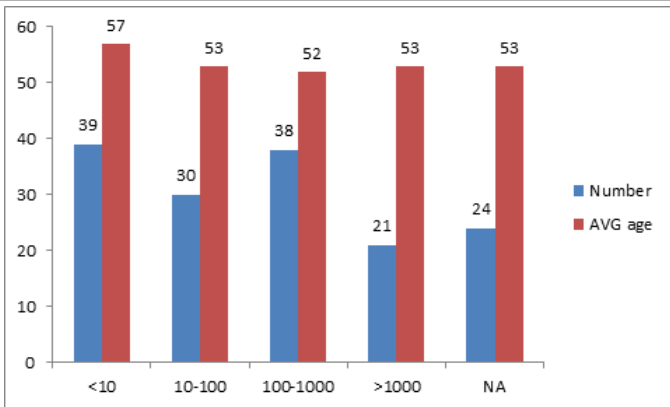
Approval from Institutional Research Committee (IRC) & Kasturba hospital, Manipal Institutional Ethics Committee (IEC) was obtained under IEC no: 249/2019

Materials used for this study is specially designed proforma to analyze the titre levels and seroconversion rate. 154 patients with chronic kidney disease undergoing HD were selected randomly. The participant's data was retrieved from laboratory investigations and medical record department of Kasturba Hospital Manipal for analysis. It is an observational study. During study period participants HBs titer were checked through laboratory report and patient co morbidities are obtained from patient record in MRD

The statistical analysis was done using SPSS17 and the statistical test used for analysis was descriptive statistics.

## RESULTS

A total of 152 CKD 5D patients who fulfilled inclusion criteria were studied. The average age of CKD 5D patients were 52 years (range 18 to 84years), 120 (78%) were males. [Table 1, Figure 1].



**Table 1:**

Anti HBs titer(U/ml)	<10	10-100	100-1000	>1000	NA
Number	39	30	38	21	24
AVG age	57	53	52	53	53

**Table 2:**

titreavg * comboavg Cross tabulation						
Count		Comboavg				Total
		Only HTN	HTN & Anemia	HTN&DM	ALL	
Titreavg	<10	2	15	7	15	39
	10-100	8	12	3	7	30
	100-1000	23	12	0	3	38
	>1000	20	1	0	0	21
	Na	10	9	3	2	24
Total		63	49	13	27	152

## DISCUSSION

### Limitations

- It is a retrospective study
- This study was done in single center and result may not be generalized
- There was no sero conversion of patients to HBV so result may not be significant
- 16% of patients on maintenance hemodialysis did not check their anti HBs titer levels

- Could not assess hepatitis B vaccination status because of financial problem

## CONCLUSIONS

Majority of participants were males. Hypertension was found to be the most common co morbidity and its effect is not seen in titer level. The immunity development against hepatitis B virus following hepatitis B vaccination is moderate in diabetes patients and very poor in anemic patients. 59% of patient on maintenance hemodialysis had anti HBs titer of



>10U/ml and is considered as having protective titer. 26% of patient on maintenance hemodialysis had anti HBs titer of <10U/ml and was in immunodeficiency state and were

subjected for booster dose of vaccine. 16% of patients failed to check their anti-HB titer. There was no seroconversion of patient to hepatitis B virus in 2019.

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