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Cross Sectional Study to Inquire Hepatitis B Immunization Status and in Immunized Individuals Knowledge about Post Vaccination Serological Titer Status among Nursing Staff and Lab Technicians in a Teaching Hospital of Ujjain

Rashmi Bhujade[1], Pawan Pathak[2], Tarique Ibrahim[3], Konika Jain[4]

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Author's Affiliation:
[1]Asst Prof, Dept. of Community & Medicine, Index Medical College, Indore; [2]Director Prog, Dept. of Community & Medicine, Society of Community health oriented operation links, Delhi; [3]Asst Prof, Dept. of Community Medicine, Varun Arjun Med Collage, Shahjahanpur; [4]P.G student, Dept. of Community & Medicine, R D Gardi Medical College, Ujjain

Correspondence
Dr Rashmi Bhujade
drbhujaderashmi@gmail.com

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ABSTRACT

B**ackground**: More than 2 billion people worldwide are infected with Hepatitis B Virus(HBV) infection, among them, around 360 million individuals are chronically infected and are at risk of serious illness and death, especially from fulminant hepatic failure ,cirrhosis and hepato-cellular carcinoma (HCC). HBV is commonest blood-borne hepatitis and significant healthcare occupational pathogen.HBV infection can be prevented by vaccine**.**

Material and Method: Hepatitis B immunization status and in immunized individual status of post vaccination Anti Hbs titer of the health care providers (nursing staff and lab technicians) in teaching hospital was assessed by a cross sectional study using a semi structured proforma.

Results: Only 23 % study participants were fully immunized against hepatitis B. No one was aware about importance of post vaccination anti HBs titer. No one had ever estimated or tested for their post vaccination anti HBs titer. Hepatitis B immunization status of study participants was found to be significantly (<0.05) associated with sex and year of experience of study participants.

Conclusion: Immunization coverage of hepatitis B among staff nurses and lab technicians found to be low. Anti HBS titer was not utilized as a tool to assess immunity provided by hepatitis B vaccine.

Key-words: Hepatitis B immunization status, health care personals, post vaccination anti HBs titer.

INTRODUCTION

According to WHO more than 2 billion people worldwide are infected with Hepatitis B Virus(HBV) infection, among them around 360 million individuals are chronically infected and are at risk of serious illness and death, specially from fulminant liver diseases, cirrhosis and hepatocellular carcinoma (HCC) . Hepatitis B virus can form a dangerous alliance with delta virus and produce a new form of virulent hepatitis which considered being a widespread threat to health. India comes in intermediate endemicity of Hepatitis B where the prevalence of HBV infection is 5-7% in general population[1] .In India 43-45 million HBsAg carriers are there. In 2015, 1.34 million deaths attributed to viral hepatitis. Numbers are comparable to deaths caused by tuberculosis and

HIV infection.[2] Men is the only reservoir of HBV infection which can transmit either by carriers or cases. HBV is commonest blood-borne hepatitis and significant healthcare occupational pathogen. Transmission of Hepatitis B depends on behavioural, environmental and host factors. The virus is transmitted through contact with the blood or other body fluids of an infected person. HBV is 50-100 times more infectious than the HIV virus. Health care providers, lab technicians, public safety personnel, emergency response team members and other workers who can be exposed to blood through needle stick and other sharps injuries, mucous membrane, and skin exposures, are at high risk of acquiring HBV infection . In India, carrier rate of HBsAg in hospital staff has been found to be higher (10.87%) where as in voluntary blood donor 6% and in general population it is 5%,[1]that's why Serological screening & vaccination of high risk group is highly recommended. The World Health Assembly adopted the first "Global Health Sector Strategy on Viral Hepatitis, 2016-2020"[3] in may 2016 .Targets of the strategy are aligned with the Sustainable Development Goals. It has an objective of eliminating viral hepatitis as a public health problem and global targets of reducing new viral hepatitis infections by 90% and reducing deaths due to viral hepatitis by 65% by 2030. In general population vaccination is the mainstay of prevention of transmission of HBV infection.

Hepatitis B vaccine is a recombinant vaccine that prevents from hepatitis B infection. It is in the World Health Organization's List of Essential Medicines. For adult, 3-doses (# 1stdose – now, 2nddose after 1 month and 3rd at 6 month) and for infant 4 doses (including Hepatitis B birth dose) intramuscularly are recommended. Use of standard personal protective measures, precautions, appropriate pre and post-exposure immunization can reduce the risk of occupational transmission of HBV significantly. The Occupational Safety and Health Administration recommends that health care facilities should offer the vaccination against HBV to those employees with jobs that require exposure to blood, blood products, or other potentially infectious materials. For the Healthcare Personnel (HCP) hepatitis B vaccination recommendations by centre for disease control (CDC) are serologic testing should be done after 1–2 months of 3rd dose of hepatitis B vaccine. If anti-HBs is at least 10 mIU/Ml or more considered as positive, the recipient of vaccine is immune. Protection following first, second, and third doses of the vaccine has been reported to be 20-30%, 75-80%, and 90- 95%, respectively.[4,5,6] If anti-HBs is less than 10 mIU/mL considered as negative, recipient is not protected from HBV infection, and should receive 3 additional doses of Hep B vaccine on the routine schedule, followed by anti-HBs testing 1–2 months later. A recipient of vaccine whose anti-HBs titer remains less than 10 mIU/mL after 6 doses is considered a "non-responde.[7,8] No further serologic testing or vaccination is recommended. It is important to obtain anti-HBs titer especially in HCP. So this study was planned with the objectives of to inquire the Hepatitis B immunization status and to assess awareness about their post vaccination serum titer among nursing staff and lab technicians in a teaching hospital of Ujjain, Madhya Pradesh

METHODOLOGY

After getting the approval from institutional ethical committee, the study was conducted in a teaching hospital of Ujjain Madhya Pradesh. Health care personals (nursing staff and lab technicians) were selected as study participants.266 Sample size was calculated on the basis of prevalence of Hepatitis B vaccination in a previous study[9] and $n=z^2p(110-p)/l^2$ formula was used for calculating the sample size {Where z=90%, p=prevalence (44.8%) L=Absolute error (5%). Sampling was done by using Simple random method. Total number of target population for present study was 383 (total nursing staff and lab technicians at teaching hospital). Each 383 had their employment numbers. The sequence of employment number was taken as it is but labelled from 1 to 383. To choose which will be the study population we used random number table generated by computer. So out of 383 nursing staff, 266 nursing staff and lab technician were taken. Written informed consent was taken from the participants. Participants who gave consent were included in study. Selected participants who were absent at the day of data collection were traced 3 times even after that who were absent, were excluded from study. Next random number participant was taken, generated by computer. Cross sectional observational study design was found to be most suitable design for current study. Study duration was 3 months .Data was collected with the help of proforma containing semi structured questionnaires. In questionnaires participant's socio-demographic information, hepatitis B immunization status and if applicable their anti HBs titer were asked. Dependent/outcome variables were hepatitis B immunization status and anti HBs titer & Independent/ predictor /experimental variable were socio demographic factors, year of experience, designation etc. Data entry and analysis was carried out by using Statistical Package of Social Sciences (SPSS) version -20. The qualitative variables were expressed in proportion and percentages. The difference in proportion was analyzed by applying chi-square test - Alfa error was set at 5% with 95% of confidence

level. It was taken as cut off for commenting statistically significant association .For assuring quality control specific inclusion & exclusion criteria were defined at design stage .In current study there is possibility of selection bias, recall bias, non response bias and confounders.

RESULTS

Table 1 shows study population composed of 68% male. Majority (88%) of participants were nursing staff rest were lab technicians. Only 18 % had experience more than 5 years .Most (63%) of the participants were unaware about their hepatitis B status, no one was known Hepatitis B positive, and 36% were hepatitis B negative. Only 31% individuals were immunized (fully and partially). Of this 31 % ,73 % were fully immunized.

Overall 23% were fully immunized. No one knows about the Anti HBs titre and no one got tested for the same (AntiHBs titer).

Table 1 Distribution of participants according to socio-demographic profile and hepatitis b immunization status

Factors	Frequency (n=266) (%)
Sex	
Male	182 (68.4)
Female	84 (31.6)
Designation	
Nursing staff	235 (88.3)
Technician	31 (11.7)
Years of experience	
Less than five years	219 (82.3)
More than five years	47 (17.7)
Hepatitis B status	
Positive	0 (0)
Negative	97 (36.5)
Not known	169 (63.5)
Hepatitis B vaccine status	
Immunized	83 (31.2)
Not immunized	183 (68.7)
Doses of Hepatitis vaccine taken	
1	1 (1.2)
2	21 (25)
3	61 (73.4)
Hepatitis B vaccine status	
Fully immunized	61 (22.9)
Partially immunized	22 (8.27)
Not immunized	183 (68.79)
Time of vaccination	
Within 3 years	34 (55.7)
Before more than 3 years	27 (44.3)
Knowledge about AntiHbs	
Yes	0 (0)
No	266 (100)
AntiHbs. test done	
Yes	0 (0)
No	266 (100)

Table 2 Cross table between Immunization status and sex and years of experience

Indicators	Immunized	Unimmunized	Total	p-value
Sex				
Male	31	151	182	0.001
Female	30	54	84	
Total	61(23%)	205(77%)	266(100%)	
Year of experience				
<5 yrs	45	174	219	0.039
>5 yrs	16	31	47	
Total	61(23%)	205(77%)	266(100%)	

Table 2 shows that out of 182 male health care providers 17% males (31) were immunized for hepatitis B and out of 84 females 35.7%(30) females were immunized against Hepatitis B infection. So females were found to have better immunization rate . Sex was found to be associated with the immunization status of study participants. This association was statistically significant as the p-value was (0.001) for chi square test. Years of experience in health sector is also found to be associated with Hepatitis B immunization status. This association was also statistically significant as the p value was (0.039) for chi square test.

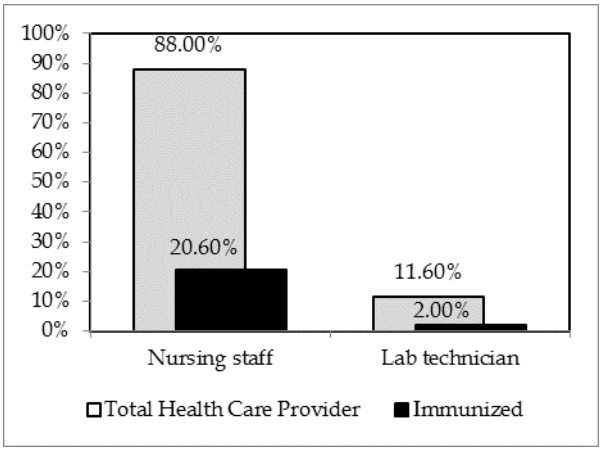

Fig 1: Immunization status of staff

DISCUSSION

Current study was planned with the objectives to assess the hepatitis B immunization status and post vaccination serological titer of nursing staff and lab technicians of teaching hospital of Ujjain. Main results of the study were 23% participants were fully immunised. Not a single participant had knowledge about the importance of post vaccination serological testing. Among immunized participants no one was tested for post vaccination anti HBs titer. The reason behind these results may be the unawareness and somewhat ignorant behaviour of staff and institutions. No compulsion of testing of hepatitis B status, Hepatitis B vaccination status

and post vaccination serological testing before employment is also may be an important cause behind this status. In most of the western states, it is advised that before entering nursing and medical schools and before employment in healthcare settings, vaccination or demonstration of immunization against HBV must be recorded for legal and medical reasons, and if not immunized, they need to be vaccinated.

Vijaya Doddaiah, Katta Janakiram, Shakthi Ramamurthy et al[10] conducted a similar study but the difference with current study was that they have tested for post hepatitis B Vaccination titer of participants and in current study we only inquired about their post vaccination titer status, if ever done.They Concluded that 23.5% had history of complete vaccination (as similar to current study) and 76.49% had incomplete vaccination (1/2 doses). 72.01% were immune and 27.98% non immune. Maria Ganczak.[11]Concluded by a study that only few health care provider (16%) had undergone anti HBs titer and among them around 12% were found to be non –immune. HNH Kumar, RP Nambiar, S Mohapatra, A Khanna ,R Praveen DS Bhawna et al [12] concluded that Nearly all (93.8%) of the HCWs surveyed had taken 1 dose of hepatitis B vaccine. However, only 57.1% completed the primary series of 3 doses and only 26.4% had taken 1 or more booster doses. Averhoff F, Mahoney F, Coleman P, Schatz G, Hurwitz E, Margoli s H [13] conducted a study to know the post immunization serology and concluded that among staff members, 93.3% reached anti-HBs protective titres after the third vaccine dose. M.S. Memon, S. Ansari, R. Nizamani et al [14]Conducted a study and concluded that only 19% nursing assistant were immunized as also seen in current study.Saroshe S, Pandey D, Dixit Set al[15]revealed by their study that36.67% of nurses of government hospital and 93.33% nurses of Private Hospital were vaccinated against Hepatitis B. Batraa, A. Goswamib S. Dadhichb et al[16] concluded by their study that 50% participants were not immunized against hepatitis B. Out of vaccinated 30% had anti-HBs titre <10 mIU/Ml. A Kaur, R. S. Gambhir, S. Singh[17] revealed that immunization status of participants were found to be associated with the awareness about Hepatitis B. T. Reang*, T. Chakraborty, M. Sarker et al[18] concluded that eighty five percent (84.7%) respondents were vaccinated with three doses of Hepatitis B vaccine. S.C.Joshi, G.Joshi, Y.Singh et al[19] revealed that 49 % were fully immunized. Y.S. Yimer, M.S. Mohammed, K. M. Muhammed et al[20] relieved only 35.8% were fully vaccinated. Nurses from Better Socio economic status, more knowledge level and nurses with history of needle prick was found to be more immunized .While in current study hepatitis B immunization status find to be associated with sex and year of experience.

CONCLUSION

Health care providers are at occupational risk of many blood born infections, Hepatitis B is one of the most frequent among them. Very less (22%) participants were immunized for hepatitis B .No participant was found with known positive Hepatitis B infection. None had ever gone through AntiHBs test. There is a need of guidelines for health care providers. There should be provision of preplacement basic investigation so that some basic immunization and disease status of health care providers should be known. It's important because either they may get infected or they can spread the infections.

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