

ORIGINAL ARTICLE

PREVALENCE OF HEPATITIS B VIRUS INFECTION IN HEALTH CARE WORKERS OF A TERTIARY CARE HOSPITAL

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ABSTRACT

Introduction and objective: Hepatitis B infection is recognized as one of the occupational hazards among Health Care Workers (HCW). The purpose of this study was to estimate the prevalence of Hepatitis B infection among HCW in a Tertiary care Hospital.

Material and method: 500 HCWs (159 physicians, 119 nurses, 49 medical laboratory technicians, 50 sanitary staff members and 119 medical students) aged between 22 and 58 years were included in the surveillance. Serum samples were screened for presence of HBsAg, HBeAg and anti-HBc with the help of ELISA.

Results: The highest proportion of HBsAg positivity was found among laboratory technicians (4.1%) followed by nurses (1.7%). The distribution of the HBsAg was not associated with age and gender. However, the positive rates of HBsAg were the highest for the HCWs with greater than thirty years in job, with overall positivity of 2.4% (1/41) (odds ratio: 1.06, *p* value: 0.01), suggesting greater exposure to blood and other putative risk factors. Among the 5 HBsAg positive participants, 4 were chronic carrier and one is progressing towards the chronic infection. None of them were positive for HBeAg, which is suggesting that there is decreased risk of transmission.

Conclusion: Based on this surveillance, we can make reasonable decisions in case of occupational exposure to hepatitis B virus. Thus, in order to prevent the nosocomial infection of hepatitis, we advocate precaution and protection from sharp injuries. Health care workers should be made aware of hazards, preventive measures and post-exposure prophylaxis to needle-stick injuries. A hospital-wide hepatitis immunization programmed should also be started.

Key words: Health care workers, HBsAg, Hepatitis, Occupational hazards

INTRODUCTION

Hepatitis B, a global but preventable disease, is estimated to affect at least 2 billion individuals worldwide, and 350 million among them are suffering from chronic hepatitis B virus (HBV) infection¹. Transmission of HBV occurs through percutaneous or permucosal exposure to infective body fluids. In addition to sexual contact and drug injection, nosocomial transmission should not be neglected as a risk factor, even in hospitals with high hygiene standards. Literature shows that this form of transmission is not unique, numerous cases of HBV-infected health care workers (HCWs) who potentially perform exposure prone procedures (EPPs) have been reported, as reviewed by Mele and Gunson^{2,3}. In India, the exact incidence of nosocomial HBV transmissions is unknown, but various measures have been

implemented in recent years to reduce nosocomial HBV infections such as improved hygiene, increased vaccine coverage, increased awareness of medical staff, and highly sensitive testing of blood products⁴. On the other hand the number of invasive diagnostic and therapeutic procedures is increasing⁵ thereby further increasing the risk of HCWs for getting an infection with HBV; therefore, HBV vaccination has been strongly recommended for them. However, studies on the HBV-markers for HCWs in India are rare. Thus in this study an attempt has been made to determine the seroprevalence of HBsAg in HCWs with the objective of providing data that might help to improve preventive measures and national surveillance.

MATERIAL AND METHOD

This cross-sectional study was designed to determine the prevalence of hepatitis B infection among HCWs, defined by persons working in medical profession for at least 20 weeks i.e. performing EPPs, not performing EPPs, or potentially performing EPPs in the future. The latter category applied to medical students who do not yet perform invasive procedures. 500 participants (312 males and 188 females) of varying age were enrolled which include: Resident doctors (n = 159; 112 males and 47 females), Sanitary staff (n = 54; 45 males and 9 females), Medical students (n = 119; 90 males and 29 females), Staff nurses (n = 119; 30 males and 89 females) and Medical laboratory technicians (n = 49; 35 males and 14 females). Anyone inoculated at least once was classified as the vaccinated: according to the number of doses, they were divided into the complete (3 or more) and incomplete (1 or 2) vaccinated groups. Participants with known HBsAg, history of unsafe blood transfusion, parenteral drug abusers, spouse of hepatitis B patients, lack of approval by physician and persons showing disinterest were excluded from the study.

Information on demographics (such as gender, age, education, economic status, and residency), occupation, parenteral exposures, sexual partners, vaccination status, duration of employment, medication and history suggestive of any systemic illness were collected through a self-administered questionnaire. Present and past history of each case was recorded in detail.

A sample of blood was drawn with an aseptic technique and was collected in plain vial. Serum was separated by centrifugation and were tested for HBsAg [by Enzyme Linked Immunosorbant assay (ELISA)] using commercially available kits (Genedia, Green Cross, Korea). Tests were carried out by an ELISA reader

(LISA PLUS, Rapid Diagnostics, New Delhi). All the positive HBsAg positive samples were then screened for HBeAg and anti-HBc by immunocomb technique (EIA) solid phase ELISA (Orgenics Ltd, Israel). This study was carried out from January 2010 to December 2010 and was approved by Institutional Human Research Ethical Committee. Written informed consent was obtained from all participants. All statistical analysis was done using SPSS for Window software, version 15. For all analyses, the nominal level of statistical significance was <0.05.

RESULTS

The overall positive rates of HBsAg were 1% (5/500) and none of them had previous vaccination histories (Table 1). The trend was similar when the sexes were examined separately, and no significant difference with age, education, socio-economic status and other lifestyle variations was found. However, according to duration of profession, the positive rates of HBsAg were the highest for the HCWs with greater than thirty years in the job, with overall positivity of 2.4% (1/41) (odds ratio: 1.06, p value: 0.01) (Table 1 and 3).

Table 1: Sero-positivity among serving HCW according to duration of profession

Duration of Profession	Samples	HBsAg positive (%)
0-15	341	2 (0.6)
16-30	118	2 (1.7)
>30	41	1 (2.4)
Total	500	5 (1)

Table 2: Sero-positivity among serving health care workers according to occupation

Occupation	Samples	Vaccinated	Unvaccinated	HBsAg Positive (%)
Resident	159	120	39	-
Nurses	119	53	66	2 (1.7)
Lab. Tech	49	18	31	2 (4.1)
Sanitary staff	54	17	37	1 (1.9)
Students	119	63	56	-

Table 3: Odds ratio and 95% CI for HBsAg according to different variables

Variables	Odds ratio	95% CI	p value
Duration of profession			
0 – 15	Ref.		
16 – 30	1.01	0.22–0.86	0.71
> 30	1.08	1.01–1.09	0.01
Occupation			
Physician	Ref.		
Staff nurses	1.45	0.69–3.5	0.61
Sanitary staff members	1.18	0.89–2.78	0.68
Medical lab. technicians	1.89	0.49–4.05	0.67

According to occupations, the positive rate of HBsAg was the highest in the medical laboratory technicians

group (4.1%) followed by nurses (1.7%) (Table 2). The odds ratios for the nurses, technicians and sanitary staff were slightly elevated, but this was statistically insignificant (Table 3).

Among the 5 HBsAg positive cases, 4 cases (80%) (2 nurses, 1 sanitary staff member and 1 laboratory technician) had previous history of jaundice, surgery or blood transfusion. Out of the 5 HCWs screened 4 were chronic carrier and one had acute infection. Progressing towards the chronic carrier, none of them found to be positive for HBeAg.

DISCUSSION

Hepatitis B infection is a leading cause of morbidity and mortality, not only because of the acute illness but

also due to its chronic sequelae like chronic hepatitis, cirrhosis and hepatocellular carcinoma, and accounting for more than a million deaths annually worldwide⁶⁻⁸. Besides other modes of infection, nosocomial transmission is one of the major modes of infection and risk factor and it was first emphasized in early fifties when serum hepatitis cases occurred in health personnel after the percutaneous exposure to the blood of the same patient⁹.

Various epidemiological and cross-sectional studies have reported marked variation in the prevalence of HBsAg among HCWs¹⁰⁻¹². A study of CDC (USA) estimated the annual risk of HBV infection 2% among of laboratory technicians, 1% among physicians, and 0.7% among nurses^{13,14}. In the present study, overall prevalence among HCWs was 1%. The positive rates of HBsAg in the laboratory technician group (4.1%) were highest followed by nurses (1.7%) among the occupational groups. This suggested that these groups have more chances to be exposed to the needle stick injury or other infectious body fluid from patients than did the other occupational groups. Further, it was observed that, the positive rates of HBsAg were significantly related to the duration of profession (Table 1 and 3) as in accordance with other recent studies^{15,16}. Thus, specific measures should be implemented to reduce such risk. These may include strict policies on sharps and considering any blood or other body fluids being a potential risk¹⁷.

In order to prevent the nosocomial infection of hepatitis, we advocate precaution and protection from sharp injuries. Health care workers should be made aware of hazards, preventive measures and post-exposure prophylaxis to needle-stick injuries. A hospital-wide hepatitis immunization programmed should also be started.

Nonetheless, this study has few limitations, firstly, use of less sensitive techniques, secondly, the design was cross-sectional and therefore, casual relationship cannot be ascertained, in spite of all these, this study have provided sufficient base for developing a proper preventive guidelines and educational programs for the care of health care providers.

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