

Full Length Research Paper

Prevalence of Hepatitis B and Hepatitis C Viruses among Nurses and nursing students in a Medical College Hospital in Southern Tamil Nadu, India

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Healthcare workers especially nurses have an elevated risk of acquiring and transmitting parenteral infections. The aim of this study was to evaluate the prevalence of Hepatitis B virus (HBV) and Hepatitis C virus (HCV) markers with the final goal to encourage HBV vaccination of the non-immune Indian Nurse. A total of 442 samples were screened from July 2010 to June 2011. They were screened for the presence of hepatitis B surface antigen (HBs Ag), antibodies to Hepatitis B core antigen (anti-HBc) and Hepatitis B Surface antigen (anti-HBs) and anti-HCV antibodies by the third generation ELISA. The HBsAg, anti-HBc antibodies and anti-HBs antibodies prevalence were 1.13 %, 14% and 28% respectively. Anti-HCV antibody was not detected in any of the Nurses screened. The presence of anti-HBc increased with age from 5% in those 18-24 years old to 12% in those more than 50 years old. Of the 124 anti-HBs positive cases 96(77%) were anti-HBc negative and this was significantly associated with a past history of HBV Vaccinations. None were positive for anti-HCV antibodies. A moderate HBV infection rate and low HBV vaccination coverage were found in the study. India is a tropical country still endemic for HBV infection and new strategies to promote HBV vaccinations are to be adopted.

Keywords: Healthcare workers, Hepatitis C virus, Hepatitis B surface antigen, Indian nurse, ELISA

INTRODUCTION

Hepatitis B virus (HBV) infection is a well recognized Occupational risk for healthcare workers. Mast E.E. et.al (1993) Hepatitis C is an emerging infection in India and an important pathogen causing liver disease in India. The high risk of chronicity of these blood-borne infections and their association with hepatocellular carcinoma is of public health importance. Mukhopadhyaya A (2008). The factors attributed to the high prevalence are exposure to blood and blood products of infected patients. Dienstag JL et.al (1982) Blood contains the highest HBV titers and is the most important vehicle of transmission in the healthcare setting. HBV is relatively stable in the environment remains viable for at least 7 days in environmental surfaces at room temperature. Bond WW et.al (1981)

Because of the high risk of HBV infection among healthcare workers routine pre exposure vaccination of healthcare workers against Hepatitis B and the use of

universal precautions to prevent exposure to blood and other potentially infectious body fluids have been recommended in many countries since the vaccine became available in the early 1980s. In the United States, regulations issued by the occupational health and safety administration have increased compliance with these recommendations. Mahaney FJ et.al (1997), Agerton TB et.al (1995)

It has been estimated that the global prevalence of Hepatitis C virus (HCV) infection is around 2%, with 170 million persons chronically infected with the virus and 3 to 4 million persons newly infected each year. Shepard CW et.al (2005) It is the leading cause of liver transplantation and the most common chronic blood borne infection in developed countries like the USA.

Since test for HBsAg and anti-HBs have become available, several studies of prevalence of these markers have been published in which hepatitis B surface antigenemia approximated 1% and that of anti-HBs fell in the range of 15-70%. Grop PJ et.al (1981), Hapaz R, et.al (1996), Lewis TL et.al (1973), Pattisan CP et.al (1975)

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Table 1. Distribution of variables among the HBsAg positive cases

History	HBsAg Positive
Injury	2
Visit to Dentist and Blood Transfusion	1
Recent / Past HBV infection	0
Frequent IV infections	1
Wearing gloves	1

Table 2. HBsAg positivity in relation to age group:-

Age group (Years)	Number of subjects	HBsAg positive
11 - 20	75	0
21 – 30	205	4(1.95%)
31 – 40	76	1(1.31%)
41 – 50	48	0
>50	18	0

Majority of the Nursing Staff were of 21 to 30 years of age. Most of the positive cases also belonged to this group (4 out of 5).

Objectives

1. The study was undertaken to evaluate the prevalence of Hepatitis B virus (HBV) and Hepatitis C virus (HCV) markers among nursing personnel in a medical college Hospital in south Tamil Nadu, India.
2. To encourage HBV vaccination of the Indian Nurse.
3. To determine the risks and educate the nurses about the occupational hazards of Blood-borne infections.

MATERIAL AND METHODS

The study was done at the teaching hospital of Sree Mookambika Institute of Medical Sciences, which is a 500 bed hospital located in southern Tamil Nadu, India. Data collection was done by a retrospective review between July 2010 and June 2011. Nurses and nursing students who were Subjects, were selected using a computerized randomization technique based on Nursing staff medical record numbers, with equal probabilities, using a stratified random sampling method.

A self assessment questionnaire Rabi yacoub et.al (2010) was designed and filled to assess Hepatitis history and potential exposure risks for each subject. The questionnaire included Demographic data, Employment history, History of vaccinations against HBV, history of clinical hepatitis and potential exposure that is blood transfusion or frequency of needle stick injuries etc. The study group consisted of the 510 nursing personnel to whom Questionnaires were distributed and in total, 442 HCWs responded (86.6%). Of the 442 Nursing staff, 44 were senior staff nurses, 66 junior staff nurses (< 3 year experience), 52 nursing interns and 280 nursing students.

Out of 422 Nurses, 151 had the history of Vaccination against HBV.

The consent was obtained from each participant of the study and was briefed about the purpose of the study. About 5ml of blood was collected under strict biosafety. The sample was allowed to clot at 4⁰ c overnight. Sera were separated by centrifugation at 3000 revolutions per minute (rpm) for five minutes, and stored at -20⁰ c till the time of testing.

Hepatitis B surface antigen (HBs Ag) and antibodies to hepatitis B core (anti-HBc), Hepatitis B surface antigen (anti-HBs) and anti-HCV antibodies were carried out using Third generation enzyme Immunoassays (Genedia HBsAg ELISA 3.0). The kits were supplied by Vitro Diagnostics Limited. All the Positive samples were retested in duplicate.

RESULTS

Out of 442 Nursing staff, Five (1.13%) were positive for HBsAg, 62(14%) had anti-HBc and 124(28%) had anti-HBs antibodies. None were positive for anti-HCV antibodies. The median age was 32 years.

History of blood transfusion was given by 32 (7.2%), Visit to dentists 84 (19%), Intravenous injections 109(24.6%), injuries during procedures 164(37%) and wearing of gloves during procedures 228(51.5%).

Five subjects who were found positive for HBs Ag, two were junior nurses, one senior nurse, one intern and one student. None of them gave the history of recent or past infection, Two of them had the history of injury, one of them visit to dentist and of blood transfusion and one of frequent intravenous injections, one of them gave the

Table 3. HBsAg positivity in different categories of nurses

Category	No of Nurses	HBsAg Positive
Senior staff nurse	42	1(2.4%)
Junior staff nurse	96	2(2.1%)
Intern	86	1 (1.1%)
Nursing students	218	1(0.4%)

Table 4. HBSsAg positivity in relation to vaccination status.

Vaccination status	No of Nurses	HBS Ag positive
Fully vaccinated	124	0
Incomplete course	42	1(2.38%)
Not vaccinated	276	4(1.44%)
Total	442	5(1.13%)

history of wearing gloves during procedure.

DISCUSSION

Out of 442 Nurses tested, Five were positive for HBs Ag (1.13%). This was significantly more than the prevalence of HBsAg in general population in different parts of India. The prevalence was 0.1% in the general population of Delhi as per the study of sama et .al (1971). Studies conducted in western countries also have shown 2–10 times higher prevalence of serologic markers for Hepatitis B virus in healthcare workers: Denes AE, et.al (1978), Maynard JE et.al (1978), Palmer DL et.al(1983)

The prevalence of 1.13% in this study is less than that observed in same of the previous Indian studies. Sukriti et.al (2008). This difference may be due to the fact that more and more of healthcare workers are vaccinated now, as vaccine against Hepatitis B has become freely available.

The history of injury (37%) during surgical and other routine procedures are one of the major sources of percutaneous transmission of HBV infection. Mahmood A. et.al (1999) Blood transfusion is also major source of HBV infection. McQuillan et.al (1999) The Contaminated dental instruments may cause HBV infection because the presence of HBs Ag in saliva in acute and chronic Hepatitis B patients has been documented as possible sources of infection. Fazli. Z et.al (1998) Sharing razors may also cause infection. Bukhari, S.M et.al (1999)

Only one (20%) of our Five HBs Ag positive cases gave a history of wearing gloves during routine procedures. Four (80%) cases did not wear gloves so percutaneous transmission may be the cause of infection. Fox, J.A (1996)

All the positive cases were below 40 years of age. This is because there is more chance of acquiring infections

as they deal with bulk of work including procedures like sample collection and administering inject able medicines and hence the contact with blood and blood products, needle pricks etc was more. Also most of them were unimmunized when entering health care services.

The significant difference in HBsAg positivity among vaccinated and non-vaccinated / incomplete vaccination groups calls for complete immunization of all the healthcare workers.

CONCLUSION

As persistence of HBV infection has grave consequences and no satisfactory treatment is available for, the Nursing staff should take all the preventive measures to save themselves of this menace. All the staff should be given vaccination for HBV at the start of their career. All healthcare workers should be educated regarding universal precautions.

In the United States there has been a dramatic decrease in the Prevalence of HBsAg among healthcare workers and they are now at lower risk of hepatitis-B than general population. This interesting observation is food for thought for those making immunizations policies in India.

REFERENCES

- Agerton TB, Mahoney FJ, polish LB, Shapiro CN (1995). Impact of the blood borne pathogen standard on vaccinations of healthcare workers with hep B vaccine. *Infection control Hospital epidemiol.*16:287-91
- Bond WW, Favero MS, peterson NJ , Gravelle CR , Ebert JW, Maynard JE (1981). Survival of hepatitis B virus after drying and storage for one week. *Lancet* 1:550-551.
- Bukhari SM, Khatoun N, Iqbal A, provide names of other authors (1999). prevalence of hepatitis B antigenemia in mayo Hospital,

- lahore, *Biomedica* 15:88-91.
- Denes AE, Smith JL, Maynard JF provide names of other authors (1978). Hepatitis B infections in physicians. Results of a nationwide survey, *JAMA* 239:210-212.
- Dienstag JL, Ryan DM (1982). Occupational exposure to Hep B virus in hospital Personnel; infection or immunization. *Am. J. epidemiol.* 115: 26 – 39.
- Fazli Z, Asghar H, Baig NU provide names of other authors (1998). prevalence of hepatitis B virus in Dental clinic in Rawalpindi / Islamabad. *J.Pakistan Med. Assoc.*48:259.
- Fox JA (1996). Hepatitis B and the theatre nurse. *British J. Theatre nurses* 6: 26-9, 31
- Grop PJ, Bischof B, Naeff F (1981). cluster of Hep B. transmitted by a physician *The lancet* 121: 8-20.
- Hapaz R, Seidlein LV, Averhoff FM provide names of other authors (1996). Transmission of hep B virus to multiple patients from a surgen without evidence of inadequate infection control. *The new Eng. J. med.* 334: 549-54.
- Lewis TL, Alter HL, Chatmees TC provide names of other authors (1973). A comparision of the frequency of Hepatitis B antigen and antibodies in hospitalised patients and hospital personnal. *New Eng. Med.* 289: 647.
- Mahaney FJ, Stewark K, Hu H, Coleman P,Alter MJ (1997). Progress toward the elimination of Hep B virus transmission among healthcare workers in the united states. *Arch. intern med.* 157:2601-5.
- Mahmood A, Rehman Z (1999). prevalence of Hepatitis B-core antibodies amongst healthcare workers. *JCPSP* 9:529-31.
- Mast EE, Alter MJ (1993). prevention of hepatitis B virus infection among healthcare workers. In Ellis RW, Ed. *Hep B vaccines ins clinical practice.* Marcel Dekker inc, west point Pp. 295 – 307.
- Maynard JE (1978). Viral Hepatitis as an occupational hazard in the healthcare profession : IN: Vyas GN, Cohen SN, Schmid R,eds. *Viral Hepatitis*, Philadelphia Franklin Institute press:321-31
- McQuillan GJ Patrick Coleman Deanna Kruszon-moran provide names of other authors (1999). Prevalence of hepatitis B infections in the united states. *American J. public Health* 89:14-18.
- Mukhopadhy A (2008). Hepatitis C in India; *J. Biosci.*; 33: 465–473
- Palmer DL ,Barash M. King R provide names of other authors (1983). Hepatitis among hospital employees. *The western J. med.* 138:519-23.
- Pattisan CP, Maynard JE, Berquist KR provide names of other authors (1975). Epidemiology of hepatitis B in hospital personnel. *Am. J. epidemiol.* 105:59-64.
- Rabi Yacoub, Radwan Al Ali, provide names of other authors (2010). Hepatitis B vaccination status and needlestick injuries among healthcare workers in Syria. *J. Glo. Infect. Dis.* Pp. 28-34
- Sama SK Anand S, malaviya N provide names of other authors (1971). Australia antigen in normal population and patients of viral hepatitis in Delhi. *Ind. J. Med. Res.* 59: 64-08.
- Shepard C W, Finelli L and Alter M J 2005 Global epidemiology of hepatitis C virus infection; *Lancet Infect. Dis.* 5: 558–567
- Sukriti, Pati NT, Sethi A, Agrawal K, Agrawal K, Kumar GT, provide names of other authors (2008). Low levels of awareness, vaccine coverage, and the need for boosters among health care workers in tertiary care hospitals in India. *J. Gastroenterol. Hepatol.* 23:1710 5.