Prevalence of HBV & HCV Infection and Adequacy of HBV Vaccination among Healthcare Workers - A Sero Epidemiological Survey and Knowledge, Attitude & Practice (KAP) Study

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ABSTRACT

Background: Health Care Workers (HCWs) acquiring hepatotropic blood borne viral infections from work place is common. HCWs should be aware of health consequences, safety practices, preventive strategy and post exposure prophylaxis pertaining to these blood borne infections.

Methods: We evaluated the awareness of HCWs (Doctors, Nurses, Paramedical staff) on mode of transmission, health consequences of infection, preventive and therapeutic options available for Hepatitis B and C using a structured K.A.P. questionnaire (Knowledge, Attitude and Practice). Sero virological assessment to identify the prevalence of HBV and HCV infections were carried out-HBsAg, AntiHBc (total core) and anti HCV.HBV vaccination status was also assessed by history of vaccination and serological assessment of anti HBs titers.

Results: 98 % of participants were aware of health consequences of an accidental exposure and were concerned about follow up. Four (0.8%) were found to be anti HCV positive but turned out to be RNA negative. None were HBsAg positive. Protective (> 10 IU/mL) anti-hepatitis B surface (anti-HBs) antibody titers were seen in 86%. 83.7 % had taken all three doses but only 34% had checked Anti HBS titer after full course of vaccination. Protective antiHBc titres did not wane of even in those with >25 years of practice after vaccination. Surprisingly more proportion of nurses (93.5%) as compared to doctors (72.4%) was fully vaccinated.

Conclusion: Most of the Health Care workers (98%) were aware of occupational risks of HBV and HCV infections and also were aware of significance of HBV vaccination but only 34% received complete HBV vaccination by definition. The need to check anti HBs titer after completing the course of vaccination has to be stressed, since in the event of accidental exposure whether to administer hepatitis B immunoglobulin depends on post vaccination antibody titers. There is need to ensure mandatory vaccination against HBV infection among HCWs and ensure complete and consistent adherence to standard safety measures as well as post exposure prophylaxis protocols pertaining to HBV and HCV in the workplace.

Keywords: Occupational risk, Health awareness, KAP study, Sero-virological assessment

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INTRODUCTION

Hepatitis B virus (HBV) infection and Hepatitis C virus (HCV) infection are among the commonest occupational risks healthcare workers (HCW) are exposed to.[1] The prevalence of Hepatitis B surface antigen (HBsAg) among general population in India is between 2-7%, while the risk of acquiring HBV infection by Health care workers (HCW) is almost four times greater than that of general adult population.[2] The infections are acquired in the hospital setting via needle prick injuries from contaminated needles, splashing of infected body fluids into the eyes or broken skin. Among the health care workers, operation theatre and laboratory staff are at a higher risk of HBV and HCV infection. Throughout the world, it is estimated that 6-8 million cut injuries occur per year, out of which approximately 50% are not reported.[3] It is imperative that HCWs should be aware of safety practices and preventive strategy for these blood borne infections. We evaluated the prevalence of HBV and HCV infection along with awareness of health care workers

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on mode of transmission, health consequences of infection, preventive and therapeutic options available for these two hepatoviral infections. HBV vaccination status was also assessed by history of vaccination and serological assessment of anti HBs titers amongst HCWs in Amrita Institute of Medical Sciences (AIMS), a tertiary care teaching hospital in Kochi, Kerala, India.

METHODS

This was a cross-sectional study conducted by Centre for Liver Diseases, Amrita Institute of Medical Sciences (AIMS), Kochi, Kerala, India. AIMS is a 1400 bedded teaching hospital serving as training center for undergraduate, postgraduate & post doctoral trainees, resident doctors, fellows and nursing students. The study population consisted of doctors, nurses, laboratory, operation theatre and ward staff. A 15 -item structured questionnaire based on participant characteristics, vaccination status and awareness of HBV& HCV was given to the participants. Informed written consent was obtained from each participant. The identity of participants was masked and participants were ascribed a code number for submitting filled up questionnaireand blood samplesdrawn. Four serological analysis (HBsAg, Anti HCV Ab, Anti HBs Ab, antiHBc (total core Ab) were performed. Anti-HBs titre of > 10 mIU/ mL were considered protective.

STATISTICAL ANALYSIS

Statistical analysis was done using SPSS version 20 for windows. Results of the categorical variables are given in percentage. Chi –Square test was used for finding the association between two categorical variables. P value < 0.05 is considered as statistically significant.

RESULTS

555 participants were enrolled, out of which 510 responded to the questionnaire including 133 males (25.1 %) and 387 females (74.9%). The majority of the participants belonged to the age group 20-30 years (range 20-70 years). Considering duration of clinical practice, majority fell into period of 10-15 years (range 1-35years). Doctors comprised of 40.9% (208); 49.2 % (250) were nurses and 9.9 % (52) were lab personnel **(figure 1).**

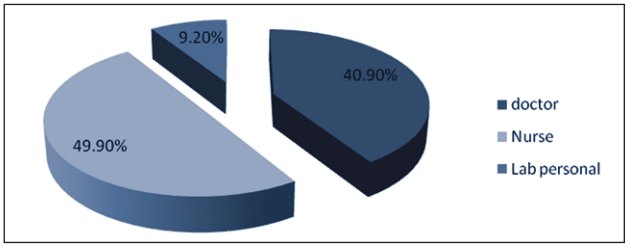

Figure 1. **Study Participants**

Exposure

255 (50.6 %) responders had a cut/needle prick/splash any time in life, out of which only 37.7 % reported the incident occupational health department or employees OPD. 173 (34.1%) of population received needle prick during work, 42(8.2%) had blood splashing into eyes & 217(42.8%) blood splashing onto skin **(table 1 & figure 2).**

Table 1. Exposure among Health Care Workers

Profession	Needle prick	Accidental cutexposure	Blood splash in eyes	Blood splash on skin
Doctors	36.5%	44.4%	14.1%	42.1%
Nurse	36.6%	55.5%	4.4%	39.7%
Lab personnel	14%	54.2%	4.2%	28.9%

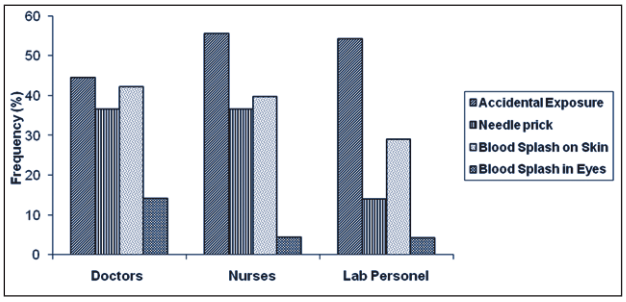

Figure 2. **Exposure among Health care workers**

Awareness

82.9 % of participants were aware about free vaccination offered by AIMS hospital. 83.7 % had taken all three doses and 37% had checked Anti HBS titer after full course of vaccination. 98 % of participants were aware of health consequences of an accidental exposure and concerned about follow up, but still 37.7 % alone had reported exposure events. The Hospital provides Vaccination to HCWs free-of-cost, yet 17 % of our study population was not aware of this fact. To our surprise the awareness to check Anti HBs titer after 3 doses of vaccine was seen only in 34% population. This is particularly important since vaccine non response is of the tune of 5-10%.[4] Those who are non responders ideally should be more cautious in dealing with HBV infected blood body fluids and tissues.

Since the activities of our respondents involve handling tissue and body fluids, it is of great concern that 50.6 % our respondents had accidental exposure in the form of needle prickor blood splash and only about a 37.7% sought post exposure prophylaxis and follow up protocol consistently even when those are available in our Outpatient Employees Health Department .Despite having awarenessabout HBV infection and HBV vaccine, the level of vaccination among the

respondents is low. Although three doses of HBV vaccine was taken by majority, only about a third of the study population had checked Anti HBs titer after three doses of vaccination. (Ideally complete HBV vaccination means- full course Vaccination followed by Anti HBs titer assessment).

Serological Results

Protective (> 10 IU/mL) anti-hepatitis B surface (anti-HBs) antibody titers were seen in 86%.

1(0.2%) participant was found HBs Ag positive and 4(0.8%) were found to be Anti HCV positive. Total core antibody to HBV (Anti HBc-total core) signifying resolved natural infection was reactive in 4.4 %.

We did not find any change in the immune status with increased years of experience **(figure 3).**

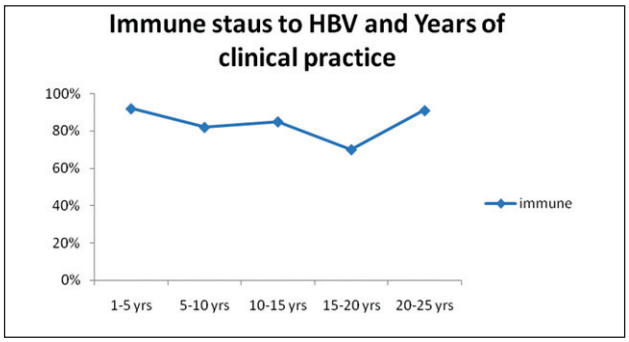

Figure 3. **Immunity status against HBV with duration of experience**

DISCUSSION

Health care workers are individuals whose activities involve potential contact with blood or body fluids from patients. According to World Health Organisation (WHO), the proportion of HCWs in the general population varied substantially from region to region (0.2-2.5%), with average number of injuries per health care workers (0.2 -4.7 sharp injuries per year).[5] Considering this, health workers are at higher risk of contracting HBV and HCV infections than the general population. HBV is 50 to 100 times more infectious than HIV.[6] The need for the adoption of appropriate and consistent safety measures by the health care worker is paramount in view of the prevalence of HBV infection in the general population and the high frequency of potentially contaminating accidents among health care workers.[7,8]

Prevalence of HBV and HCV infection

Prevalance of HCV infection in our study was seen 0.8%, comparing to the other Indian studies among HCW were as follows, Nijhawan et al 5.7 %, Parik et al-1.3%, Duseja et al –0.87%,[9,10,11] Prevalence of HBV infection seen in our study was 0.2%. This is at variance with results of other Indian studies. Cobe et al[12] from Pune showed a prevalence of 3.12% for HBV among HCW. Duseja et el[13] from Chandigarh showed prevalence of 1.7% in health care workers. Shanmughan et al[14] studied 60 HCW and demonstrated a prevalence of 6.6%. Prevalence of HBsAg among HCW in our study is low compared to thecommunity prevalence of HBV. This may be due to the high awareness about HBV infectionor it may as well be a selection bias which crept in due to the fact that the HCWs who already knewtheir HBV status might not have turned up for the voluntary screening fearing potential adverse publicity.

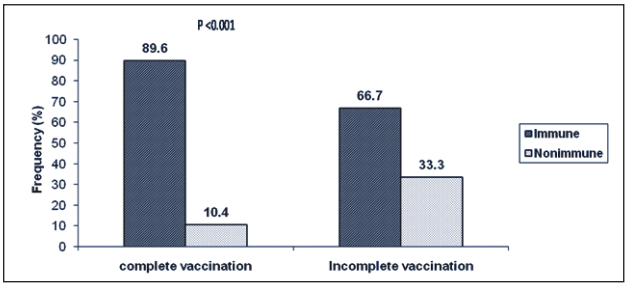

Figure 4. **Immunity with Vaccinated status**

Vaccination

In our study, protective antiHBsAb titers were seen in 89.6% of the cases who were completely vaccinated. Comparing with the study by Nageo et al who studied Japanese dental care workers found 75% of vaccinated subjects developed antibodies to HBV surface antigen.[15] On the contrary, those who were incompletely vaccinated, 66 % had protective immunity **(figure 4).** Probably resolved natural infection as evidenced by 4.4 % of anti HBc (total core) would have been one of the reasons in the participants of incompletely vaccinated group to develop protective antibody level. An interesting observation in our study was that only 72% of the doctors had received full vaccination while 93% of nurses and 82% other staff (laboratory attendants, assistants, and technicians) were

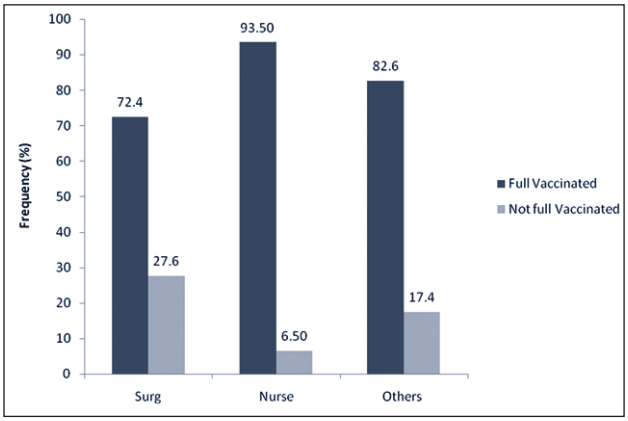

Figure 5. **Vaccination status**

fully vaccinated **(figure 5).**

Although serologic testing for immunity is not necessary after routine vaccination of adults in general population, Post vaccination assessment of Anti Hbs titer is recommended for HCWs. Applying this principle, complete vaccination is seen only in about a third of the study population (full vaccination followed by Anti HBsAg titre assessment).[16]

CONCLUSION

Most of the Health Care workers (98%) were aware of occupational risks of HBV and HCV infections and

also were aware of significance of HBV vaccination but only 34% received complete HBV vaccination by definition.[15] The need to check anti Hbs titer afer completing the course of vaccination has to be stressed since in the event of exposure whether to administer hepatitis B immunoglobulin depends on post vaccination antibody titers. Unfortunately, only about 37.7 % used follow up protocols after an exposure event when it was available in hospital. There is need to ensure mandatory vaccination against HBV infection among HCWs and ensure complete and consistent adherence to standard safety measures against HBV and HCV infection as well as post exposure prophylaxis in the workplace.

END NOTE

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Conflict of Interest: None declared

Editor's Remarks: Hepatotropic blood borne viral diseases are commonly acquired from the work place. The study aims at understanding the knowledge among Health Care workers about the knowledge, attitude and practices regarding the disease. This is probably the first study done on this subject in India.

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