

Awareness and risk perception of hepatitis B infection among auxiliary healthcare workers

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Abstract

Context: Auxiliary healthcare workers (AHCWs) have a higher risk of occupational exposure to hepatitis B virus infection than the general population. Daily handling and exposure to biomedical wastes, blood, and its products make the AHCWs vulnerable to blood borne diseases among which Hepatitis B is one of the world's most common and serious infectious diseases. **Aims:** To evaluate the HBV infection related awareness and occupational risk perception among AHCWs. **Settings and Design:** Survey. **Materials and Methods:** A cross-sectional survey was carried out in M. S. Ramaiah Medical and Dental Hospitals among 300 auxiliary health workers which comprised of laboratory technicians, hygienists, laundry workers, and the housekeeping staff. After acquiring ethical clearance and informed written consent, they were explained about the objective of the study and were requested to fill a standard questionnaire. The data was compiled and subjected to statistical analysis using the Statistical Package for Social Sciences (SPSS) software. **Statistical Analysis Used:** SPSS Software Version 19. **Results:** Our survey revealed that 90.03% of the respondents were aware of hepatitis B infection (HBI) and 67.2% answered questions correctly on risk perception. Only 37% of the respondents correctly answered questions on biomedical waste management. **Conclusions:** Overall, an adequate awareness and a moderate occupational risk perception about HBI were found among the study group. However, knowledge regarding hospital waste disposal was found to be insufficient. Our vision aims at a nation committed to combat silent epidemic of viral hepatitis infection.

Key words: Auxiliary healthcare workers, biomedical waste management, blood borne diseases, hepatitis B infection, infection control, needle stick injury, occupational exposure

INTRODUCTION

Hepatitis B infection (HBI) is one of the major public health problems globally and is the 10th leading cause of death. Worldwide, more than two billion of the population have evidence of past or recent HBV infection and there are more than 350 million chronic carriers of this infection.^[1,2] The number of HBsAg carriers in India has been estimated to be over 40 million. Estimates indicate that annually over

100,000 Indians die due to illness related with HBV infection.^[3]

HBV is a 42 nm DNA virus assigned to the family Hepadnaviridae. The inner core of the virus contains hepatitis B core antigen (HBcAg); hepatitis B e antigen (HBeAg); a partially double-stranded 3,200-nucleotide DNA molecule, and DNA polymerase with reverse transcriptase activity surrounded by an outer lipoprotein envelope containing the surface antigen (HBsAg).^[4] Humans are the only known natural host and the virus circulates in the blood in concentrations as high as 108 virions per ml. Transmission of HBV occurs through percutaneous or permucosal exposure to infective body fluids. In addition to sexual contact and drug injection, nosocomial transmission is also a possibility.^[5]

Blood and blood products are the most common vehicle of transmission in healthcare settings.^[6] With

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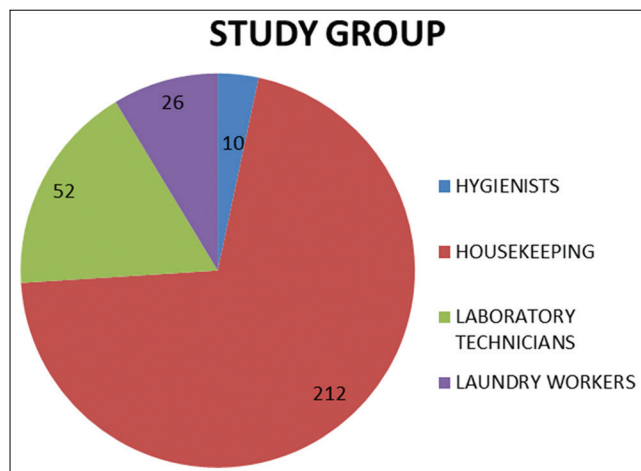
the increasing number of invasive diagnostic and therapeutic procedures, there is an increasing risk of HBV infection to the auxiliary healthcare workers (AHCWs).^[7] The AHCWs constantly come in contact with blood and its products due to daily handling of biomedical wastes and while performing invasive procedures. Hence, it is necessary for them to be aware of HBI and its prevention. In the present study, we have aimed at investigating the HBV infection related awareness and occupational risk perception of the AHCWs.

METERIALS AND METHODS

A cross-sectional survey was carried out in M. S. Ramaiah Medical and Dental Hospitals among 300 AHCWs which comprised of laboratory technicians, hygienists, laundry workers and the housekeeping staff. After ethical clearance and written consent, they were counseled and explained about the objective of the study and were requested to answer a standard questionnaire with multiple choices. The devised questionnaire comprised of 20 questions and was prepared in two languages, one being English and the other in the local language, that is, Kannada. The data was compiled and subjected to statistical analysis. The data was analyzed through Statistical Package for Social Sciences (SPSS) package (IBM SBSS Statistics-Statistical Package for the Social Sciences).

RESULTS

The various groups of AHCWs have been depicted in Figure 1 and the overall responses have been depicted in Figure 2. It was encouraging to find that 96.2% of the 300 AHCWs were vaccinated against HBV.



AQ1 Figure 1: Various groups of auxiliary healthcare workers

Overall, an adequate HBV infection related awareness was found among the group. 96.9% of the respondents knew that the main mode of transmission of Hepatitis B was through blood and its products. More than three quarters (76.3%) of the AHCWs knew that HBI causes liver cancer. Majority of the respondents (93.9%) were aware that HBI could spread through contaminated needles and syringes.

A moderate occupational risk perception was found among the group. Astonishingly, only 40.5% of the AHCWs knew the correct course of action after a needle stick injury. Just about 38.9% of the respondents knew that blood soaked cotton and dressings are discarded in yellow colored bags and 52.7% answered correctly that sharps and needles are disposed in white colored bags. 80.2% of the AHCWs used sharps container to dispose used needles and lancets.

The questions on the awareness and occupational risk perception of HBV infection and the percentage of correct responses are enlisted in Tables 1 and 2, respectively.

DISCUSSION

AHCWs are at a greater risk at contracting blood borne diseases due to their constant contact with blood, body fluids, or sharps contaminated with blood. In the present study we found that there was adequate awareness among the group, but risk perception was found to be moderate. Information regarding biomedical waste management was particularly found to be inadequate and this is a matter of great concern. Suggestions for remedial steps to be taken to prevent nosocomial HBV infection in AHCWs are elaborated in Table 3. Hepatitis B vaccination protocol and needle stick injury prophylaxis are collated in Tables 4 and 5, respectively^[8,9]. Table 6 enlists the hospital waste

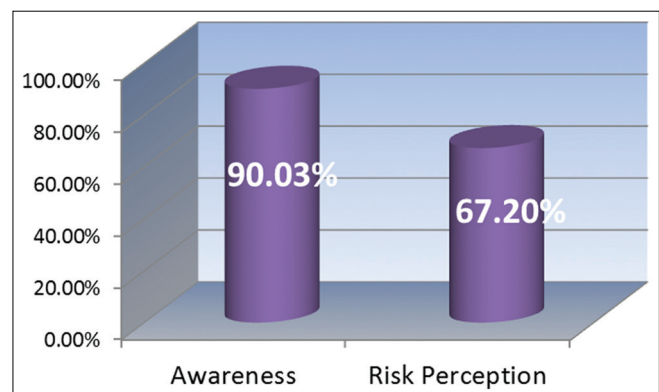


Figure 2: Overall results obtained

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Table 1: Results obtained on the awareness of hepatitis B infection in auxiliary healthcare workers

Variable	Correct option	Frequency (%)
Ever heard of hepatitis B infection?	Yes	91.4
What is hepatitis B	Virus	91.6
Hepatitis B infection spread	Through blood	95.4
Risk factors for hepatitis B infection	Sharing used needles and syringes	93.9
Can hepatitis B infection spread through blood and blood products	Yes	96.9
Can hepatitis B infection be transmitted from a mother to her infant	Yes	90.1
Is hepatitis B infection more easily spread than acquired immunodeficiency syndrome	Yes	87
Can hepatitis B infection cause liver cancer	Yes	76.3
How many doses of hepatitis B vaccine are required for complete protection	3	91.6
Can newborns be vaccinated against hepatitis B infection	Yes	75.6

Table 2: Results obtained on the occupational risk perception of hepatitis B infection in auxiliary healthcare workers

Variable	Correct option	Frequency (%)
Can your profession put you at risk of hepatitis B infection	Yes	92.4
Do you wear gloves while handling medical wastes, biological samples, and doing procedures on patients	Yes	97.7
Do you use a used-needle breaking instrument to dispose used needles and syringes	Yes	80.2
If you get pricked accidentally by a used needle, what will you do	Go to a physician and get screened and vaccinated for hepatitis B	40.5
In which color bags are blood soaked cotton, dressings, etc., discarded	Yellow	38.9
In which color bags are sharps/needles/syringes/scalpels discarded	White/Translucent	52.7
Can an infected health worker transmit hepatitis B infection to a patient	Yes	81.7
Can hepatitis B infection be prevented by vaccination	Yes	97.7
Are you vaccinated against hepatitis B virus	Yes	96.2

Table 3: Remedial steps to prevent nosocomial hepatitis B infection in auxiliary healthcare workers

Health education campaigns, training programs, and workshops on hospital infection control
 Monitoring of effective hospital waste disposal
 Use of personal protective equipment
 Needle stick injuries should be reported to the infection control coordinator and immediate measures taken

management protocol.^[10] Waste not properly managed can lead to serious health implications; therefore, proper waste disposal is mandatory and is protective against blood borne diseases.

In a similar study conducted by Singhal *et al.*, in 2011 they found that a significant number (41.7%) of HCWs were unvaccinated even at an apex healthcare center. Two HCWs were found to be HBsAg positive. The antibody levels were significantly lower in those who were vaccinated more than 5 years ago than those who were vaccinated in last 5 years.^[7] In the present study however, we found that 96.2% of AHCWs were vaccinated.

Table 4: Vaccination protocol for hepatitis B

The vaccination schedule most often used has been three intramuscular injections. The following timing of injections are

1 st dose	At elected date
2 nd dose	4-10 weeks after the 1 st dose
3 rd dose	1-5 months after the 2 nd dose

Dosage and administration
 Paediatric dose vaccine: 10 µg dose (in 0.5 ml suspension) is recommended for neonates, infants, and children up to 10 years of age
 Adult dose vaccine: 20 µg dose (1.0 ml suspension) is recommended for adults and children above 10 years of age
 Booster dose
 It would seem advisable to recommend a booster dose when the anti-HBs antibody titer falls below 10 IU/L, particularly for all people at risk
 After the 0, 1, and 6 month primary immunization schedule a booster dose may be required 5 years after the primary course

Another survey conducted by Carvalho in 2012 in Brazil revealed a seropositivity of 0.5% in students and 8.8% in professionals. They concluded that seroprevalence for previous contact with HBV was 17.6 times higher in professionals than in students.^[11]

Table 5: Guideline following exposure to hepatitis B virus (US public health services)

Vaccination and antibody response status of exposed AHCWs ^a	Treatment (source)		
	HbsAg ^b positive	HbsAg ^b negative	Unknown or not available for testing
Unvaccinated	HBIG ^c ×1 and initiate HB vaccine ^d series	Initiate HB vaccine ^d series	Initiate HB vaccine ^d series
Previously vaccinated			
Known responder ^e	No treatment	No treatment	No treatment
Known non-responder ^f	HBIG×1 and initiate re vaccination or HBIG×2 ^g	No treatment	If known high risk source, treat as if source were HbsAg positive
Antibody response unknown	Test exposed person for anti-HBs ^h If adequate, no treatment is necessary If inadequate ^a administer HBIG×1 and vaccine booster	No treatment	Test exposed person for anti-HBs If adequate, ^f no treatment is necessary If inadequate, ^f administer vaccine booster and recheck titer in 1-2 months

^aPersons who have previously been infected with HBV or immune to reinfection and do not require post exposure prophylaxis, ^bhepatitis B surface antigen, ^chepatitis B immunoglobulin; doses 0.06 ml/kg intramuscularly, ^dhepatitis B vaccine, ^ea responder is a person with adequate levels of serum antibody to HbsAg (i.e. anti-Hbs>10 mIU/ml), ^fa non-responder is a person with inadequate response to vaccination (i.e. anti-Hbs<10 mIU/ml), ^gthe option of giving one dose of HBIG and reinitiating the vaccine series is preferred for non-responders who have not completed a second three dose vaccine series. For persons who previously completed a second vaccine series but failed to respond, two doses of HBIG are preferred, ^hantibody to HbsAg. AHCW = Auxiliary healthcare worker

Table 6: Different categories of waste and their color-coded disposal

Color coding	Waste
Yellow	Human anatomical waste, microbiological and biotechnology waste, solid Waste (disposable plastic items such as gloves)
Red	Soiled waste (non-plastic items such as dressings, cotton, linen, and bandage), solid waste (disposable plastic items such as gloves) Microbiological and biotechnology waste
Blue/white	Waste sharps Lancets Needle hubs Ampules
Black	Discarded medicines and cytotoxic drugs, incinerator ash, chemical waste

Khakhkar Vipul *et al.*, in 2012 screened serum samples for presence of HBsAg, HBeAg, and anti-HBc with the help of enzyme-linked immunosorbent assay (ELISA). They inferred that 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 more than 30 years in job, with overall positivity of 2.4% (1/41) suggesting a greater exposure to blood and other putative risk factors.^[12]

In another survey done by Muhammad S Memon *et al.*, in 2007, a total of 596 (64.6%) participants were immunized for HBV infection and 392 (66.2%) were inoculated three or more than three doses of vaccine. The pre-vaccination HBsAg status was checked in 380 (41.2%) and it was positive in 18 (4.7%) participants.

The frequency of immunization was highest in doctors (92.4%) and lowest in nursing assistants (18.9%).^[13]

A cross-sectional questionnaire based study done by Habib *et al.*, among HCWs in 2011 revealed that overall knowledge were inadequate and behavior and attitude towards clinical practices were found compromised. Sixty-five percent believed that all HCWs are at risk and 89% believed that vaccination provides protection.^[14] In the present study overall awareness was found to be adequate with 90.03% of AHCWs well-informed about HBI. On the other hand, risk perception was found to be inadequate with only 67.2% of AHCWs being well-informed on biomedical waste management.

In a survey conducted by Dannetun *et al.*, in Sweden in 2006, they found that 79% (293/369) of HCWs had received at least one dose of vaccine, but only 40% (147/369) reported that they were fully vaccinated and 21% (76/369) had not been vaccinated at all. The majority of unvaccinated HCWs (72/76, 95%) stated that they would accept vaccination if offered. They concluded that the main barrier to better compliance with the guidelines is not lack of acceptance among the employees, but the failure of the employer to ensure that policies are implemented.^[15]

AHCWs' safety is often overlooked, but these AHCWs comprise an invaluable part of our medical fraternity. It is our duty to ensure their safety.

CONCLUSION

Awareness, precaution, and protection should be advocated in order to prevent the nosocomial spread

of HBI. Therefore, there is a need for well-planned and clear policies for HBV screening, vaccination, and serological response checkups for all HCWs.

Also hospital waste management is an important aspect in preventing the HBI which should not be overlooked. The AHCWs should be trained and periodically monitored for effective hospital waste disposal. Health education campaigns and training programs should be regularly organized for health workers on hospital infection control. Staff safety is a challenge that must be met with a comprehensive effort. A reduction in health disparities can be brought about by a joint effort which should aim at the following:

- Early detection and surveillance of viral hepatitis transmission and disease
- Prevention of liver disease and cancer by improvising treatment and care
- Implementation of vaccines to prevent hepatitis
- Protecting patients and HCWs from hospital acquired viral hepatitis.

Staff safety is a challenge that must be met with a comprehensive effort and they should be made to understand the risks they are exposed to. We need to work towards building a healthcare workforce prepared to prevent and diagnose viral hepatitis and provide care and treatment to infected persons.

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