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
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.

MATERIALS 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.

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
management protocol. Safety 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. In the present study however, we found that 96.2% of AHCWs were vaccinated.

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.

### 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

### Table 4: Vaccination protocol for hepatitis B

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

1st dose: At elected date
2nd dose: 4-10 weeks after the 1st dose
3rd dose: 1-5 months after the 2nd 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
Table 5: Guideline following exposure to hepatitis B virus (US public health services)

| Vaccination and antibody response status of exposed AHCWs\(a\) | HbsAg\(b\) positive | HbsAg\(b\) negative | Unknown or not available for testing |
|---------------------------------------------------------------|----------------------|---------------------|-----------------------------------|
| Unvaccinated                                                  | HBIG\(x1\) and initiate HB vaccine\(d\) series | Initiate HB vaccine\(d\) series | Initiate HB vaccine\(d\) series |
| Previously vaccinated                                         | No treatment         | No treatment        | No treatment                      |
| Known responder                                              | HBIG\(x1\) and initiate re vaccination or HBIG\(x2\) | If known high risk source, treat as if source were HBsAg positive | |
| Known non-responder                                          | HBIG\(x1\) and initiate re vaccination or HBIG\(x2\) | If known high risk source, treat as if source were HBsAg positive | |
| Antibody response unknown                                     | Test exposed person for anti-HBs\(b\) | No treatment | Test exposed person for anti-HBs |
|                                                              | If adequate, no treatment is necessary | If inadequate, administer HBIG\(x1\) and vaccine booster | If adequate, no treatment is necessary |
|                                                              | If inadequate, administer HBIG\(x1\) and vaccine booster | | If inadequate, administer vaccine booster and recheck titer in 1-2 months |

\(a\)Persons who have previously been infected with HBV or immune to reinfection and do not require post exposure prophylaxis, \(b\)hepatitis B surface antigen, \(c\)hepatitis B immunoglobulin, doses 0.06 ml/kg intramuscularly, \(d\)hepatitis B vaccine, \(e\)a responder is a person with adequate levels of serum antibody to HBsAg (i.e. anti-Hbs>10 mIU/ml), \(f\)a non-responder is a person with inadequate response to vaccination (i.e. anti-Hbs<10 mIU/ml), \(g\)the option of giving one dose of HBIG and reintitimating 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, \(h\)antibody 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) |
| Blue/white   | Microbiological and biotechnology waste                               |
| Black        | Waste sharps, lancets, needle hubs, ampules                          |
|              | Discarded medicines and cytotoxic drugs, incinerator ash, chemical waste |

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 HBV.
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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