KNOWLEDGE, AWARENESS & PREVALENCE OF NEEDLE STICK INJURY AMONG STUDENTS OF MEDICAL COLLEGE OF UTTARAKHAND, INDIA

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ABSTRACT

Background and objectives: Needle stick injuries pose a significant risk of transmission of blood borne pathogens. The study was carried out to assess the knowledge, awareness and prevalence of needle stick injury among undergraduates, postgraduates and nursing students of medical college of Uttarakhand.

Methods: A cross-sectional observational study was conducted among undergraduates, postgraduates and nursing students (100 in each category) of the SRHU, Uttarakhand, India. Data was collected on a pre-tested structured questionnaire distributed among the students which consisted of questions to assess the knowledge and awareness towards needle stick injuries.

Results: A total of 300 students participated in the study and completed the questionnaire. Out of these, needle prick injury was reported in 6 undergraduates, 7 postgraduates and 20 nursing students in past twelve months. Out of 300 students, 22% (66) knew the definition of needle stick injury and 58.6% (176) knew the immediate measure to be taken i.e. to wash the wound with soap and water. Out of the 33 students who contracted NSI, 38.5% cannot remember the cause of needle stick injury, while 34.9% mentions the cause of NSI due to the carelessness/accident and 21.7% reports the NSI due to poor disposal of needle. Only 56.6% reported the incident, whereas only 21.7 filled an incident report at integrated counselling and testing centre.

Conclusions: NSI were observed in all categories of Health care workers. Elimination of unnecessary injections, prohibition of recapping, proper disposal and careful handling of sharps following universal work precautions strictly are effective measures of preventing NSI.

INTRODUCTION

A needle stick injury is a percutaneous piercing wound typically set by a needle point, but possibly also by other sharp instruments or objects.

Of the 35 million health-care workers (HCW’s) worldwide, 3 million experience percutaneous exposure to blood pathogens each year: 2 million are exposed to hepatitis B virus (HBV); 0.9 million to hepatitis C virus (HCV) and 170,000 to HIV. As a result of these injuries, 150,000 health-care workers contracted HCV, 70,000 HBV and 500 HIV. More than 90% of these infections occur in developing countries. [1]

Needle stick injuries (NSI) constitute a major hazard for the transmission of viral diseases such as Hepatitis B, Hepatitis C and HIV. The risk of transmission from patient to the healthcare worker is as follows: Hepatitis C (3%), Hepatitis B (30%), and HIV (0.3%) which depends on the viral load of patient. [2]

At least 20 different pathogens are known to have been transmitted by needle stick injuries. [3] Most injuries occur during disposal of used needles (23.7%), during administration of parental injection or infusion therapy (21.2%), drawing blood (16.5%), recapping needles after use (12%), or handling linens or trash containing uncapped needles (16.1%). [4]

Needle stick injury is a significant problem in general practise and exposes general practitioners and practise nurses to a serious risk of infection from blood – borne transmissible agents. Health-care workers in the operating, delivery and emergency rooms and in laboratories have an enhanced risk of exposure. [1] An effective and multifaceted management plan must be prepared for prevention and management of needle stick injuries in health care workers. After an occupational exposure, the health care worker should be counselled about the degree of risk associated with the type of exposure: needle stick injuries pose a greater risk than splashes and those from a hollow-bore needle are a greater risk than from a solid needle. [5]

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REVIEW OF LITERATURE

Needle stick injury (NSI) are wounds caused by sharps such as hypodermic needles, blood collection needles, iv cannulas or needles used to connect parts of intravenous delivery system. In USA 600000 to 100000 receive NSI from conventional needles & sharps every year while in UK it is 100000 HCWs in 1 year. In India, authentic data on NSI are scarce. More than 90% infections occur in developing countries. CDC estimates that each year 385000 needle stick injuries are sustained by hospital based health care personnel.

According to WHO study, the annual estimated proportions of HCWs exposed to blood borne pathogens globally were 2.6% of HCV, 5.9% for HBV & 0.5 % for HIV .

The objective of the study was to assess the knowledge, awareness and prevalence of needle stick injury among undergraduates, postgraduates and nursing students of Swami Rama Himalayan University (SRHU).

MATERIALS AND METHODS

A cross-sectional observational study was conducted among undergraduates, postgraduates and nursing students (100 in each category) of the SRHU, Uttarakhand, India. Students were randomly sampled and who voluntarily participated in the study; the subjects were fully informed about the design and purpose of the study.

A written informed consent was obtained from each participant and anonymity of the participants was maintained throughout the study. Data was collected on a pre-tested structured questionnaire distributed among the students who were asked to fill the questionnaire.

The questionnaire consisted of questions to assess the knowledge and awareness towards needle stick injuries and questionnaire included a brief introduction covering the potential risk of needle stick injuries (questionnaire enclosed). The questionnaire only covered the occupation group. There were no additional questions about gender, age, or name.

There will be no disclosure of persons participated in the feedback process and informed consent will be obtained from participating personnel. The questionnaire aimed to record the details of needle stick injuries within the last 12 months, under each group of students, the HBV vaccination status, circumstances resulting in the sharps incident, and additional contributing factors, e.g., the kind of activity and procedure under which needle stick injury occurred.

RESULTS

A total of 300 students participated in the study and completed the questionnaire; of these 100 were undergraduates (pursuing MBBS), 100 postgraduates (pursuing MD/MS) and 100 nursing students. Out of these, needle prick injury was reported in 6 undergraduates, 7 postgraduates and 20 nursing students in past twelve months. Results regarding the student’s knowledge about needle stick injury are tabulated in table 1.

Out of 300 students, 22% (66) knew the definition of needle stick injury and 58.6% (176) knew the immediate measure to be taken i.e. to wash the wound with soap and water. 11% (33) reported at least one needle stick injury in last twelve months; 6 were undergraduates, 7 were postgraduates and 20 were nursing students.

38.5% cannot remember the cause of needle stick injury, while 34.9% mentions the cause of NSI due to the carelessness/accident and 26.7% reports the NSI due to poor disposal of needle.

Out of the 33 students who contracted NSI, only 56.6% reported the incident, whereas only 21.7 filled an incident report at integrated counselling and testing centre (ICTC).

After calculating the chi square test and p value, the difference of knowledge between the three groups was found to be statistically significant (p<0.05) as shown in table 1.

The data regarding student’s awareness after contracting needle stick injury is tabulated in table 2. It shows that 31.6% (95) knew the importance of post-exposure prophylaxis. On an average 26.6% gave correct answers regarding their knowledge on risk of transmission of important blood borne pathogens like hepatitis B, hepatitis C and HIV.

The percentage of undergraduates who were fully vaccinated for hepatitis B vaccine was 63%, whereas postgraduates were 56% and nursing students were 74%. Overall percentage of vaccination was 64.3% (193).

Out of 300 students, 37% received training in prevention and/or prevention of NSI. Whereas only 19.3% had read the hospital policy on safe disposal of waste products.

DISCUSSION

The medical fraternity has systematically ignored the importance of occupational health and safety. In the present study about 11% of the medical students had at least one episode of NSI in past twelve months. In a similar study by Sumathi Murlidhar et al., a total of 428 HCWs participated in which 343 (80.1%) gave a history of NSI. Another study conducted by Radha R et al with a pre structured questionnaire among 441 respondents.

Data showed that about 57% of HCWs had at least one episode of NSI in the preceding 1 year. These were very high as compared to our study. In our study, 22% (66) knew the definition of needle stick injury and 58.6% (176) knew the immediate measure to be taken i.e. to wash the wound with soap and water. Whereas in a similar study conducted by Radha R et al at Maharashtra showed that on an average 89.23% students had correct knowledge about NSI.
Table I Results (correct answer) regarding the student’s knowledge and prevalence of needlestick injury.

<table>
<thead>
<tr>
<th>Statement regarding knowledge</th>
<th>Undergraduates (n=100)</th>
<th>Postgraduates (n=100)</th>
<th>Nursing students (n=100)</th>
<th>Overall (n=300) %</th>
<th>Chi Square P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition of NSI</td>
<td>29</td>
<td>30</td>
<td>16</td>
<td>22%</td>
<td>6.06</td>
</tr>
<tr>
<td>After NSI it should be washed with soap &amp; water</td>
<td>56</td>
<td>51</td>
<td>69</td>
<td>58.65%</td>
<td>7.12</td>
</tr>
<tr>
<td>How many assisted in removal or disposal of needle</td>
<td>39</td>
<td>91</td>
<td>83</td>
<td>71%</td>
<td>76.2</td>
</tr>
<tr>
<td>Needles after use should not be re-sheathed</td>
<td>45</td>
<td>84</td>
<td>85</td>
<td>71.3%</td>
<td>50.9</td>
</tr>
<tr>
<td>Disposal of sharps in puncture proof container</td>
<td>48</td>
<td>67</td>
<td>70</td>
<td>61.6%</td>
<td>12.0</td>
</tr>
<tr>
<td>Hollow bore needle most commonly involved in NSI</td>
<td>61</td>
<td>54</td>
<td>87</td>
<td>67.3%</td>
<td>27.5</td>
</tr>
<tr>
<td>Sustained NSI in last 12 months</td>
<td>37</td>
<td>22</td>
<td>70</td>
<td>43%</td>
<td>49.2</td>
</tr>
<tr>
<td>Number of injuries</td>
<td>2.1 ± 1.6</td>
<td>2.4 ± 0.53</td>
<td>3.66 ± 1.14</td>
<td>2.72</td>
<td>-</td>
</tr>
<tr>
<td>(mean±SD)</td>
<td>(mean±SD)</td>
<td>(mean±SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common cause of NSI</td>
<td>0%</td>
<td>0%</td>
<td>30%</td>
<td>26.66%</td>
<td>-</td>
</tr>
<tr>
<td>Poor disposal of needle</td>
<td>16.7%</td>
<td>42.9%</td>
<td>45%</td>
<td>34.86%</td>
<td>-</td>
</tr>
<tr>
<td>Carelessness/accident Cannot remember</td>
<td>33.3%</td>
<td>57.1%</td>
<td>25%</td>
<td>38.46%</td>
<td>-</td>
</tr>
<tr>
<td>How many reported the NSI</td>
<td>2 (33.3%)</td>
<td>5 (71.4%)</td>
<td>13 (65%)</td>
<td>56.56%</td>
<td>10.4</td>
</tr>
<tr>
<td>Filled an incident report at ICTC</td>
<td>0</td>
<td>0</td>
<td>13 (65%)</td>
<td>21.66%</td>
<td>-</td>
</tr>
<tr>
<td>Disposal of sharps box when it is ¾ full</td>
<td>49</td>
<td>57</td>
<td>39</td>
<td>55%</td>
<td>2.26</td>
</tr>
<tr>
<td>Never separate needle from syringe</td>
<td>22</td>
<td>45</td>
<td>12</td>
<td>26.3%</td>
<td>29.5</td>
</tr>
</tbody>
</table>

Note: n= number of students, SD= standard deviation

Table II Results (correct answer) regarding the student’s awareness for management of needlestick injury.

<table>
<thead>
<tr>
<th>Statement regarding awareness</th>
<th>Undergraduates (n=100)</th>
<th>Postgraduates (n=100)</th>
<th>Nursing students (n=100)</th>
<th>Overall (%)</th>
<th>Chi Square P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEP should begun within one hour after injury</td>
<td>47</td>
<td>29</td>
<td>19</td>
<td>31.6%</td>
<td>18.6</td>
</tr>
<tr>
<td>Risk of transmission of HIV from NSI is least (0.1-1%)</td>
<td>45</td>
<td>35</td>
<td>7</td>
<td>29%</td>
<td>27.7</td>
</tr>
<tr>
<td>Risk of transmission of Hepatitis B from NSI is high (10-30%)</td>
<td>26</td>
<td>19</td>
<td>24</td>
<td>23%</td>
<td>1.47</td>
</tr>
<tr>
<td>Risk of transmission of Hepatitis C from NSI is (1-10%)</td>
<td>33</td>
<td>29</td>
<td>23</td>
<td>28.3%</td>
<td>5.28</td>
</tr>
<tr>
<td>Fully vaccinated for Hepatitis B</td>
<td>63</td>
<td>56</td>
<td>74</td>
<td>64.3%</td>
<td>7.18</td>
</tr>
<tr>
<td>Anti-HBs Antibody titre done</td>
<td>18</td>
<td>18</td>
<td>17</td>
<td>17.6%</td>
<td>0.458</td>
</tr>
<tr>
<td>Received training in prevention and/or treatment of NSI</td>
<td>30</td>
<td>60</td>
<td>21</td>
<td>37%</td>
<td>35.8</td>
</tr>
<tr>
<td>Read hospital policy on safe disposal of waste</td>
<td>15</td>
<td>6</td>
<td>37</td>
<td>19.3</td>
<td>32.6</td>
</tr>
</tbody>
</table>

According to CDC, Hollow bore needle are considered to be the commonest cause of NSI. The figures shown in our study were 43%. Whereas in some studies the figures are as high as 72.2% shown by Askarian et al[11] and 62.2% by Nee et al.[12] Common causes associated with injuries include, 34.9% mentions the cause of NSI due to the carelessness/accident, 26.7% reports the NSI due to poor disposal of needle whereas 38.5% cannot remember the cause of needle stick injury. In another study by Rahul Sharma et al.[13] showed that out of total number of 322 participants, 79.5 % of HCWs reported having had one or more NSIs in their career. Most of the injuries (34%) occurred during recapping. Only 20 (7.8%) of the total took Post Exposure Prophylaxis (PEP) against HIV/AIDS after injury. Muralidhar et al. [6] showed that 39% NSI occurred during needle recapping while 55% occurred during blood withdrawal. Out of the 33 students who contracted NSI, only 56.6% reported the incident, whereas only 21.7 filled an incident report at integrated counselling and testing centre (ICTC). This was because majority of them were not aware about the formal reporting system existent in the institute. This problem could be solved by doing regular training of the students.

Vaccination is one of the best ways to protect HCW’S from these blood borne pathogens but vaccination is available only for HBV. In our study 64.3% students were fully vaccinated. In a study from Germany, Sabine et al. [14] reported an average of 78.2% HCW’s to be vaccinated. In another study by Radha et al. [9] HBV vaccination in HCW’s was reported to range between 83% in doctors and 8% in nurses. The moderate to high percentage of vaccination rate among our students may be because the organization makes provisions for HBV vaccination.

CONCLUSION

NSI were observed in all categories of HCW’s. Elimination of unnecessary injections, prohibition of recapping, proper disposal and careful handling of sharps following universal work precautions strictly are effective measures of preventing NSI. There is a scope for improvement in safety protocols.

The training of HCW’s especially regarding reporting of NSI and filling an incident report needs to be emphasized. Regular monitoring of safety practices should be an on-going activity in hospital.

To conclude, the results of this study confirm the importance of the need for an increased awareness of the risk of needle stick injury, education to improve and update the knowledge of NSI and its management.

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References


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