



RESEARCH ARTICLE

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

¹Mittal Garima*, ²Taneja Anmol. R K, ³Garwal R K, ⁴Gupta Pratima and ⁵Gupta Priyanka

^{1,3}Department of Microbiology HIMS, SRHU, Dehradun Uttarakhand, India

^{2,5}HIMS, SRHU, Dehradun Uttarakhand, India

⁴Department of Microbiology AIIMS, Rishikesh Uttarakhand, India

ARTICLE INFO

Article History:

Received 5th, February, 2015
Received in revised form 12th,
February, 2015
Accepted 6th, March, 2015
Published online 28th,
March, 2015

Key words:

medical students, needle stick
injury

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.

Copyright © 2015 Mittal Garima *et al.*, This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

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]

*Corresponding author: **Mittal Garima**

Department of Microbiology HIMS, SRHU, Dehradun Uttarakhand, India

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 1000000 receive NSI from conventional needles & sharps every year while in UK it is 100000 HCWs in 1 year.^[6] In India, authentic data on NSI are scarce. More than 90% infections occur in developing countries.^[6-7] 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.^[8]

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.](#),^[6] a total of 428 HCWs participated in which 343 (80.1%) gave a history of NSI. Another study conducted by [Radha R et al](#)^[9] using 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 [Rajiv Saini](#)^[10] 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.

Statement regarding knowledge	Undergrada-uates (n=100)	Postgradua-tes (n=100)	Nursing students (n=100)	Overall (n=300) %	Chi Square	P value
Definition of NSI	20	30	16	22%	6.06	0.048
After NSI, it should be washed with soap & water	56	51	69	58.65%	7.12	0.028
How many administered injections	39	91	83	71%	76.2	0.001
How many assisted in removal or disposal of needle	45	84	85	71.3%	50.9	0.001
Needles after use should not be re-sheathed	48	67	70	61.6%	12	0.002
Disposal of sharps in puncture proof container	61	54	87	67.3%	27.5	0.001
Hollow bore needle most commonly involved in NSI	37	22	70	43%	49.2	0.001
Sustained NSI in last 12 months	6	7	20	33(11%)	12.5	0.002
Number of injuries	2.1 ± 1.6 (mean±SD)	2.4 ± 0.53 (mean±SD)	3.66 ± 1.14 (mean ±SD)	2.72 (mean)	-	-
Common cause of NSI	50%	0%	30%	26.66%	-	-
Poor disposal of needle	16.7%	42.9%	45%	34.86%	-	-
Carelessness/accident	33.3%	57.1%	25%	38.46%	-	-
Cannot remember	2 (33.3%)	5(71.4%)	13(65%)	56.56%	10.4	0.006
How many reported the NSI	0	0	13(65%)	21.66%	-	-
Filled an incident report at ICTC	49	57	59	55%	2.26	0.323
Disposal of sharps box when it is ¾ full	22	45	12	26.3%	29.5	0.000
Never separate needle from syringe						

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

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

Statement regarding awareness	Undergrad -uates (n=100)	Postgraduat-es (n=100)	Nursing students (n=100)	Overall (%)	Chi Square	P Value
PEP should begun within one hour after injury	47	29	19	31.6%	18.6	0.001
Risk of transmission of HIV from NSI is least (0.1-1%)	45	35	7	29%	27.7	0.001
Risk of transmission of Hepatitis B from NSI is high (10-30%)	26	19	24	23%	1.47	0.480
Risk of transmission of Hepatitis C from NSI is (1-10%)	33	29	23	28.3%	2.50	0.287
Fully vaccinated for Hepatitis B	63	56	74	64.3%	7.18	0.028
Anti-HBs Antibody titres done	18	18	17	17.6%	0.458	0.977
Received training in prevention and/or treatment of NSI	30	60	21	37%	35.8	0.001
Read hospital policy on safe disposal of waste	15	6	37	19.3	32.6	0.001

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] Commonest 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.

Acknowledgement

Will like to acknowledge STS-ICMR for giving us financial grant.

References

1. Secretariat of the Safe Injection Global Network. Health Care Worker Safety. Geneva: World Health Organization. Available at www.injectionsafety.org (last accessed 7 July 2007)
2. Elmiyeh B, Whitaker IS, James MJ, Chahal CA, Galea A, Alshafi K. Needle-stick injuries in the National Health Service: A culture of silence, *J R Soc Med* 2004;97:326-7.
3. Aiken LH, Sloane DM, Klocinski JL, Hospital nurses occupational exposure to blood: Prospective, retrospective and institutional reports. *Am J Public Health* 1997;87:103-7.
4. Rita D, Makki DG. Epidemiology of needlestick injuries in hospital personnel. *Am j Med* 1981;70:928-32.
5. Centers for disease Control and prevention. Updated US Public Health Service Guidelines on the management of occupational exposures to HBV, HCV, and HIV and recommendations for post-exposure prophylaxis. *MMWR Recomm Rep* 2001 ;50:1-67
6. Muralidhar S, Singh PK, Jain RK, Malhotra M, Bala M. Needle stick injuries among health care workers in a tertiary care hospital of India. *Indian J Med Res* 131, March 2010, pp 405-410.
7. Tadesse M, Tadesse T. Epidemiology of needlestick injuries among health-care workers in Awassa City, Southern Ethiopia. *TROPICAL DOCTOR* 2010;40: 111-113 DOI: 10.1258/td.2009.090191.
8. Pruss-Ustan A, Rapiti E, Hutin Y. Sharps injuries: Global burden of diseases from sharps injuries to health-care workers. Geneva: World Health Organization; 2003. (WHO Environmental Burden of Diseases Series, No. 3)
9. Radha R, Khan A. Epidemiology of Needle Stick Injuries Among The Health Care Workers of A Rural Tertiary Care Hospital-A Cross Sectional Study. *Natl J Community Med* 2012; 3(4):589-94.
10. Saini R. Knowledge and awareness of needlestick injury among students of Rural Dental College, Maharashtra, India. *Ann Nigerian Med* 2011;5:12-4.
11. Askarian M, Shaghaghian S, McLaws ML. Needlestick injuries among nurses of Fars Province, Iran. *Ann Epidemiol* 2007; 17 : 988-92
12. Nee L, Lim HL, Chan YH, Bachok DB. Analysis of sharps injury occurrences at a hospital in Singapore. *Int J Nurs Prac* 2002; 8 : 274-81.
13. Sharma R, Rasanias SK, Verma A, Singh S. Study of prevalence and response to needle stick injuries among health care workers in a tertiary care hospital in Delhi, India. *Ind J Community Med.* Jan 2010;35(1):74-77.
14. Wicker S, Jung J, Allwinn R, Gottschalk R, Rabenau HF. Prevalence and prevention of needlestick injuries among health care workers in a German university hospital. *Int Arch Occup Environ Health.* 2008 Jan;81(3):347-54.

How to cite this article:

Mittal Garima et al., Knowledge, Awareness &Prevalence of needle stick injury among students of medical college of uttarakhand, India. *International Journal of Recent Scientific Research* Vol. 6, Issue, 3, pp.3055-3058, March, 2015
