

Needle Sticks Injury with Contaminated Blood in the Special Unit, S Staff

¹E. Nasiri, ²M. Vahedi, ³H. Siamian, ⁴Y. Mortazavi and ¹H. Jafari

¹Department of Anesthesia and Operating Room, Mazandaran University of Medical Sciences, Sari, Iran

²Department of Microbiology, Sari Medical College, Mazandaran University of Medical Sciences, Sari, Iran

³Department of Medical Records, Mazandaran University of Medical Sciences, Sari, Iran

⁴Department of Anesthesia, Babol University of Medical Sciences, Sari, Iran

Abstract: The most important occupational hazardous at the health care centers are the needle sticks injuries and contact with the blood born diseases. Operative room, ICU and emergency unit cause more exposing of the personnel to needle stick. This study was done to determine the rate of blood borne infection due needle sticks injuries in hospitals staff of special units in mazandaran province. In this descriptive study, all of 352 special unit's staff from educational (158 persons) and non educational (194 persons) were selected. Questionnaire containing 5 questions about demographic and 12 questions about needle stick injuries was used. Validity of the question was evaluated after review of the literatures and inquiry from the related medical specialists. Its durability was confirmed by retest on 20 staff. The data were collected in questionnaire directly after explanation by the researchers about needle sticks injuries incidences in the last three years. X2 test was used for analysis of qualitative data. $P < 5\%$ was considered significant. Data indicate that 225 (64%) were male, 127 (36%) female, 156 (44.9%) from educational hospitals and 194 (55.1%) from non educational hospitals. No significant difference was observed from the view point of needle stick injuries between male and female, but significant between educational and non education hospitals, $p < 0.14$. Findings revealed that 75.6% of the staff at least once had blood contaminated needle stick injury. Needle was the most common vehicle of injury (72.6%). Considering the high rate of injuries in many hospital staff and potential of transmission of infection, instruction of educational planning in order to activate the infection control committee and planning of NSI preventing procedures and daily control seem necessary.

Key words: Needle stick injuries • ICU staff • operation room • blood born infection

INTRODUCTION

Needle stick injuries is the problem in which may expose medical staff to the blood born diseases such as, HIV, hepatitis B and C [1-3] the Anaesthesiologists are at risk of acquiring blood transmitted infections through injury [4].

Different studies showed that medical staff is prone to needle stick injuries at different rate. Among them the nurses during injecting the patients are at more risk condition [5, 6]. This problem is main cause of hepatitis B and C and HIV infections [7].

Considering the special conditions of the operation room, ICU and emergency units where the staff cares the patients stressfully. In all, less studies have been done regarding occupational hazardous in medical centers [8].

This study is the first of its kind in the hospitals of mazandaran province.

It is important because many HIV patients are not identified before operation. and also, blood drawing is the first step of treatment procedures of the patient referring to emergency unit. the patients in ICU is not known.

Risk of transmission for hepatitis B is 3-6%, of hepatitis C 1.5-2% for each needle tip and HIV 0/3% for each needle tip and 0.09% for each mucosal contact. For HIV and hepatitis C, there is no definite treatment and vaccine. For hepatitis B there is prophylaxis which is helpful up to 90%. Since the mortality and morbidity rate of the above mentioned diseases is high [9, 10], This study was done in the educational and non educational hospitals of mazandaran province to determine and compare the rate of needle stick injuries in

the medical care staff in order to have better planning for prevention and reduce the rate of infection in different units at risk.

MATERIALS AND METHODS

In this descriptive study all of the staff at special units of operation room, emergency and ICU of educational (Imam and Boali of sari, Razi of Qaemshahr and shahid Bheshti of Babol) and non education (hospitals from the eastern, central and western cities of mazandaran province, two hospitals from each part) hospitals of Mazandaran province were selected.

In all, 352 staff were selected (158 educational and 194 non educational) with their prior consent. Data were collected in questionnaire comprising 5 questions of demographic and 12 questions related to NSI. Validity of the questionnaire was confirmed by referring to the review of the literatures and consultation from the related specialist and considering the environmental condition. Durability of the questions was confirmed by retest with index higher than 0.7 for all of the questions in 20 staff. After arrangement with the administrators and special unit staff by simple sampling and in case of Subjects were willing to enter the study. After explanation by the researchers, the subjects were asked to fill the questionnaire designed about the blood contaminated needle sticks injuries or any sharp injury within the previous 1 to 3 years. The obtained data were analyzed by descriptive test and X2 test using spss soft ware. $P < 0.05$ was significant.

RESULTS

The subjects under study 225 (63.9%) were male, 127 (36.1%) female, 158 (44.9%) from educational hospitals and 194 (55.1%) from non educational hospitals. Mean age and work experience ranges were 33.8 ± 8.6 (20 to 56 years) and 10.7 ± 8.5 years (2 to 29 years), respectively.

Needle stick injuries at different special blood contaminated units and the number of injuries are shown in Table 3. It shows that 75.57% (Table 3) of the staff, at least, once had blood contaminated needle stick injuries.

In fact 72 (20.45%) (Table 3) of the staff had frequent injuries (above 5 times). Based on results of this study, 26 (7.4%) of them did not vaccinate hepatitis B previously, 325 (92.3%) had once previous vaccination and 1 (0.3%) didn't remember. 252 (71.6%) of participants had vaccinated three times.

Table 1: Frequency distribution of the staff at ICU, operation room and emergency unit

Specialty	Frequency	
	Number	Percentage
Operation room staff	60	17.10
Anaesthetic staff	41	11.66
Surgeon	26	7.34
Anaesthesiologist	11	3.14
Auxiliary nurse	28	7.97
Nurse	186	52.80
Total	352	100.00

Table 2: Frequency distribution of staff at operation room, ICU and emergency unit by differentiating educational and non educational hospitals

Hospitals	Frequency in the units			
	Operation room	ICU	Emergency	Total
Educational hospital N=158	111	18	29	158
Non educational hospital N=194	65	47	82	194
Total = 352	176	65	111	

Table 3: Frequency distribution of needle sticks injuries from different special units at different times

Variables	Frequency	
	Number	Percentage
Nil	86	24.43
Once	53	15.10
2-4 times	141	40.10
5-20 times	47	13.35
<20 times	25	7.10
Total	352	100.00

Also 193 (54.8) of injured staff only disinfected the needle stick injury site with betadine solution but 9 (2.6%) were indifferent, 71 (20.2%) washed with soap and 2 (0.6%) in addition to washing with soap, vaccinated too. Seventy seven (21.6%) had unclear condition. Ninety eight (27.8%) of them in their first injury requested for hepatitis B test for the patients and themselves. In this study the most cases of needle stick injuries goes back to operation room staff, that is surgeons, anaesthesiologists and the nurses, Hundred thirty three (37.8%). Table 4 shows the rate of injury based on the related units. 20 staffs were Injured more than two wards.

This study shows that the most frequent cause of needle stick injuries is related to syringe needle. And 170 (48.3%) of them during putting the needle cap.

Table 4: Frequency of needle sticks injuries from different units

Unit	Frequency	
	Number	Percentage
Operation room	133	37.78
Emergency	93	26.42
ICU	50	14.20
Recovery unit	10	2.84
More than two unit	20	5.68

Table 5: Rate of injury with different devices

Type of device	Frequency	
	Number	Percentage
Needle tip	175	65.79
Angio cut	34	12.78
Sweeping needle	36	15.53
Bistury blade	9	3.38
Scalpavien	12	4.51
More than 2 devices	32	12.00

Table 6: Frequency distribution of blood contaminated needle sticks injury at different units staff

Occupation	Frequency			
	Number Non injured	Once only one time	More than 5 times	Total No (Percent)
Nurse	49(26.34%)	71(38.2%)	66(35.48)	186(100)
Anesthesia staff	17(41.46%)	3(7.3%)	21(51.22%)	41(100)
Anesthesiologist	3(27.27%)	3(27.3%)	5(45.5%)	11(100)
Operating room staff	12(20%)	15(25%)	33(55%)	60(100)
Auxiliary nurse	3(10.71%)	7(25%)	18(64.3%)	28(100)
Surgeon	2(7.69%)	2(7.7%)	22(84.6%)	26(100)
Total	86(24.43)	101(28.69)	165(46.88)	352(100)

Table 5 shows the condition of injuries by differentiating the type of the devices used in different units.

It shows that the surgeon, above 84%, operation room staff 55%, anaesthesia staff 65%, nurses 36%, anaesthesiologist, 45%, auxiliary nurses 64%, had at least 5 to 20 times blood contaminated needle sticks and other sharps injuries. Two hundred sixty three (74.4%) of the staff had at least once or more NSI while breaking the ampule cap to draw drug for injection on the hands.

Hundred seventy (48.3%) of the staff while detecting the vien for Catheterization, during suchuring or drawing out the catheter from the patients, blood drops or the discharges spread on the face and in their mouth.

It happened in 55(87%) educational hospitals and 43(83%) non educational hospitals, but there was no difference between male and female staff, $p < 0.172$. The difference was significant between the educational and non educational hospitals ($p < 0.001$).

DISCUSSION

In this study, 75.6% of the 352 subjects under study faced at least once blood contaminated NSI, that is 78% from education and 74% from of non educational hospitals. Smith *et al.* in their study on anaesthesia residents reported NSI in 50% in a year, of which, 27% during putting needle cap[11]. In our study, the most common cause of NSI was related to syringe needle. Hundred seventy (72.6%) of 234 staff had injury during putting needle cap. The rate of injury in our study is higher than that of report by them. We think due to three reasons as follow: they did their study in one year but we did in 3 years, they did on particular group of subjects(anaesthesiologists), we did on different groups of staff (such as surgeons, nurses, operation room staff); in that study the subjects were instructed not to use two hands while putting the cap, while in our study the subjects used two hands. In this study 46% of anaesthesiologists and 86% of surgeons experienced 5 to 20 times NSI which is more than in the other professions. Giving local aesthesia, Sometimes during vein detection and performing operation the needle should be covered with cap. Presence of sharps in the operation field can be the cause of injury in surgeon and anaesthesiologists. Therefore it is suggested that proper training about NSI prevention be given to the operation room staff and suitable mechanical devices be used for collection of needle sticks. Better to put cap with the same hand holding syringe. In this study 92% of surgeons, 80% operative room staff at least once experienced blood contaminated NSI. Also 73% of anaesthesia staff and anaesthesiologist experienced NSI. Considering the unawareness about the patient in operative room and special units regarding infection with HIV, HCV and that, there is possibility of getting infection due to blood contaminated needle stick injury 0.3% with HIV, 0.2%, HCV and 37% with HBV. Greenø's report indicated at least one anaesthesiologist acquired HIV through blood contaminated needle stick injury [8]. The reason of acquiring infection in duty, particularly in operative room staff is that during fixing catheter and blood drawing they are expose to the blood contaminated with pathogenic organisms. If patient coughs during intubation and extubation the particles drop on the eye, face and mouth, here when the staff do not use protective device they are prone to acquiring infection. Due to using of protective device there was less chance of needle stick injury in the subjects under study [10].

In our study, 75% of the nurses at least once experienced NSI and 37% of them 5 to 20 or more. The other reports indicate the rate of NSI in the nurses 49.7% (3 and 10) which is lower than our report. It is because in Iran nurses are active in different units and that we selected the subjects from stressful units. Also 7.4% of the subjects under study did not vaccinate for hepatitis B and the rest vaccinated at least once. Considering high prevalence rate of NSI and being susceptible to the blood born diseases, there is high possibility of acquiring hepatitis B through needle stick.

Therefore attention to the vaccination condition in the medical staff seems necessary.

Considering the lack of proper planning in at least 35% of cases for collection of needle stick and sharps made it potential threatening condition for transmission of blood born infection to the other units and the workers.

In this case, having of proper educational program about separation of sharps and needle stick from the hospital garbage is important.

The other finding was that the rate of NSI in the educational hospitals is more than the non educational.

In spite of presence of nosocomial infection control committee in the educational hospitals which seems to be active but could not play its role in prevention of infections in the province. The reason can be that the educational hospitals act as reference center and more patients refer to such centers and also due to presence of students and different patients with various diseases and high load of work. Therefore considering high rate of NSI in special units it seems that more activation of nosocomial infection control committee and better planning for using of the NSI prevention is necessary.

REFERENCES

1. Philipps, W. H onghong and Y. Min *et al.*, 2002. Risk of medical sharps injuries among Chinese nurses. *Am. Infect. Control*, 3: 277-282.
2. Clarke sp, D.M. Sloane and L.H. Aiken, 2002. Needlestick Injury to nurses, in context LDL Issue Brief 2002 Sep; 8 (1): 1-4.
3. Karimi, S. and M.H. Khademian, 2004. Study of knowledge, attitude and practice of health care staffs in prevention of blood born disease. *Gournal of Boghrat, Fasa University of Medical Sciences*, 1: 12-14.
4. Berry, A.S. and E.S. Greene, 1992. The risk of needlestick injuries and needlestick-transmitted diseases in the practice of Anaesthesiology, 77: 1007-1021.
5. Khuri-Bulos, N.A., A. Toukan, A. Mahafzah *et al.* 1997. Epidemiology of needlestick and sharp injuries at a university hospital in a developing country: A 3-year prospective study at the jordan university hospital 1993 though 1995. *Am Infect control*, Aug; 1997, 25 (4B22-9).
6. Canini, S.R., E. Gir, M. Hayashida and A.A. Machado, 2002. Needlestick Injuries amog nursing workers at a university hospital in the interior of the sao Paulo stste. *Rev lat Am fermagem* 2002 Mar-Apr; 10 (2): 172-178.
7. Guoy, L., J. Shia, C. Chuangy and K.Y. Huang, 1999. Needlestick and sharps Injuries among health- care workers in Taiwan. *Epiemiol. Infect.* 1999 Apr; 122 (2): 259-265.
8. Greene, E.S., A.J. Berry, W.P. Arnold and J. Jagger, 1996. Percutaneous injuries in anaesthesia personel. *Anaesthesia and analgesia*. 1996 August; 83 (2): PP273-278.
9. Siostrom, H., E. Skyman, L. Hellstrom, M. Kula and V. Grinevika, 2003. Cross infection prevention: basic hygiene practices and education in nursing and health care in Latvia. *Nurse Edu. Today*, 23: 404- 411.
10. Bonnie, R. and G. Leslie, 2000. Evaluation of interventions to prevent needlestick injuries in health care occupations. *Am. J. Preventive Med.*, 18 (4): 90-98.
11. Smith, M.P. and A.J. Berry, 1995. Hazard of small-gouge needles. *Anesthesiology*. January 1995; 82 (1): 310-311.