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Original Research

SHARP INJURIES IN CLINICAL PRACTICE AMONG NURSING STUDENTS OF DA NANG UNIVERSITY OF MEDICAL TECHNOLOGY AND PHARMACY

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ABSTRACT

Background: *While studying at the hospital, nursing students are at risk of getting sharp instrument injuries during clinical practice. The likelihood of being injured by sharp instruments in nursing students is very high due to prolonged clinical practice in medical facilities, working in new environments, lacking of experiences and concentration. Our study aimed to detect the prevalence of students injuring by sharp instruments in clinical practice and related factors influencing this rate.*

Methods: *A descriptive cross-sectional study was conducted on 400 nursing students going for clinical practice from January 2018 to May 2018 at Da Nang University of Medical Technology and Pharmacy. Data were collected through self-filled questionnaires.*

Results: *Our study showed that 71% of students were hurt by sharp instruments. The number of injuries including 1 time, 2 times, 3 times and more than 3 times accounted for 14.8%, 18.7%, 19.7% and 46.8%, respectively. Fingers were the most frequently damaged position (74.7% of the total number of injured cases), the rest were hands, toes and feet with 22.9%, 1.5% and 0.9%, respectively. Regarding workplaces where the injury occurred, the Faculty of Internal Medicine (42.8%) was the most common place of occurrence, followed by Department of Surgery (32.8%), Rehabilitation Department (8.6%); Department of Pediatrics (7.9%) and Emergency Department (7.9%). In which, 70.4% occurred at the patient room, 20.3% at the injection room and 9.3% at the waste collection. The proportion of students injured when removing needle cap was 9.5%, covering needle cap was 24.4%, breaking ampoule was 40.1%, infusing, collecting venous blood and disposing of sharp instruments were 16.9%, 2.3% and 6.8%, respectively. There was a significant relationship between the proportion of sharp instruments injuries and students' learning ranking, trained on using sharp instruments safely and student's knowledge about sharp instruments ($p<0.05$).*

Conclusions: *The proportion of nursing students injured by sharp instruments was significantly high and associated with students' learning ranking, training about sharp instruments safety and qualified knowledge about sharp instruments.*

Key words: *Injury, sharp instruments, nursing students.*

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I. INTRODUCTION

Occupational exposure refers to direct contact between mucosal or intact skin with blood, tissue or body fluids containing infectious diseases or direct contact with hazardous chemical substances and rays at work. Among many causes of occupational exposure, sharp instrument injuries is one of the most common causes in the world, and is also a

cause of blood transfusions of many diseases such as hepatitis B virus, hepatitis C virus, and human immunodeficiency virus.

According to U.S. Centers for Disease Control and Prevention, in 2008, there were approximately 384,000 skin injuries among healthcare workers, of which medical students represented 45%. The rate of sharp instruments injuries among medical students in universities in the world ranged from 9.4% to 100% [1]. According to World Health Organization (WHO), in 2010, the average number of sharp instruments injuries for healthcare workers was 0.2 - 4.7%. The average number of first time sharp instruments injury was 1.4 - 9.5/100 healthcare workers, or 6.2/100 hospital beds. The most suffered subjects were nurses (44 - 72%), followed by doctors (28%), technicians (15%), paramedics (3 - 16%) and administrative staffs (1 - 6%) [2].

Nursing students are at risk of getting injury by sharp instruments during clinical practice. The likelihood of being injured by sharp instruments in nursing students is very high due to prolonged clinical practice in medical facilities, lack of experience, lack of concentration and working in new environments. The present study aims to detect the prevalence of students injuring by sharp instruments in clinical practice and related factors influencing this rate.

IIMATERIALS AND METHODS

A cross - sectional study was conducted on 400 nursing students who had had clinical practice were chosen by using stratified random sampling.

Using a questionnaire designed according to CDC's guidelines for sharp instrument injury investigations. The questionnaire includes three parts:

Part 1: Student's general informations.

Part 2: Student's knowledge about sharp instruments injuries.

Part3: Student's experience with sharp instruments injuries.

The rubric for student's knowledge about sharp instruments injuries was 1 point for a correct answer and 0 point for an incorrect one. Those achieving ≥75% were considered qualified.

III. RESULTS

Among the chosen 400 students, 284 students (71%) had experienced sharp instruments injuries.

Table 1: Students' sharp instruments injuries situation

Category		N	%
Number of injuries (N=284)	1 time	42	14.8%
	2 times	53	18.7%
	3 times	55	19.7%
	> 3 times	134	46.8%
Level of injury (N=495)	Scratches	354	71.5%
	Cuts	141	28.5%
Body part (N=495)	Finger	370	74.7%
	Hand	113	22.9%
	Foot	4	0.9%
	Toe	8	1.5%
Time of day (N=495)	Morning	312	63.1%
	Afternoon	93	18.7%
	Night shift	90	18.2%
Faculty (N=495)	Surgery	162	32.8%
	Internal Medicine	212	42.8%
	Pediatrics	39	7.9%
	Resuscitation	43	8.6%
	Emergency	39	7.9%
Workplace (N=495)	Patient room	348	70.4%
	Injection room	101	20.3%
	Trash collection room	46	9.3%
Object (N=495)	Needle	194	39.2%
	Butterfly needle	61	12.3%
	Glass fragments	240	48.5%
	Surgical suture needle	0	0%
Task (N=495)	Removing needle cap	47	9.5%
	Recapping needle	121	24.4%
	Breaking ampule	198	40.1%
	Infusion	84	16.9%
	Venipuncture	11	2.3%
	Disposing sharp instruments	34	6.8%

Category		N	%
Needle recapping technique used when injured (N=121)	One hand scoop	8	6.6%
	Two-hand method	82	67.8%
	Using shears	31	25.6%
Ampule openning technique used when injured (N=198)	Using gauzes	12	6.1%
	Using shears or scissors	6	3.0%
	Using bare hand	180	90.9%
First aid (N=284)	Proper technique	109	38.4%
	Improper technique	175	61.6%

Number of injuries: The proportion of students who had been injured by sharp instruments more than three times (46.8%) was highest while that of those injured once (14.8%) was the lowest. Level of injury: Two types of injury were reported: scratches (71.5%) and cuts (28.5%). Body part: Finger was the most injured body part (74.7%) while hand, foot, and toe accounted for 22.9%, 1.5% and 0.9%, respectively. Faculty: There was a significant difference in the number of injuries in different units: 42.8% in Internal Medicine, 32.8% in Surgery, 8.6% in Resuscitation, 7.9% in Pediatrics and 7.9% in Emergency. Most injuries occurred in the patient room (70.4%), while 20.3% occurred in the injection room and 9.3% in the trash collection room. Among the sharp instruments, needles caused the highest number of injuries (39.2%). Ampule opening caused the highest number of injuries (40.1%), followed by needle recapping (24.4%), infusion (16.9%), cap removing (9.5%), sharp instruments disposal (6.8%) and venipuncture (2.3%). 61.6% of the students did not follow first aid procedures properly.

Table 2: Relationship between sharp instruments injuries rate and characteristicsof subjects

Category		Injured		Not injured		p
		N	%	N	%	
Gender	Male	24	68.6%	11	31.4%	p > 0.05
	Female	260	71.2%	105	28.8%	
Year	Junior	194	67.6%	93	32.4%	p < 0.05
	Senior	90	79.6%	23	20.4%	
Academic ability	Average	8	72.7%	3	27.3%	p < 0.05
	Good	150	72.1%	58	27.9%	
	Excellent	126	69.6%	55	30.4%	

The rate of female students getting injured (71.2%) was higher than that of male students (68.6%). The rate of seniors being injured (79.6%) was higher than that of juniors (67.6%); this difference was statistically significant ($p<0.05$). Students with better academic ability had lower risks of getting injured with $p<0.05$.

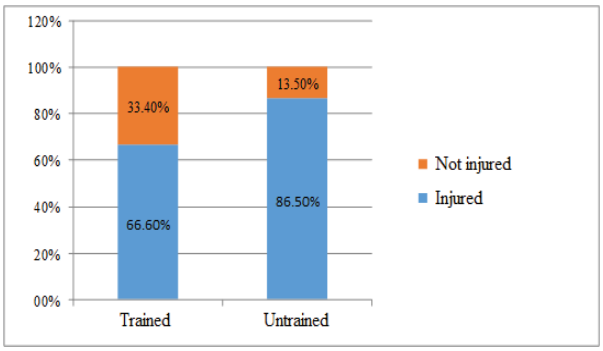

Figure 1: Students' training

The rate of injured students among untrained ones was 86.5%, higher than that among trained students (66.6%), this difference was statistically significant ($p<0.05$).

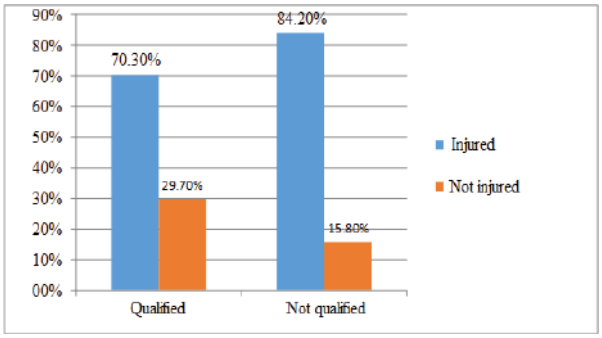

Figure 2: Students' safety knowledge

29.7% of those with sufficient safety knowledge had not experienced injuries, higher than that of those without sufficient knowledge (15.8%) ($p<0.05$).

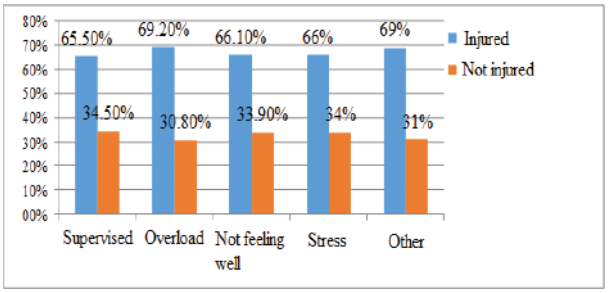

Figure 3: Students' mental factors

Among those with the researched mental factors (261 supervised students, 146 overloaded students, 118 not feeling well students, 94 stressed students and 100 students with other factors), the rate of injured students was 65.5%, 69.2%, 66.1%, 66% and 69%, respectively.

IV. DISCUSSION

In this research, 284/400 students had experienced sharp instruments injuries (71%). This proportion was lower than that in research in China [3], India [4] but higher than that in a research in Mexico [5] and Turkey [6]. The proportion of students who had been injured by sharp instruments more than three times (46.8%) was the highest while that of those injured once (14.8%) was the lowest. The proportions for that of those injured twice and three times were 18.7% and 19.7% respectively. This was similar to the research at Shiraz University [7] but was different from that at Namibia University where 58.5% of the students were injured once, 26.5% were injured twice, 5.8% were injured three times, and 8.8% were injured more [8]. In one research in Turkey, 58.4% of nurses had been injured 1 to 3 injuries [6]. Two types of injury were reported: scratches (71.5%) and cuts (28.5%). These were very dangerous since they posed the risk of blood transmitted diseases. Finger was the most injured body part (74.7%) while hand, foot, and toe accounted for 22.9%, 1.5% and 0.9% respectively. There was a significant difference in the number of injuries in different faculties: 42.8% in Internal Medicine, 32.8% in Surgery, 8.6% in Resuscitation, 7.9% in Pediatrics and 7.9% in Emergency. Most injuries occured in patient room (70.4%) while 20.3% occured in injection room and 9.3% in trash collection room. This was similar to Smith's research at North Queensland where a large proportion of students were injured in patient room (31.8%), treatment room (8.5%), ICU (1.9%) [9]. This can be explained by the frequency of damage associated with the frequency of infusions and most patient care activities (especially injections, infusions, blood tests...) are usually conducted in patient room.

Among the sharp instruments, needles caused a high number of injuries (39.2%), which was similar to a research in Turkey [6]. This is reasonable since students have to carry out many different tasks involving needles such as cap removing, recapping and disposal. Ampule opening caused the highest number of injuries (40.1%), followed by needle recapping (24.4%), infusion (16.9%), cap removing (9.5%), sharp instruments disposal (6.8%) and venipuncture (2.3%). This was similar to the research at Selcuk University [10]. However, research in Malaysia showed that venipuncture was the most common cause (59.1%) [11]. With needle recapping, 67.8% of the injuries occured when using the two-hand method, while only 6.6% occurred

when using the one hand scoop method, and 25.6% occured when using shears. This showed that students lacked experience and knowledge about handling needle after injection. With ampule opening, 90.9% of the injuries occured when using bare hand, 6.1% occured when using gauzes and 3.0% occured when using shears of scissors. This shows that students did not follow safety procedures for injection. 61.6% of the students did not follow first aid procedures; this was higher than that at Melaka, Malaysia [12]. This shows that medical centers need to have strict rules about first aid procedures.

The rate of female students getting injured was higher than that of male students. This was similar to Rapparini's research in Brazil [13]. The academic year was a factor that many studies show that there was a link to the injury. The rate of seniors being injured was higher than that of juniors since seniors have to do more tasks. Research had shown a statistically significant relationship between academic year at college and the rate of sharp instruments injuries ($p<0.05$). This was different from Smith's research in which the percentage of juniors that experienced sharp instruments injuries was 14.8 times higher with $p<0.01$ [9]. At the Nursing University in Australia, third year student suffered injuried 14.8 times higher than other courses ($p<0.01$) 14. Students with better academic ability, knowledge and skills had lower risks of getting injured. Research had shown a statistically significant relationship between students' academic performance with students' sharp instruments injuries ($p<0.05$). As can be seen in figure 2, the rate of injured students among untrained ones was 86.5%, which was 1.3 times as high as that among trained students (66.6%), this difference was statistically significant ($p<0.05$). Similarly, Victor Hugo Garcia's research in Mexico also found a relationship between training and sharp instruments injuries: the rate of injured was higher in students without preventive training compared to those who had such a training (68% vs 51%; p value= 0.002) [5]. As can be seen in figure 3, 29.7% of those with sufficient safety knowledge had not experienced injuries. This rate was 1.9 times as high as that of those without sufficient knowledge (15.8%), this difference was statistically significant with $p<0.05$. Injuries caused by sharp instruments in particular and like other injuries are predictable and preventable, rather than random, irregular, or risky events. Research by Zhang YT showed that health protection education for students reduced the rate of needle injury by 33% 15. Most students know that preventable sharp object injury is important to implement the intervention program successfully. They are aware to inform responsible people like nurses and lecturers when being injured for treatment. This was similar from the research in Mexico [5] and in the U.S. [16]. The researched mental factors such as supervised, overloaded, not feeling well, stressed and with other factors, were the risk of students injury. Some research had shown that some other possible factors were anxiety and lack of interest [13].

IV. CONCLUSIONS

The rate of students injured by sharp instrument in clinical practice was quite high (71%) and they can be injured multiple times. Techniques that most likely to cause injuries were related to needles and glass fragments such as breaking ampule, recapping needle… Mentality was also a contributing factor. There was a statistically significant relationship between sharp instruments injuries and students' academic ability, safety training and knowledge about sharp instruments injuries.

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