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Awareness of Students of Applied Medical Sciences Faculty Regarding Needle Stick and Sharp Injuries (NSSIs). Taif University, Taif, KSA

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Abstract: ***Applied medical sciences students (particularly nursing and laboratory) are at high risk for needle stick and sharp injuries, especially when there are lack of experiences and awareness. This study aimed to assess the awareness of applied medical sciences students regarding needle stick and sharps injuries and to determine the prevalence of NSSIs among those students. A descriptive cross-sectional study was conducted by self-administered questionnaire on a representative random sample taken from nursing and laboratory department students. The total of students involved in this study was 92, (49 were from nursing department) and (43 were from laboratory department). 45.7%, of them were exposing to NSSIs and 89.1% were fully vaccinated against HBV. The orientation for the students about the infection control recommendations and guidelines is mandatory and students are advised to avoid recapping of used needle, however in case of exposure to NSSIs, the students should have report this incidence to their clinical instructors immediately.***

Keywords: Awareness, Needlestick and Sharp Injuries, Blood Borne Viruses, Students.

1. Introduction

Needlestick and sharp injuries (NSSIs) can increase the risk of blood borne pathogens infection. A Needlestick injury is a percutaneous piercing wound typically set by a needle point, but possibly also by other sharp instruments or objects. Commonly encountered by people handling needles in the medical setting, such injuries are an occupational hazard in the medical community [1]. The Centers for Disease Control and Prevention (CDC) estimates that about 385,000 sharps-related injuries occur annually among HCP in hospitals [2]. In 2011, the percutaneous injury rate was 19.46 per 100 occupied beds[3]. Sharps injuries are primarily associated with occupational transmission of hepatitis **B** virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV), but they may be implicated in the transmission of more than 20 other pathogens [4.5]. Exposure Prevention Network (EPINet) suggests that one of every ten HCP has a needlestick exposure each year.[6]. Despite their seriousness as a medical event, needlestick injuries have been neglected. [7]. On the other hand, as needlesticks have been recognized as occupational hazards, their prevention has become the subject of regulations in an effort to reduce and eliminate this preventable event.[8]. Underreporting of exposures remains a distinct problem, even in institutions that provide easily accessible reporting systems[9]. EPINet data from 2011 documented approximately 700 percutaneous injuries. Of those, nurses reported the most frequent number, followed by attending clinicians, and medical trainees such as medical students, interns, residents, and fellows [10].

Among health care personnel (HCP) trainees, only about 50 percent of percutaneous exposures are reported to occupational health [11]. The most common reason that such injuries were not reported was lack of time. According to data from the CDC, 18 percent of HCP trainees (e.g. interns, residents, and fellows) sustain a percutaneous exposure annually [11].

Long work hours and sleep deprivation result in fatigue, which is associated with a threefold increase in the risk of needlestick injuries [12.13]. The two most common devices involved in percutaneous injuries include disposable syringes and suture needles [10]. These sharp devices are most commonly used for suturing, administering injections, or drawing venous blood. Minimizing risks to HCP for acquisition of bloodborne pathogens should be an integral part of the infection control and occupational health programs in all healthcare facilities[7.14. 15.] All healthcare facilities are required by Occupational Safety & Health Administration (OSHA) to undertake measures to reduce occupational exposures to bloodborne pathogens, and include the use of engineering controls that minimize the risk of sharp injuries (e.g., needleless intravenous medication systems, blunted suture needles) [10. 16]. The key measures required by (OSHA) include the following; all HCP with "reasonably anticipated" exposure to blood must receive yearly education on the epidemiology of bloodborne pathogen transmission and means of minimizing such risks; and all at-risk HCP must be offered hepatitis **B** immunization at no cost to the employee. Healthcare facilities must provide personal protective equipment (PPE) and HCP must use PPE when performing procedures during which it is reasonably anticipated that exposure to blood might occur.

2. Methodology

Design: This is descriptive cross-sectional study carried out to assess the awareness of applied medical sciences students regarding needle stick and sharps injuries.

Setting: This study was conducted at faculty of applied medical sciences (CAMS), in this faculty there are four departments (Nursing, Laboratory, Physical therapy and Radiology). This study involve nursing and laboratory department students, Physical therapy and Radiology students were excluded because they were at low risk to contact of (NSSIs).

Subjects and sampling: The study sample was taken from undergraduate nursing and laboratory. The sample was derived from the second, third, fourth year and bridging students from both departments. The first year students were excluded from the study because they were not starting their clinical practice. The total of students participated in this study were 92; (49 nursing and 43 laboratory).

Data collection: The data was collected by self-administered questionnaire consisted of three parts; part one include questions about sociodemographic features of students such as (department, academic year, vaccination and immunity status). Part two include questions about student`s knowledge about NSSIs such as viruses transmitted by NSSIs, incidences of NSSIs among students, recapping of needle …ect. Part three consisted of questions about attitude and awareness of students NSSIs; such as prevention of NSSIs, factors increased risk for NSSIs, and actions should be done after exposure to NSSIs.

Data collection technique (procedure): before distribution of questionnaires each student was informed about the objectives of the study. The total of questionnaires distributed was 115, the returned questionnaires with full answered was 92. (Return percent was 80). For this study the data was collected during academic day, each student was allowed 30 to 60 minutes to answer the questionnaire.

Data analysis: For this the data was analyzed by SPSS version 20. Chi- square test was used to compare the independent variables with the characteristics such as expose to needle stick injuries, hepatitis B vaccine and to compare the awareness between nursing and laboratory students.

3. Results

In this study the data was gathered from 92 male students. About half of students were from nursing department 53.3%, the rest were from laboratory department. Majority of student 89.1% were vaccinated against hepatitis B virus and near to half of them were known their immune status against this virus. More details regarding students` demographics are presented in *Table 1*.

Table 1: Shows the demographic characteristics of students

Item	*Demographic characteristics*	*Frequency*	*Percentage*
Department	Nursing	49	53.3%
	Laboratory	43	47.7%
Academic year	Third year	12	13%
	Fourth year	31	33.7%
	Bridging	49	53.3%
Hepatitis B vaccination	Yes	79	89.1%
	No	13	14.1%
Immune status	Positive	50	54.3%
	Negative	42	45.7%

Table *2* represents students` knowledge and attitude towards needle stick and sharp injuries. This table reveals that 45.7% of students were exposed to needle stick and sharp injuries during their practices and 59% of them were reported this incidence to their clinical instructors. In addition, 85.9% of students were using gloves for venopuncture procedure and 73.9% of them were believed that needle stick and sharp injuries are preventable.

Table 2: Shows knowledge and attitude of students regarding needle stick and sharp injuries:

Questions	Options	N	Percentage
Which of the flowing viruses are highest risk to be transmitted by needle stick and sharp injuries?	**HIV**	45	48.9%
	HBV	25	27.2%
	HCV	22	23.9%
Did you ever have needle stick or sharp injury?	**Yes**	42	45.7%
	No	50	54.3%
When you had a needle stick injury, are reported this incidence to your clinical instructor ?	**Reported**	25	59.5%
	Not reported	17	40.5%
Using of gloves for venopucture procedures.	**Yes**	79	85.9%
	No	13	14.1%
Did you recap the needle post venopuncture procedure?	**Yes**	59	64.1%
	No	33	35.9%
In case you have to recapped the needle, are you using one hand technique (scoop method) for recapping?	**By using one hand technique**	49	53.3%
	By using two hands	43	47.3%
Are you heard about needleless safety device?	**Yes**	60	65.2%
	No	32	34.8%
Needle stick or sharp injuries are preventable	Yes	68	73.9%
	No	24	26.1%

Table 3 expounds the awareness of students regarding needle stick and sharp injuries (NSSIs), 28.3% of students were not known post needle stick injury recommendations such as milking out of more blood from injured site. Most needle stick sharp injuries have been neglected and not reported this was agreed by 62% of students. Whereas majority75% of students were believed that most injuries occur during recapping of used needles.

Table 3: Shows awareness of students regarding needle stick and sharp injuries (NSSIs):

Items	*Options*	*N*	*Percentage*
Most NSSIs have been neglected and not reported.	Agree	57	62
	Disagree	8	8.7
	Don't know	27	29.3
Post NSSIs the recommendation is to milk out more blood from injured site?	Agree	37	40.2
	Disagree	29	31.5
	Don't know	26	28.3
Post NSSIs the affected area should be immediately washed thoroughly with soap and water?	Agree	65	70.7
	Disagree	5	5.4
	Don't know	22	23.9
Post- exposure prophylaxis (PEP) should be initiated within one hour of the injury ;	Agree	67	72.8
	Disagree	7	7.6
	Don't know	18	19.6
Most injuries occur during recapping of used needles	Agree	69	75
	Disagree	16	17.4
	Don't know	7	7.6
Post injury the exposed person should be monitor for at least 6 months after exposure	Agree	74	80.5
	Disagree	6	6.5
	Don't know	12	13

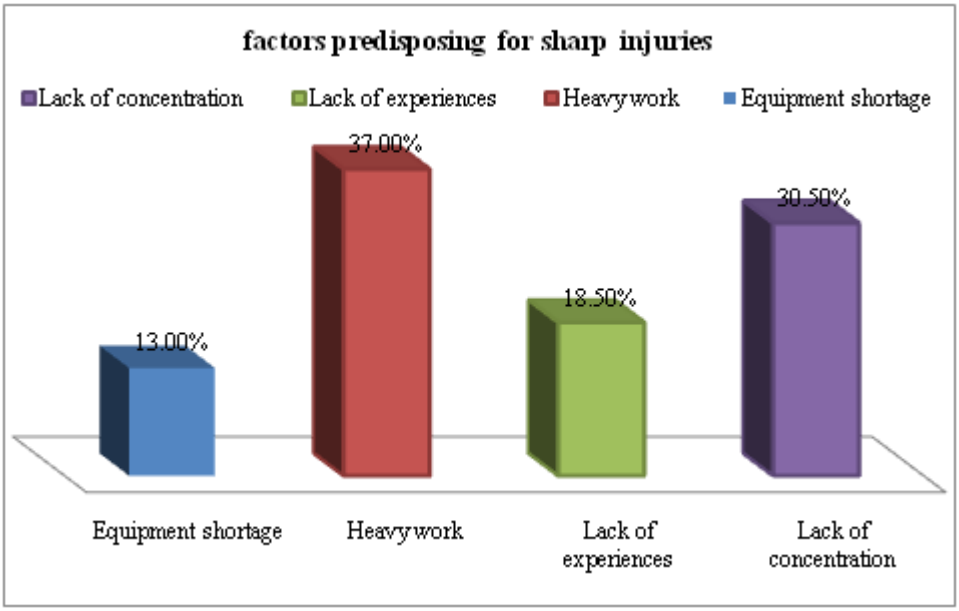

Figure 1: illustrate students` view regarding factors predisposing for needlesticks and sharp injuries

Table 4 presents the comparison of students' exposure to Needlestick and sharp injuries, according to their academic year, departments, using of gloves for venopuncture and Hepatitis B vaccination. It was found that there was a significant relation between departments (p=0.014) in regard to status of Hepatitis B vaccine, which mean 95.3% of laboratory students was vaccinated against hepatitis B virus Whereas only 77.6% of nursing students were vaccinated against it.

Table 4: Compare the exposure of students to Needlestick and sharp injuries, according to their academic year, departments, using of gloves for venopuncture and Hepatitis B vaccination

Characteristic	Did you ever have needle stick or sharp						Are using of glove for venopuncture?					
	Yes		No		X^2	P-value	Yes		No		X^2	P-value
Academic	n	%	n	%			n	%	n	%		
Third year	7	17%	5	10%			9	11.4	3	23%	1.35	**0.509**
Fourth year	15	36%	1	32%	**1.33**	**0.513**	2	34.2	4	31%		
Bridging	20	40.9	2	59.1			4	87.7	6	12.3%		
Department	**Did you ever have needle stick or sharp**						**Hepatitis B vaccine status**					
	Yes		**No**		X^2	P-value	**Vaccin**		**Not vaccinated**		X^2	P-value
	n	%	N	%			n	%	n	%		
Nursing	22	52.8	2	54%	.024	**.887**	3	77.6	1	22.4%	5.97	**0.014**
Laboratory	20	40.9	2	59.1			4	95.3	2	4.7%		

Table 5 shows the comparison of students' characteristics with reporting of needlestick injuries to clinical instructors and the technique used to recap used needles in case they have to recap them. It was found that there was a significant relation between departments (p=0.014) in regard to status of Hepatitis B vaccine, which mean 95.3% of laboratory students was vaccinated against hepatitis B virus Whereas only 77.6% of nursing students were vaccinated against it. In this table there was no significant relation between academic year and departments (p>0.05) in regard to reporting of Needlestick injuries to clinical instructors.

Table 5: Compares the student`s characteristics with reporting of needlestick injuries to clinical instructors and the technique used to recap used needles in case they have to recap them

Characteristic	in case you have to recap the needle are you using one hand technique or two hand						Reporting of needlestick injuries to clinical instructors					
	One hand technique		Two hands technique		X^2	P-value	Reported		Not reported		X^2	P-value
Academic	n	%	n	%			n	%	n	%		
Third year	8	66.7	4	33.3%	2.760	0.252	3	37.5	5	62.5%	2.819	**0.244**
Fourth year	13	41.9	18	58.1%			1	73.3	4	26.7%		
Bridging	28	57.1	21	42.9%			1	57.9	8	42.1%		
Department	in case you have to recap the needle are you using one hand technique or two hand						Reporting of needlestick injuries to clinical instructors					
	One hand technique		Two hands technique		X^2	P-value	Reported		Not reported		X^2	P-value
	n	%	N	%			n	%	n	%		
Nursing	28	57.1	21	42.9%	.635	0.279	1	56.5	1	43.5%	0.19	**0.453**
Laboratory	21	48.8	22	51.2%			1	63.2	7	36.8%		

4. Discussion

92 male students were participated in this study, from two departments; 49(53.3%) were nursing students, 43(47.7%) were laboratory students. Hepatitis B vaccination is curtail for students in medical and health sciences, and CDC [17] recommended vaccination against HBV for medical and nursing students, laboratory technicians, pharmacists, hospital volunteers, and administrative staff. In various studies performed among the students from different fields of health in world and Turkey, the rates of hepatitis B vaccination were changed between 50% with 99.3% .[18]. In this study (79) 89.1% of students were fully vaccinated against hepatitis B virus, which indicated that most of students were oriented about the important of this vaccine. In regard to significant of Hepatitis B vaccination, this study showed, there was a significant relation between departments (p<0.05). "The major blood-borne pathogens of concern associated with needlestick injury are hepatitis B virus (HBV), hepatitis C virus (HCV) and HIV. Among these viruses HBV take highest chance (30%) to be transmitted by NSSIs." [19]. This study revealed that students think that HBV was take 27.2% and HIV 48.9%. Respectively, so the students need to know that HBV take highest chance to be transmitted by NSSIs than HIV. In study performed among the students from the departments of medicine, dentistry, nursing and midwifery, the frequency rate of NSSIs was determined to be 71.1% [20]. However, in various studies performed among health school students (nursing, midwifery, health officials) in Turkey, the rates of injuries were determined between 35.5% with 74.1%. [18]. In this study, among (92) students from both department the rate of inquiries was 45.7% (42). Compared to these studies, this rate was considered high because near to half of students were expose to needle stick injuries.

In regard to reporting of exposure to clinical instructor, this study found there no statistical significant (p>0.05) between departments and academic year.

In regard to the student should have to recap the used needle, this study found that near to half of (47.3% students using two hands to recapped the used needle, this methods increase the risk to expose to needle injury, so the students need more clinical to practice to not recapping needles and in case of they have to that, they must have to use one hand technique (scoop

method) recapped the used needle. About factor predispose for exposure to NSSIs, "one study performed among nursing students in Brazil, the factors affecting the rate of exposure to NSSIs were found as lack of attention (22.2%), lack of experience (13.9%), inadequate hand skills (9.7%) and hurrying (6.9 %)." [18]. In this study the factor affecting expose to injuries was heavy work (37%), lack of concentration (30.5%), lack of experiences (18.5%) and lack of equipments to dispose sharps (13%). This study revealed that heavy work was dominant factor predisposed to needle stick injuries.

5. Conclusion

The rate of expose to inquiries among students was 45.7%, majority of them were vaccinated against (HBV) and there was a significant relation between departments ($p<0.05$) in regard to HBV

6. Recommendations

The orientation for the students about the infection control recommendations and guidelines is mandatory and students are advised to avoid recapping of used needle, however in case of exposure to NSSIs, the students should have report this incidence to their clinical instructors immediately.

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