

Ramazan Akgun

V year, 13gr

**Attitude and awareness of international dental students toward
needle-stick and sharp injuries at LSMU**

Master's Thesis

Supervisor

Dr, Sandra Petrauskienė

Kaunas, 2020

LITHUANIAN UNIVERSITY OF HEALTH SCIENCES
MEDICAL ACADEMY
FACULTY OF ODONTOLOGY
CLINIC FOR PREVENTIVE AND PAEDIATRIC DENTISTRY

**Attitude and awareness of international dental students toward
needle-stick and sharp injuries at LSMU**

Master's Thesis 2020

The thesis was done

by student

.....
(signature)

.....
.....
(name surname, year, group)

..... **20....**
(day/month)

Supervisor

..... (signature)

..... (degree, name surname)

..... **20....**
(day/month)

Kaunas, 2020

ABBREVIATIONS	4
SUMMARY	5
INTRODUCTION	6
Objectives:	7
1. REVIEW OF REVIEW	9
1.1 Most HCWs affected by injury with sharp instruments.	9
1.2 Attitude and Behaviour towards standard precaution guidelines	9
1.3 Effect of Standard Precaution	10
1.4 Risk of infection	10
2. MATERIAL AND METHODS.....	11
2.1 Subjects	11
2.2 Questionnaire	11
2.3 Statistical analysis.....	12
RESULTS	13
DISCUSSION.....	19
4.1 Limitation of the study	20
ACKNOWLEDGEMENT	21
CONFLICT OF INTERESTS	22
CONCLUSIONS	23
ENSURING OF CONFIDENTIALITY	23
PRACTICAL RECOMMENDATIONS	23
REFERENCES	24
ANNEXES.....	29
Annexe 1: Questionnaires.....	29
Annexe 2: Standard Precaution Brochure - WHO 2007.....	31
Annexe 3: Ethical approval	33

ABBREVIATIONS

HCW - Health care workers

BBP - Blood-Borne Pathogens

HBV - Hepatitis B Virus

HCV - Hepatitis C Virus

HIV - Human Immunosuppressive Virus

DHCW - Dental Health Care Worker

UP - Universal Precaution

SP - Standard Precaution

NSI - Needle-stick injury

NS – Needle-stick

SI - Sharp injury

NSSI – Needle-stick and sharp injury

BOPIM -Blood and Other Potential infectious Material

Attitude and awareness of international dental students toward needle-stick and sharp injuries at LSMU

SUMMARY

Aim: To evaluate the attitude and awareness toward NSSI among international dental students at LSMU.

Materials and methods: The study enrolled 117 international dental students at LSMU. The self-administered questionnaire consisted of demographic characteristics, injury prevalence, behaviour after any occurred injury, the attitude of safety precautions. The participation was anonymous and voluntary. The data was analysed using SPSS 20. A comparison between variables was made by Chi-square test. Statistical significance was set at $P < 0.05$. Univariate logistic regression analysis evaluated the probability of an event given a certain risk indicator, including the odd ratio (OR) and its confidence interval (95% CI).

Results: Participants were 54.7% female and 45.3% male. Overall, 48.7% of international dental students had an experienced SI during their Dentistry studies. Senior dental students showed significant associations with experienced SI (OR = 2.222, 95% CI [1.053 – 4.692]; $p = 0.035$). Significantly more undergraduates (48.1%) of the younger group reported about the occurred injury while working on phantoms, while significantly more senior students (30%) experienced SI while working with patients ($p=0.006$). A majority (86.0%) of dental students experienced SI did not report for staff. Almost all dental students (97.4%) washed hands before and after the procedure, in addition 63.2% of participants knew the proper handwashing sequence.

Conclusion:

Almost half of the international dental student experienced sharp injury once, whereas preclinical student showed lower rate. Participants behaviour after an injury showed a significant underreporting to the staff. Most of the international dental students showed an adequate level of attitude and knowledge toward the Universal Precaution at LSMU.

Keywords: Needle-stick injury, sharp instrument injury, dental workplace, dental students prevalence, attitude, behaviour.

INTRODUCTION

Health care workers (HCW) are daily at risk for occupational exposure of various origins [1].

Moreover, incidents occur with a high prevalence among HCW around the world [2-6]. Various studies revealed that from 32% to 75.11% of health care workers, had been exposed to at least one occupational exposure of injury with sharp instrument [3,6,7,8].

Meanwhile, percutaneous injuries with needle-stick and sharp instruments are the most common (89-98%) source of exposure to blood and other potentially infectious material (BOPIM) [3,7,9,10].

Furthermore, needle-stick and sharp instrument injuries accounts 25% - 45% among all types of occupational-related injuries [11-13].

More dangerously, an accidental occupational injury from a contaminated needle stick or sharp instrument increases the risk of infection from blood-borne pathogens (BBP). Most familiar blood-borne pathogens is Hepatitis B virus (HBV), Hepatitis C virus (HCV) and Human Immunodeficiency Virus (HIV), which can be transmitted from infected patients' blood and body fluids [1,14-16]

Occupational sharps injury is attributable to 37-40% of all HBV and HCV infections [17,18]. The average risk of HBV, HCV, and HIV infection transmission associated with occupational exposure by a needle stick or sharp instrument, might be low and rare, especially among dentists [19,20] but should not be blindsided toward its consequences.

Standard Precaution Guidelines

The first measure taken against infectious control was by Joseph Lister performing the first surgery with the antiseptic system in 1877 [21]. In 1985, the Center for Disease Control (CDC) introduced the first set of guidelines, Universal Precaution (UP). The new guidelines assumed, that any blood and patients, universally, respective of their unknown diagnosis, are potentially a source of infection for blood-borne pathogens. [22,23]. Later, new edited guidelines got simplified in regards of both terms, and elements, while reiterating previous guidelines, being called Standard Precaution Guidelines. Subsequently, the recent standard precautions cover hand hygiene, personal protective equipment, safe management of sharps, safe disposal of waste and environmental controls [24,25, see Annex 2]

Personal Protective Equipment (PPE)

Protective barriers include gloves, masks, gowns, and protective eyewear or face shields.

Gloves should be used for numerous reasons, for instance, to avoid direct contact of blood and body fluids, to handle items or contaminated surfaces. With gloves you can prevent a gross microbial

contamination of hands, however, they can't stop any percutaneous injuries from needle-stick or other sharp utensils. Masks and protective eyewear or face shields are barriers that are intended to avert exposure and incidence of contamination, e.g saliva with blood unto mucous membranes of the mouth, nose, and eye conjunctivitis, which is usually seen in dentistry. Impermeable fluid resistance gown should be worn during procedures and patient-care activities when contact of clothing and exposed skin with blood/body fluids is anticipated. In addition, the feet should be covered and protected fully towards the exposure of blood and body fluid, and from an accidental drop of sharp items and any chemical exposure [22,23,25].

Hand hygiene

A good practice of hand hygiene is considered as the single most important and cost-effective precaution against exposure of infectious agents (BOPIM) in healthcare settings. It should be employed every time after touching blood, body fluids, secretions, excretions, contaminated items and surfaces, immediately after removing gloves and between patient contacts [22-25]

Immunization

HBV vaccine is considered as a vital adjunct to universal precautions for health-care workers, who have a high risk for exposure to blood and OPIM [22]. HBV vaccination is highly recommended in developed countries, with several countries even mandating employers and institutions to offer vaccination to HCW such as the USA and France. [25-26].

All health-care workers should take precautions to reduce injuries caused by sharp items. Any handling of sharp instruments should be considered as a potential infective source; thus, be conducted with extraordinary care during invasive procedures. Unnecessary usage, along with unsafe cleaning of used sharp instruments, and with incorrect disposal of needles after procedures, should be prevented by special measures, To prevent further needle-stick injuries, needles shouldn't be recapped, purposely bent or manipulated by hand, and try to eliminate unnecessary procedures and hand-to-hand passing of sharp items. [22-23]

The number of accidental needle-stick and sharp injuries have been shown to be preventable and can drastically be reduced by different interventions programs, communication, new safety devices and a continual education on the topic [27-30].

The undergraduate dental students today, are tomorrows' doctors. Therefore, should they partake with a heavier social responsibility, and act as an exemplary function among their accompanying environment, especially for their patients [31].

Dental students should have a good knowledge before their initial training period at the clinic which should be preconditioned for compliance [32].

Therefore, a challenging responsibility relies on the teaching institute. They must provide students of healthcare an adequate training and knowledge to increase their awareness and perspective towards the risk and consequences of nosocomial transmission from occupational exposure as pre-requisite before undertaking any patient procedure involving sharp devices. The introduction of new safety devices is another crucial preventive step for reducing NSI among health-care workers [10, 32-34].

Hypothesis

We expect a majority of international dental students in LSMU to encounter needle-stick and sharp instrument injury at least once during their time in practice. Preclinical students may show less sharp injury incidents.

The aim of research: To evaluate the attitude and awareness toward needle-stick and sharp injuries among international dental students from 2nd to 5th year at LSMU.

Objectives:

1. To collect the data and to evaluate the prevalence of needle-stick and sharp injuries, to define the most common procedure when this type of injury occurs among 2nd - 5th year international dental students at LSMU.
2. To evaluate international dental students' behaviour after experienced injury with sharp instruments.
3. To evaluate international dental students' knowledge and attitude toward Universal Precaution.

1. REVIEW OF LITERATURE

1.1 Most HCWs affected by injury with sharp instruments.

Worldwide, a variety of studies are carried out to assess the prevalence of occupational injuries with sharp injuries. Several studies found a high prevalence of incidents among HCW [2-6].

The global studies enrol different specialities of health care workers, such as undergraduates, master and doctorates, medical doctors, dentists, nurses, and others. Findings showed that medical doctors reported a higher incidence than dental staff [4, 35] In addition, 75% of the sustained NSI among dental health care professionals was dental assistants, occurring mostly while cleaning soiled instruments and devices [15].

A study performed in Japan revealed a higher prevalence of injury with a sharp instrument is related to a younger age (up to 35 years old) and clinical work experience with less than 2 years [33]. Overall, 10.6% of dental students had exposure with a sharp instrument and 62.5% of them were responsible for all the total injuries in the US [36]. Another study carried out in the US showed higher rates of injuries among junior year students [10]. In addition, another study confirmed, that dental students tend to experience injury with sharp instruments more often than postgraduate ones [9]. This indicates the dental students' vulnerability, with its higher risk of exposure compared with its categorical colleagues. Overall, most studies point out, that the majority of incidents are caused by nurses among healthcare workers [4-5,11,15].

1.2 Attitude and Behaviour towards standard precaution guidelines

A survey done among medical, dental and nurse students, concerning post-exposure prophylaxis (PEP), showed only 11.1% of those exposed took it either in the form of tetanus toxoid or oral antibiotics [37]. In Iran, dental students showed even a lower response of acting accordingly with the recommendations, where only 9.7% underwent follow up management and none of them had received the anti-retrovirus drug or hepatitis B Immunoglobulin [38]. To contrary on a Canadian study, dental students were not only more familiar with post-exposure protocols, but also had a higher rate of follow up procedures after injuries, compared to its medical and nurse colleagues, despite having higher prevalence [39]. Moreover, another survey done by Perry et al. found that 15% of nurses took PEP after experienced injury with sharp instruments [40].

1.3 Effect of Standard Precaution

Recapping needle is one of the most common procedures to experience an NSI injury (15, 37,38, 41-43]. Thus, if possible, elimination of unnecessary movement with sharp instruments, such as recapping, is therefore indicated in the Universal Precaution. [22, 25].

Universal Guidelines implementation in the US with sharp containers' placement close to the working area, showed a significant decrease of sharp injuries. In the 1st year of employing the new intervention, a total of NSI decreased by 45% and 53% from recapping injuries. Overall, during the 5 years, the number of needle stick injuries decreased by 60% [27].

Employment of standard precaution for health care workers has been a success to prevent injuries with sharp injuries. The implementation of universal precaution prevents direct contact with blood and body fluids, through an increased use of protective barrier, thus converts what would have been an actual exposure into an averted one [28].

1.4 Risk of infection

Although the risk for transmission of bloodborne pathogen among HCW is low and rare, a seroconversion rate on HBV is 6-30%, HCV 1.8% (range 0 to 8%), and HIV 0.3% following needle stick and sharp exposure is estimated [1, 16, 44].

Subsequently, the result of a study shows 14 seroconversion of health care workers, following an injury with a hollow-bore and blood-filled needle. Moreover, a deep injury increases the seroconversion risk. (45).

Strong recommendations for vaccination and immunization policies, especially for HBV among HCW [25], has demonstrated indisputable outcome, where HBV cases following needle stick has declined drastically over the 20-year the US (46). The absolute decline of HBV infections we see among clinical staff is foremost attributed to the success of standard precautions implementation into the health care settings. This includes as well broader application of barrier precautions and personal protective devices [16, 27, 28].

2. MATERIAL AND METHODS

A cross-sectional study was conducted to assess the attitude and awareness of international dental students toward needle-stick and sharp injuries at LSMU during the 2019-2020 study year at Lithuanian University of Health Science (LUHS), Kaunas, Lithuania.

Ethical approval for the study was obtained from the Head (E. Peičius) of Bioethics Center of LSMU, Kaunas (Reference no. BEC-OF-48)

2.1 Subjects

The subjects of the research were international dental students of the 2nd- 5th academic years at LSMU. A total of 140 2nd- 5th academic years students are registered on Dentistry in the English study program at LSMU as of 2019-2020 study year. All international dental students (2nd-5th academic years) were invited to participate and to complete an anonymous self-administered questionnaire before the beginning of a lecture or a compulsory practical class. Participation was voluntary and anonymous; thus, the return of the completed questionnaire was considered as acceptance to participate.

Overall 117 participants were enrolled in this study. The response rate was 83.6%.

Later participants were dichotomized into two groups (2nd-3rd year as a younger group) and 4th-5th year (senior group) according to academic year and experience of clinical practice.

2.2 Questionnaire

An anonymous self-administered questionnaire was developed by the investigator (RA) and scientific supervisor (SP).

The questionnaire consisted of 19 questions. The first part of the questionnaire covered demographic data (gender and academic year). The second part consisted of questions about any experienced injury with sharp instruments and students' behaviour after this type of injury. Meanwhile, the last part of the questionnaire inquired questions about Universal Precaution Guidelines.

Questions regarding experienced injury with sharp instruments covered information about times of experienced injury with a sharp instrument (once or more times), type of sharp instrument (needle, endo file, probe, bur or another type of instrument), and peculiarities when it has occurred (preparing instrument before a procedure, while working with a patient or on phantom and collecting instrument after work). Considering students' behaviour after experienced injury with a sharp instrument, questions asked if students reported about unexpected injury and reasons why the injury was not

reported (the needle was not used, did not know how to report, did not have time to report and embarrassed or worried to report) if students had post-exposure prophylaxis and washed hands with soap immediately after experienced injury with a sharp instrument.

Questions regarding students' awareness about Universal Precaution Guidelines inquired information about the usage of self-protecting measures (gloves, facemask, eye protection, closed type shoes), hand washing manner (if hands are washed before gloves will be used and after the work with a patient) and handwashing technique (if students know a correct handwashing sequence). Several questions asked about the handling of instruments after the procedure (leave sharp instruments on the working tray, place sharp instruments in the special container or throw the needle/sharp instrument in the garbage) and recapping of the needle (if students recap them after usage and how (by one hand or both hands). Finally, one question covered information about the students' knowledge about potentially transmitted diseases (hepatitis B, hepatitis C, and HIV/AIDS).

2.3 Statistical analysis

The data were analysed using the statistical package, SPSS 20. To obtain the comparison between these categorical variables, was made by the Chi-square test. Statistical significance was set at $P < 0.05$. The confidence interval was 95%.

Univariate logistic regression analysis evaluated the probability of an event (students' academic year) given a certain risk indicator (experienced injury with a sharp instrument and recapping of the needle after usage) including the odd ratio (OR) and its confidence interval (95% CI).

RESULTS

In this study, participants were 54.7% female and 45.3% male ($p>0.05$) (Table 1). The biggest group of undergraduates was 2nd academic year dental students (29.9%), while the 4th and 5th academic year participants equally (21.4%) were the lowest groups, respectively. Statistically significant differences were not found in students' distribution by academic year ($p>0.05$).

Table 1. Characteristics of the participants (N=117) by gender and academic year.

Variables	Total N (%)
Gender	
Male	53 (45.3)
Female	64 (54.7)
Total	117 (100.0)
Academic year	
2 nd year	35 (29.9)
3 rd year	32 (27.3)
4 th year	25 (21.4)
5 th year	25 (21.4)
Total	117 (100.0)

Chi-square test; $P > 0.05$. Comparing results by students' academic year.

Overall, 48.7% of international dental students (N=117) had experienced injury with a sharp instrument at least once during their Dentistry studies. Consequently, results showed that significantly more undergraduates of the 4th-5th year reported about experienced injury with sharp instrument than younger ones (60.0% vs.40.3%) ($p=0.035$) (Figure 1). Dental students of 4th-5th year showed significant associations with experienced injury with sharp instrument (OR = 2.222, 95% CI [1.053 – 4.692]; $p = 0.035$) (Table 2).

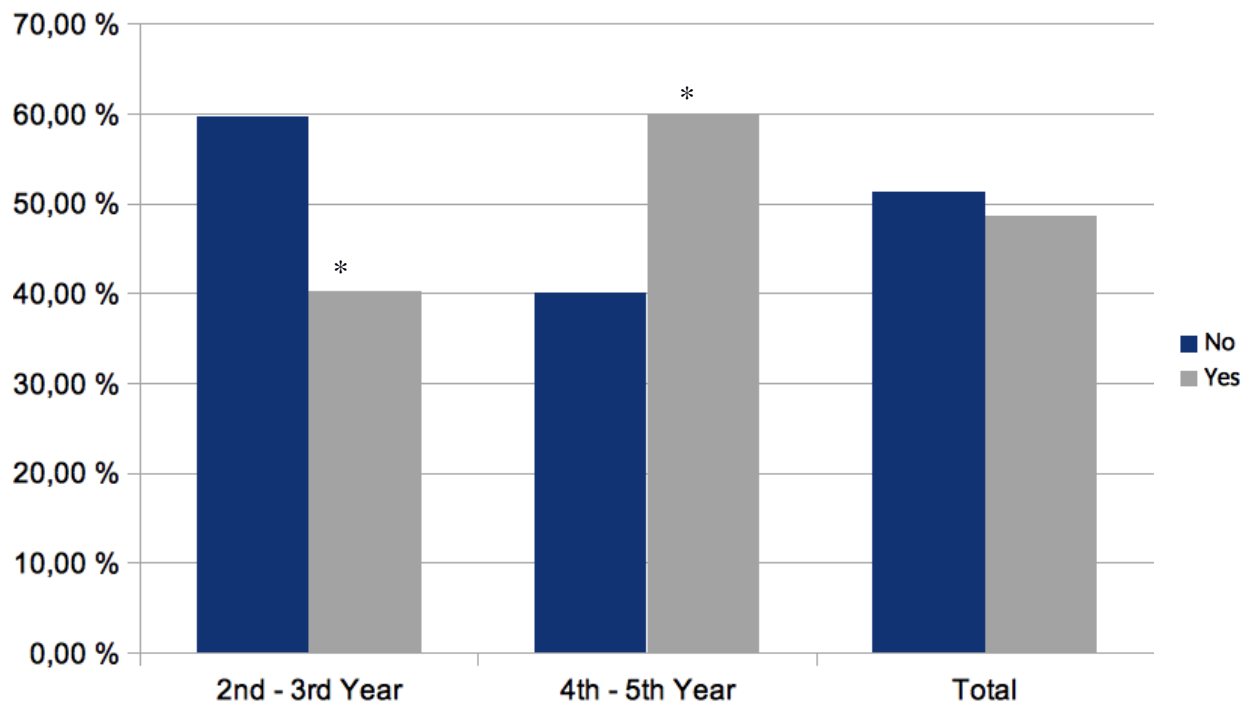


Figure 1. Prevalence of experienced injury with sharp instrument among international dental students (N=117). ($p^*=0.035$)

Table 2. Participants' behaviour towards clinical procedures in univariate logistic regression model.

	OR	95% CI	P-value
Experienced injury with sharp instrument			
2 nd - 3 rd Year	1	-	-
4 th - 5 th Year	2.222	1.053 – 4.692	0.035
Recapping of needle after usage			
2 nd - 3 rd Year	1	-	-
4 th - 5 th Year	5.957	2.338 – 15.176	<0.001

CI, confidence interval; OR, odds ratio.

Table 3 presents the participants' behaviour after experienced injury with a sharp instrument. Considering the amount of experienced injury with a sharp instrument, a majority of participants (52.6%) had it more than once ($p=0.675$). Overall, dental students reported that needle (28.1%) was the most common cause of injury. In addition, injury with bur (37.0%) was the most common among the 2nd-3rd academic year of dental students, and injury with a needle (40.0%) was prevailing among senior students ($p=0.230$). Moreover, significantly more undergraduates (48.1%) of the younger group reported about the occurred injury while working on phantoms, while significantly more senior students (30%) experienced injury with sharp instruments while working with patients ($p=0.006$). Overall, a majority (86.0%) of dental students who experienced an injury with sharp instrument did not report for staff as they needed. Consequently, all participants (100%) of the 2nd-3rd academic year group and 73.3% of senior group students did not report about this unexpected event ($p=0.004$). Considering the reason for non-reporting of experienced injury with a sharp instrument, the most common answer overall was an unused needle (44.0%). In addition, senior students reported not only that needle was unused (30.4%), but also several reasons of hidden event (30.4%) ($p=0.018$) (Table 3). Results revealed, that majority (82.1%) of dental students experienced injury with sharp instrument did not use Post-Exposure Prophylaxis (PEP), while at least 67.9% of undergraduates reported that they washed hands with soap immediately after an injury had occurred.

Table 3. Behaviour after experienced injury with sharp instrument among participants (N=57).

Variables	Academic year N (%)		Total N (%)	P-Value
	2nd - 3rd Year	4th - 5th Year		
Times of experienced injury				
Once	12 (44.4)	15 (50.0)	27 (47.4)	0.675
>Once	15 (66.6)	15 (50.0)	30 (52.6)	
Total	27 (100.0)	30 (100.0)	57 (100.0)	
Cause of injury				
Needle	4 (14.8)	12 (40.0)	16 (28.1)	0.230
Endo File	3 (11.1)	4 (13.3)	7 (12.3)	
Bur	10 (37.0)	4 (13.3)	14 (24.6)	
Other types of sharp instrument	4 (14.8)	3 (10.0)	7 (12.3)	
More than one type of sharp instrument	6 (22.2)	7 (23.3)	13 (22.8)	
Total N (%)	27 (100.0)	30 (100.0)	57 (100.0)	
Procedure when injury with sharp instrument happened				
While working with patient	0 (0.0)	9 (30.0)	9 (15.8)	0.006
While working on phantom	13 (48.1)	4 (13.3)	17 (29.8)	
While collecting instruments after procedure	4 (14.8)	3 (10)	7 (12.3)	
While preparing before procedure	4 (14.8)	5 (16.7)	9 (15.8)	
During several <i>occasions</i> of clinical work	6 (22.2)	9 (30)	15 (26.3)	
Total N (%)	27 (100.0)	30 (100.0)	57 (100.0)	
Reporting of experienced injury				
Yes	0 (0.0)	8 (26.7)	8 (14.0)	0.004
No	27 (100)	22 (73.3)	49 (86.0)	
Total N (%)	27 (100.0)	30 (100.0)	57 (100.0)	
Reason of non-reporting experienced injury (Missing N=7)				
Needle was unused	15 (55.6)	7 (30.4)	22 (44.0)	0.018
Did not know how to report	2 (7.4)	5 (21.7)	7 (14.0)	
Did not have time to report	6 (22.2)	4 (17.4)	10 (20.0)	
Embarrassed or worried to report	3 (11.1)	0 (0.0)	3 (6.0)	
Several reasons	1 (3.7)	7 (30.4)	8 (16.0)	
Total N (%)	27 (100.0)	23 (100.0)	50 (100.0)	

Chi-square test; Comparing results by students' academic year groups

Table 4 presents the behaviour toward precaution of handling with sharp instruments among participants. Results showed that three-quarters of participants (75.2%) did not follow recommendations to wear all the protective measures during clinical practice. Subsequently, 65% of dental students reported leaving used instruments in the sharp instrument containers. Considering the recapping of a needle after the procedure, significantly more 4th-5th year students recapped the needle than 2nd-3rd year ones (86.0% vs. 52.3%) ($p < 0.001$). Considering the safety of recapping, and the technique being used, a majority used the non-recommended technique of recapping by two hands (68.4%). Dental students of the 4th-5th year showed significant associations with recapping the needle after usage (OR = 5.957, 95% CI [2.338 – 15.176]; $p < 0.001$) (Table 4).

Table 4. Behaviour toward precaution of handling with sharp instrument among participants (N=117).

Table 4: Behaviour toward precaution or handling with sharp instrument among participants (N=117).				
Variables	Academic year N (%)		Total N (%)	p-value
	2 nd -3 rd year	4 th -5 th year		
Usage of protective measures during clinical practice				
Gloves, facemask, and eye-protection	11 (16.4)	12 (24.0)	23 (19.7)	0.669
Do not use all recommended protective measures	56 (76.1)	38 (74.0)	94 (75.2)	
Total N (%)	67 (100.0)	50 (100.0)	117 (100.0)	
Handling of sharp used instrument				
Leave it on the working tray	18 (26.9)	6 (12.0)	24 (20.5)	0.092
Place in a sharp instrument container	38 (56.7)	38 (76.0)	76 (65.0)	
Throw it to the garbage	7 (10.4)	2 (4.0)	9 (7.7)	
Several situations with different handling	4 (6.0)	4 (8.0)	8 (6.8)	
Total N (%)	67 (100.0)	50 (100.0)	117 (100.0)	
Recapping of needle after usage (Missing N=2)				
No	31 (47.7)	7 (14.0)	38 (33.0)	<0.001
Yes	34 (52.3)	43 (86.0)	77 (67.0)	
Total N (%)	65 (100.0)	50 (100.0)	115 (100.0)	
Technique of needle recapping (Missing N=3)				
By one hand scoop	9 (26.5)	15 (35.7)	24 (31.6)	0.001
By two hands	25 (73.5)	27 (64.3)	52 (68.4)	
Total N (%)	34 (100.0)	42(100.0)	76 (100.0)	

Chi-square test; Comparing results by students' academic year group

Table 5 represents participants' knowledge and attitude toward Universal Precaution Guidelines. Results showed that almost all dental students (97.4%) washed their before and after the procedure, although 63.2% of participants knew the proper handwashing sequence. Overall, a majority (56.4%) of dental students reported a moderate level of knowledge about "The Universal Precaution Guidelines". Surprisingly, significantly more 2nd- 3rd academic year students reported a very good level of knowledge than 4th-5th academic year ones (31.3% vs. 10.0%) ($P=0.019$). Considering the knowledge of possible disease transmission of bloodborne pathogens after injury with sharp instrument a majority (80.3%) dental students knew that HBV, HCV, HIV/AIDS can be transmitted after injury (Table 5).

Table 5. Knowledge and attitude toward Universal Precaution Guidelines among participants (N=117).

Variables	Academic year N (%)		Total N (%)	p-value
	2 nd -3 rd year	4 th -5 th year		
Washing hands before the procedure (Missing N=1)				
Yes	64 (97.0)	49 (98.0)	113 (97.4)	0.729
No	2 (3.0)	1 (2.0)	3 (2.6)	
Total N (%)	66 (100.0)	50 (100.0)	116 (100.0)	
Washing hand after procedure (Missing N=1)				
Yes	64 (97.0)	49 (98.0)	113 (97.4)	0.640
No	2 (3.0)	1 (2.0)	3 (2.6)	
Total N (%)	66 (100.0)	50 (100.0)	116 (100.0)	
Knowing of proper handwashing sequence				
Yes	41 (61.2)	33 (66.0)	74 (63.2)	0.865
No	26 (38.8)	17 (34.0)	43 (36.8)	
Total N (%)	67 (100.0)	50 (100.0)	117 (100.0)	
Knowledge of the “Universal Precaution Guidelines”				
Very good	21 (31.3)	5 (10.0)	26 (22.2)	0.019
Moderate	32 (47.8)	34 (68.0)	66 (56.4)	
Poor	14 (20.9)	11 (22.0)	25 (21.4)	
Total N (%)	67 (100.0)	50 (100.0)	117 (100.0)	
Knowledge of possible disease transmitted				
Only Hepatitis B	3 (4.5)	3 (6.0)	6 (5.1)	0.257
Only Hepatitis C	1 (1.5)	0 (0.0)	1 (0.9)	
Only HIV/AIDS	2 (3.0)	2 (4.0)	4 (3.4)	
Several of mentioned diseases	3 (4.5)	9 (18.0)	12 (10.3)	
Hepatitis B, Hepatitis C, HIV/AIDS	58 (86.6)	36 (72.0)	94 (80.3)	
Total N (%)	67 (100.0)	50 (100.0)	117 (100.0)	

Chi-square test; Comparing results by students' academic year groups

DISCUSSION

This study revealed that about half of the international dental students had experienced an injury with a sharp instrument (SI) at least once. Subsequently, an accidental occupational injury with SI was more prevalent among senior dental students, most probably due to longer clinical practice experience.

Various studies on the prevalence of injuries with sharp instruments varied from 43.5% to 64% among dental students around the world [38,42,43,47].

Moreover, half of the participants experienced occupational sharp injury, more than once, while other studies showed a lower prevalence of repeated injuries among students [38, 42,43]. Finally, a study performed in the United Kingdom revealed a higher prevalence of injuries when dental students were working alone, than having a chairside assistant employed [48].

Considering the type of clinical practice (pre-clinical or clinical), younger students, especially the 2nd academic year of dental students study preclinical subjects. Thus, having reports about injuries with sharp instruments while working on phantoms. To the contrary, senior dental students experienced injury with sharp instruments while working on patients and had a higher chance of being infected with transmittable bloodborne pathogens diseases.

An accidental injury with needle-stick or sharp instruments can occur during any moment of any procedures while handling them. The results of this study showed, that dental students underwent occupational injury during several steps of the dental treatment procedures. Surveillance study performed by Younai et al. 2001, showed most injuries occurred post-operatively (55%) while cleaning-up the instrument or intra-operatively (41%) [10]. Meanwhile, another 12-year surveillance study revealed the opposite, that needle-stick injuries usually happen intra-operatively (55%) and post-operatively (41%) [33].

Prevalence of needle-stick or sharp instrument injuries may be reduced by using a correct needle recapping technique. Although the one-hand scoop technique is the recommended way [22,25], This study presented two-thirds of the participants using the two-hands recap technique. Worldwide studies disclosed as well that recapping is the procedure that is the most common approach to get needle-stick injury [15,37,38,41-43]. Consequently, usage of non-recappable needle can ensure the absence of incidents while recapping, but injury can occur during local anaesthetics employment in the mouth [48]. Knowing and practising standard precaution and infection control are crucial for the safety of both health-care workers and patients. As previously mentioned, Hand hygiene is the single and most practical method of reducing infection transmission [49]. In regards, more or less, all of the participants washed the hands before and after the clinical procedure and almost two-thirds of participants knew a correct hand hygiene sequence.

At the beginning of every preclinical or clinical dental subject, students are introduced or reminded to recommendations on occupational safety and health at LSMU. Thus, dental undergraduates, especially senior ones, should know and behave after an unexpected injury according to the strict rules. Unfortunately, this study revealed a vast of the participants experiencing an injury with a sharp instrument, did not report about it as they must. Furthermore, dental students mentioned a lack of knowledge or time of reporting the injury or they claimed that the needle was unused. Meanwhile, the findings of other studies were in the same line with our study. Worldwide, students did not report injury with sharp instruments due to several reasons such as underestimating the significance of exposure, a lack of time to report it, unused needle, and fear for stigmatization and discrimination [41,50]. Also, the same problematic event of non-reporting was prevalent not only among students but also among hospitals' medical staff [4-6]. Finally, dissatisfaction with follow-up by administrators after reporting the events, a low-risk perception, and time-consuming protocols are some other reasons for underreporting needle-stick injuries among personnel [50,51].

Therefore, a continuous learning is needed to change insufficient self-assessment attitude and perspective for the low risk of infection transmission or the perceived lack of time among dental students and staff. Subsequently, hospital policies, rules, and regulations may confuse the personnel, thus they do not know where to report and what forms to complete after needle-stick injuries due to often updated changes in the hospitals' and clinics' guidelines and policies [6,50,51].

To conclude, injuries with needle stick and sharp instruments are unavoidable and it occurs with a high frequency, likewise among our students and with other studies of health care workers. This makes all health-care worker mores vulnerable to getting bloodborne pathogens and infectious diseases such as HBV, HCV, and HIV. Following the precaution guidelines, rules, and regulation and applying new safety devices, is drastically decreasing the health care workers' occupational exposure to blood and other potentially infectious material and needle-stick and sharp instrument injuries. This study showed that dental students lacked a correct attitude and behaviour towards sharps injury, and most of the precaution actions and perspective were not satisfactory correctly approached. Furthermore, there is a need for improvement of reporting, and change the attitude and perspective of the dental students towards the potential risk of a nosocomial transmission and consequences that can occur from any percutaneous injury.

4.1 Limitation of the study

This study enrolled only dental students of study program Dentistry taught in English. Thus, the sample of this study does not represent all dental students at LSMU. A pilot study was not performed; thus, the clarity and structure of some questions might have been improved. The data of this study were

collected with a self-reported questionnaire, and the possibility of both intentional and unintentional misreporting can compromise the validity and reliability of the findings. The data of officially reported injuries with sharp instruments among international dental students was not analysed. Thus, it is impossible to compare participants' self-reported findings and a "real" statistical data at LSMU.

ACKNOWLEDGEMENT

To my supervisor, Dr Sandra Petrauskienė, I am utterly, forever grateful for her invaluable assistance, support, enthusiasm, and collaboration. Your patience, guidance, dedication, and encouragement were inspirational towards reaching the standard of work you always wanted.

For that, I say a heartfelt thank you.

In addition, I would also acknowledge all the international odontology students who participated in the survey for their contribution to this study.

CONFLICT OF INTERESTS

The author has not encountered any conflict of interests during this research.

CONCLUSIONS

1. Almost half of the international dental student experienced sharp injury once, whereas preclinical student showed lower rate. Senior year (4th - 5th) dental students experienced more injuries while working on a patient, compared to 2nd - 3rd year dental student while working on the phantom.
2. Participants behaviour after an injury showed a significant underreporting to the staff. A majority of the students failed to apply their behaviour correctly according to the Standard Precaution guidelines after an injury.
3. Most of the international dental students showed an adequate level of attitude and knowledge toward the Universal Precaution at LSMU.

ENSURING OF CONFIDENTIALITY

Confidentiality of responses will be maintained by using an anonymous questionnaire. The name, surname and address will not be included in the questionnaire. The generalized results of the study will be published.

PRACTICAL RECOMMENDATIONS

I believe that awareness about sharp injuries among dental students should be raised by education, practices, resources, interventions and introduction of safer instruments and devices. This can be achieved by adding topics related to the importance of prevention into the curriculum. Also to include initial training and safe practice classes about handling sharp instruments and devices, with resources to upkeep

REFERENCES

1. Wilburn SQ, Eijkemans G. Preventing needlestick injuries among health care workers: a WHO-ICN collaboration. *Int J Occup Environ Health*. 2004 Oct-Dec;10(4):451-6.
2. Ruben FL, Norden CW, Rockwell K, Hruska E. Epidemiology of accidental needle-puncture wounds in hospital workers. *Am J Med Sci*. 1983 Jul-Aug; 286(1): 26–30.
3. Pérez Ruiz C, Torres Salinas M, de la Red Bellvis G, et al. Incidencia de exposiciones accidentales a sangre y fluidos biológicos en el personal sanitario de un hospital comarcal. *Gaceta Sanitaria*. 2017 Nov - Dec;31(6):505-510.
4. Garus-Pakowska A, Górajski M. Epidemiology of needlestick and sharp injuries among health care workers based on records from 252 hospitals for the period 2010-2014, Poland. *BMC Pub Health*. 2019;19(1):634.
<https://doi.org/10.1186/s12889-019-6996-6>.
5. Gao X, Hu B, Suo Y, Lu Q, Chen B, Hou T, et al. A large-scale survey on sharp injuries among hospital-based healthcare workers in China. *Sci Rep*. 2017;7:42620.
Published 2017 Feb 16. doi:10.1038/srep42620
6. Ghanei Gheshlagh R, Aslani M, Shabani F, Dalvand S, Parizad N. Prevalence of needlestick and sharps injuries in the healthcare workers of Iranian hospitals: an updated meta-analysis. *Environ Health Prev Med*. 2018;23(1):44.
Published 2018 Sep 7.
doi:10.1186/s12199-018-0734-z
7. Chen JW, Wang J, Wang AQ, Zhang J, Han LH. [Blood-borne occupation exposures in dental practice of medical staff: status and protection]. *Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi*. 2020 Jan 20;38(1):29-32.
DOI: 10.3760/cma.j.issn.1001-9391.2020.01.006
8. van Wijk PT, Meiberg AE, Bruers JJ, Groenewold MH, van Raalten AL, Dam BA, et al. The risk of blood exposure incidents in dental practices in the Netherlands. *Community Dent Oral Epidemiol*. 2012 Dec;40(6):567-73.

9. Gatto MR, Bandini L, Montevocchi M, Checchi L. Occupational exposure to blood and body fluids in a department of oral sciences: results of a thirteen-year surveillance study. *ScientificWorldJournal*. 2013;2013 459281.
10. Younai FS, Murphy DC, Kotelchuck D. Occupational exposures to blood in a dental teaching environment: results of a ten-year surveillance study. *J Dent Educ*. 2001 May;65(5):436-48.
11. Salminen S, Parantainen A. Injuries of Three Health Care Districts Employees in Finland, *Op J of Safe Sci and Tech OJSST*. 2012;2(3):108-112.
12. Martins MD, Silva NA, Correia TI. Accidents at work and its impact on a hospital in Northern Portugal. *Revista Latino-americana de Enfermagem*. 2012 Mar-Apr;20(2):217-225.
13. Garus-Pakowska A, Szatko F, Ulrichs M. Work-Related Accidents and Sharp Injuries in Paramedics-Illustrated with an Example of a Multi-Specialist Hospital, Located in Central Poland. *Int J Environ Res Public Health*. 2017 Aug10;14(8).
doi:10.3390/ijerph1408090.
14. Wicker S, Cinatl J, Berger A, Doerr HW, Gottschalk R, Rabenau HF. Determination of risk of infection with blood-borne pathogens following a needlestick injury in hospital workers. *Ann Occup Hyg*. 2008 Oct;52(7):615-2
<https://doi.org/10.1093/annhyg/men044>
15. Shah SM, Merchant AT, Dosman JA. Percutaneous injuries among dental professionals in Washington State. *BMC Pub Health*. 2006;6:269. Published 2006 Oct 30.
doi:10.1186/1471-2458-6-269
16. Beltrami EM, Williams IT, Shapiro CN, Chamberland ME. Risk and management of blood-borne infections in health care workers. *Clin Microbiol Rev*. 2000;13(3):385–407.
doi:10.1128/cmr.13.3.385-407.2000.
17. Prüss-Üstün A, Rapiti E, Hutin Y. Sharps injuries: global burden of disease from sharps injuries to health-care workers. Geneva: 2003.
18. World Health Organization. The world health report 2002: reducing risks, promoting healthy life. World Health Organization, 2002.

19. Prüss-Ustün A, Rapiti E, Hutin Y. Estimation of the global burden of disease attributable to contaminated sharps injuries among health-care workers. *Am J Ind Med*. 2005 Dec;48(6):482-90. PubMed PMID: 16299710
20. Kohn WG, Collins AS, Cleveland JL, Harte JA, Eklund KJ, Malvitz DM, et al. (2003). Guidelines for infection control in dental health-care settings—2003. *MMWR Recomm Rep* 52(RR-17):1-61.
21. Worboys M. Joseph Lister and the performance of antiseptic surgery. *Notes Rec R Soc Lond*. 2013;67(3):199–209.
22. Centers for Disease Control (CDC). Recommendations for assisting in the prevention of perinatal transmission of human T-lymphotropic virus type III/lymphadenopathy-associated virus and acquired immunodeficiency syndrome. *MMWR Morb Mortal Wkly Rep*. 1985 Dec 6;34(48):721-6, 731-2.
23. Centers for Disease Control (CDC). Recommendations for prevention of HIV transmission in health-care settings. *MMWR Suppl*. 1987 Aug 21;36(2):1S-18S.
24. Garner JS. Guideline for isolation precautions in hospitals. The Hospital Infection Control Practices Advisory Committee. *Infect Control Hosp Epidemiol*. 1996 Jan;17(1):53-80. Erratum in: *Infect Control Hosp Epidemiol* 1996 Apr;17(4):214.
25. Siegel JD, Rhinehart E, Jackson M, Chiarello L; Health Care Infection Control Practices Advisory Committee. 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Health Care Settings. *Am J Infect Control*. 2007;35(10 Suppl 2):S65–S164.
26. Haviari S, Bénet T, Saadatian-Elahi M, André P, Loulergue P, Vanhems P. Vaccination of healthcare workers: A review. *Hum Vaccin Immunother*. 2015;11(11):2522–2537. doi:10.1080/21645515.2015.1082014
27. Haiduvén DJ, DeMaio TM, Stevens DA. A five-year study of needlestick injuries: significant reduction associated with communication, education, and convenient placement of sharps containers. *Infect Control Hosp Epidemiol*. 1992 May;13(5):265-71. doi:10.2307/30145501

28. Wong ES, Stotka JL, Chinchilli VM, Williams DS, Stuart CG, Markowitz SM. Are universal precautions effective in reducing the number of occupational exposures among health care workers? A prospective study of physicians on a medical service. *JAMA*. 1991 Mar 6;265(9):1123-8.
PubMed PMID: 1995997.
29. Patel, Kamal Thakor, Reduction in Needlestick Injuries Using a Novel Package of interventions [Thesis]. Scholar Common (SC): University of South Florida (2018).
30. Hoffmann C, Buchholz L, Schnitzler P. Reduction of needlestick injuries in healthcare personnel at a university hospital using safety devices. *J Occup Med Toxicol*. 2013;8(1):20. Published 2013 Jul 29. doi:10.1186/1745-6673-8-20
31. Neeraja R, Kayalvizhi G, Sangeetha P. Oral Health Attitudes and Behavior among a Group of Dental Students in Bangalore. India. *Eur J Dent*. 2011 Apr;5(2):163-7.
32. Amin TT, Al Noaim KI, Bu Saad MA, Al Malhm TA, Al Mulhim AA, Al Awas MA. Standard precautions and infection control, medical students' knowledge and behavior at a Saudi university: the need for change. *Glob J Health Sci*. 2013;5(4):114–125.
Published 2013 Apr 21. doi:10.5539/gjhs.v5n4p114
33. Matsumoto H, Sunakawa M, Suda H, Izumi Y. Analysis of factors related to needle-stick and sharps injuries at a dental specialty university hospital and possible prevention methods. *J Oral Sci*. 2019;61(1):164-170
PubMed PMID: 30918213.
34. Elliott SK, Keeton A, Holt A. Medical students' knowledge of sharps injuries. *J Hosp Infect*. 2005 Aug;60(4):374-7.
PubMed PMID: 15936114. <http://dx.doi.org/10.1016/j.jhin.2005.01.033>
35. Ishak AS, Haque MS, Sadhra SS. Needlestick injuries among Malaysian healthcare workers. *Occup Med (Lond)*. 2019 Apr 13;69(2):99-105. doi: 10.1093/occmed/kqy129.
PubMed PMID: 30295884.
36. Kennedy JE, Hasler JF. Exposures to blood and body fluids among dental school-based dental health care workers. *J Dent Educ*. 1999 Jun;63(6):464-9. Erratum in: *J Dent Educ* 1999 Oct;63(10):774. PubMed PMID: 10418565.

37. Bhattarai S, K C S, Pradhan PM, Lama S, Rijal S. Hepatitis B vaccination status and needle-stick and sharps-related Injuries among medical school students in Nepal: a cross-sectional study. *BMC Res Notes*. 2014 Nov 3;7:(774). doi: 10.1186/1756-0500-7-774. PubMed PMID: 25366873;
38. Shaghaghian S, Golkari A, Pardis S, Rezayi A. Occupational Exposure of Shiraz Dental Students to Patients' Blood and Body Fluid. *J Dent*. 2015;16(3):206–213.
39. McCarthy GM, Britton JE. A Survey of Final-Year Dental, Medical and Nursing Students. *Occ Inj and Infect Control. J Can Dent Assoc*. 2000 Nov;66(10):561
PubMed PMID: 11091478.
40. Perry J, Robinson ES, Jagger J. Nursing2004 needle-stick and sharps-safety survey: getting to the point about preventable injuries. *Nursing*. 2004 Apr;34(4):43-7.
41. Jaber, Mohamed Abdullah. A survey of needle sticks and other sharp injuries among dental undergraduate students. *Int J Infect Control* 2011;7(3): 1-10.
42. Maurya, R. P., Maurya, M. K., Kushwaha, R., Verma, S. L., & Kumari, R. Knowledge, Awareness and Practices regarding Sharp Injuries amongst the Dental students. *Int J of Oral Health Dent*, 2017;3(3), 181-7
43. Ali I, Hameed F, Maqbool A, Kazim M, Aslam M A, Siddiqui S, et al. Incidence of Needle Stick Injury among The Dental Students and Dental House Officers of Bhitai Medical and Dental College, Mirpur Khas. *Annals of Jinnah Sindh Medi Uni*, 2019;5(1), 26-30.
44. Puro V, Petrosillo N, Ippolito G. Risk of hepatitis C seroconversion after occupational exposures in health care workers. Italian Study Group on Occupational Risk of HIV and Other Bloodborne Infections. *Am J Infect Control*. 1995 Oct;23(5):273-7.
PubMed PMID: 8585637.
45. De Carli G, Puro V, Ippolito G; Studio Italiano Rischio Occupazionale da HIV Group. Risk of hepatitis C virus transmission following percutaneous exposure in healthcare workers. *Infection*. 2003 Dec;31 Suppl 2:22-7.
PubMed PMID: 15018469.

46. Williams IT, Perz JF, Bell BP. Viral hepatitis transmission in ambulatory health care settings. Clin Infect Dis. 2004 Jun 1;38(11):1592-8. Epub 2004 May 12. Review. PubMed PMID: 15156448.
47. Hbib A, Kasouati J, Charof R, Chaouir S, El Harti K. Evaluation of the Knowledge and Attitudes of Dental Students toward Occupational Blood Exposure Accidents at the End of the Dental Training Program. J Int Soc Prev Community Dent. 2018;8(1):77–86. doi:10.4103/jispcd.JISPCD_282_17
48. Gaballah K, Warbuton D, Sihmbly K, Renton T. Needle stick injuries among dental students: risk factors and recommendations for prevention. Libyan J Med. 2012;7:(1) doi:10.3402/ljm.v7i0.17507
49. Kelčíkova S, Skodova Z, Straka S. Effectiveness of hand hygiene education in a basic nursing school curricula. Public Health Nurs 2012;29(2):152–9, doi: 10.1111/j.1525-1446.2011.00985.x. Epub 2011 Oct 17. PubMed PMID: 22372452.
50. Kessler CS, McGuinn M, Spec A, Christensen J, Baragi R, Hershow RC. Underreporting of blood and body fluid exposures among health care students and trainees in the acute care setting: a 2007 survey. Am J Infect Control. 2011 Mar;39(2):129-34. doi: 10.1016/j.ajic.2010.06.023. Review. PubMed PMID: 21356431.
51. Voide C, Darling KE, Kenfak-Foguena A, Erard V, Cavassini M, Lazor-Blanchet C. Underreporting of needlestick and sharps injuries among healthcare workers in a Swiss University Hospital. Swiss Med Wkly. 2012 Feb 10;142:w13523. Doi: 10.4414/smw.2012.13523. eCollection 2012. PubMed PMID: 22328010.

ANNEXES

Annexe 1: Questionnaires

A student Ramazan Akgun, of LSMU, MA, Faculty of Odontology is conducting a scientific research, which is aimed to evaluate the attitude & awareness of international dental students toward needle-stick & sharp injuries at LSMU.

The research data collected from the anonymous questionnaires will only be used for scientific purposes and confidentiality is guaranteed.

For more information, contact researcher: Ramazan Akgunor, Supervisor: Dr. Sandra Petrauskiene
E-mail: Ramaakgu0917@gmail.com; sandra.zemgulyte@lsmuni.lt

Thank you for your participation.

Please choose sincerely, **THE** most honest & suitable **ANSWER** of these following questions.

1. Gender:

- *Male*
- *Female*

2. Academic year:

- *2nd Year*
- *3rd year*
- *4th year*
- *5th year*

3. Have you ever had an injury from any sharp instrument?

- *Yes*
- *No (If no, proceed to question 4)*

3.1 How many injuries have you had?

- *1 time*
- *2 or more*

3.2 What did cause your injury?

- *Needle*
- *Endo file*
- *Explorer*
- *Bur*
- *.....*

3.3 When did you experience the sharp instrument injury?

- *While working on a patient*
- *While working on phantom*
- *While cleaning*
- *While preparing*

3.4 Did you report any incident of sharp instrument injury to staff?

- *Yes (If yes, proceed to question 3.6)*
- *No*

3.5 Reason for not reporting the incident of sharp instrument injury

- *The instrument or needle was unused*
- *I did not know how to report it*
- *I did not have time to report it*
- *I was too embarrassed to report*
- *I was worried to get into trouble*

3.6 Did you take Post Exposure Prophylaxis (PEP) after the sharp instrument injury?

- *Yes*
- *No*

3.7 Was injury washed with soap & water immediately?

- *Yes*
- *No*

4. What protective measures do have during your work?

- *Gloves*
- *Facemask*
- *Eye protection*
- *Closed shoes*
- *Other*

5. What do you do after usage of sharp instrument?

- *Leave it on the working tray*
- *Place the instrument in a sharp instrument container*
- *Throw the needle/sharp instrument in the garbage*

6. Do you recap needles?

- *Yes*
- *No (if no, proceed to question 7)*

6.1 Which technique do you use to recap needles?

- *One hand scoop technique*
- *Two hands to recap needle*

7. Do you wash your hands before patient contact/procedure, even if gloves is to be used?

- *Yes*
- *No*

8. Do you wash your hands after patient contact /procedure, even if gloves been used?

- *Yes*
- *No*

9. How is the proper sequence of handwash?

- *Wet the hand/ Rub & scrub your hand with soap (Palm, Back, between finger & under nails –30 seconds) / Rinse & dry.*
- *Rub & scrub your hand with soap (Palm, Back, between finger & under nails–30 seconds) / Wet the hands / Rinse & dry.*
- *Wet the hands /Rub & scrub your hand with soap (Palm, Back, between finger & under nails - 15 seconds) / Rinse & dry.*

10. How well do you know about the "Universal precaution guidelines"?

- *Very good*
- *Medium*
- *Bad*

11. Do you know what diseases can be transmitted by sharp instruments?

- *Hepatitis B*
- *Hepatitis C*
- *HIV/AIDS*
- *All of the above*

Standard precautions in health care

Background

Standard precautions are meant to reduce the risk of transmission of bloodborne and other pathogens from both recognized and unrecognized sources.

They are the basic level of infection control precautions which are to be used, as a minimum, in the care of all patients.

Hand hygiene is a major component of standard precautions and one of the most effective methods to prevent transmission of pathogens associated with health care. In addition to hand hygiene, the use of **personal protective equipment** should be guided by **risk assessment** and the extent of contact anticipated with blood and body fluids, or pathogens.

In addition to practices carried out by health workers when providing care, all individuals (including patients and visitors) should comply with infection control practices in health-care settings. The control of spread of pathogens from the source is key to avoid transmission. Among source control measures, **respiratory hygiene/cough etiquette**, developed during the severe acute respiratory syndrome (SARS) outbreak, is now considered as part of standard precautions.

Worldwide escalation of the use of standard precautions would reduce unnecessary risks associated with health care. Promotion of an **institutional safety climate** helps to improve conformity with recommended measures and thus subsequent risk reduction. Provision of adequate staff and supplies, together with leadership and education of health workers, patients, and visitors, is critical for an enhanced safety climate in health-care settings.

Important advice

- Promotion of a safety climate is a cornerstone of prevention of transmission of pathogens in health care.
- Standard precautions should be the minimum level of precautions used when providing care for all patients.
- Risk assessment is critical. Assess all health-care activities to determine the personal protection that is indicated.
- Implement source control measures for all persons with respiratory symptoms through promotion of respiratory hygiene and cough etiquette.

✓ Checklist

Health policy

- Promote a safety climate.
- Develop policies which facilitate the implementation of infection control measures.

Hand hygiene

- Perform hand hygiene by means of hand rubbing or hand washing (see detailed indications in table).
- Perform hand washing with soap and water if hands are visibly soiled, or exposure to spore-forming organisms is proven or strongly suspected, or after using the restroom. Otherwise, if resources permit, perform hand rubbing with an alcohol-based preparation.
- Ensure availability of hand-washing facilities with clean running water.
- Ensure availability of hand hygiene products (clean water, soap, single use clean towels, alcohol-based hand rub). Alcohol-based hand rubs should ideally be available at the point of care.

Personal protective equipment (PPE)

- ASSESS THE RISK of exposure to body substances or contaminated surfaces BEFORE any health-care activity. **Make this a routine!**
- Select PPE based on the assessment of risk:
 - clean non-sterile gloves
 - clean, non-sterile fluid-resistant gown
 - mask and eye protection or a face shield.

Respiratory hygiene and cough etiquette

- Education of health workers, patients and visitors.
- Covering mouth and nose when coughing or sneezing.
- Hand hygiene after contact with respiratory secretions.
- Spatial separation of persons with acute febrile respiratory symptoms.

Health-care facility recommendations for standard precautions

KEY ELEMENTS AT A GLANCE

1. Hand hygiene¹

Summary technique:

- Hand washing (40–60 sec): wet hands and apply soap; rub all surfaces; rinse hands and dry thoroughly with a single use towel; use towel to turn off faucet.
- Hand rubbing (20–30 sec): apply enough product to cover all areas of the hands; rub hands until dry.

Summary indications:

- Before and after any direct patient contact and between patients, whether or not gloves are worn.
- Immediately after gloves are removed.
- Before handling an invasive device.
- After touching blood, body fluids, secretions, excretions, non-intact skin, and contaminated items, even if gloves are worn.
- During patient care, when moving from a contaminated to a clean body site of the patient.
- After contact with inanimate objects in the immediate vicinity of the patient.

2. Gloves

- Wear when touching blood, body fluids, secretions, excretions, mucous membranes, nonintact skin.
- Change between tasks and procedures on the same patient after contact with potentially infectious material.
- Remove after use, before touching non-contaminated items and surfaces, and before going to another patient. Perform hand hygiene immediately after removal.

3. Facial protection (eyes, nose, and mouth)

- Wear (1) a surgical or procedure mask and eye protection (eye visor, goggles) or (2) a face shield to protect mucous membranes of the eyes, nose, and mouth during activities that are likely to generate splashes or sprays of blood, body fluids, secretions, and excretions.

4. Gown

- Wear to protect skin and prevent soiling of clothing during activities that are likely to generate splashes or sprays of blood, body fluids, secretions, or excretions.
- Remove soiled gown as soon as possible, and perform hand hygiene.

5. Prevention of needle stick and injuries from other sharp instruments²

Use care when:

- Handling needles, scalpels, and other sharp instruments or devices.
- Cleaning used instruments.
- Disposing of used needles and other sharp instruments.

6. Respiratory hygiene and cough etiquette

Persons with respiratory symptoms should apply source control measures:

- Cover their nose and mouth when coughing/sneezing with tissue or mask, dispose of used tissues and masks, and perform hand hygiene after contact with respiratory secretions.

Health-care facilities should:

- Place acute febrile respiratory symptomatic patients at least 1 metre (3 feet) away from others in common waiting areas, if possible.
- Post visual alerts at the entrance to health-care facilities instructing persons with respiratory symptoms to practise respiratory hygiene/cough etiquette.
- Consider making hand hygiene resources, tissues and masks available in common areas and areas used for the evaluation of patients with respiratory illnesses.

7. Environmental cleaning

- Use adequate procedures for the routine cleaning and disinfection of environmental and other frequently touched surfaces.

8. Linens

Handle, transport, and process used linen in a manner which:

- Prevents skin and mucous membrane exposures and contamination of clothing.
- Avoids transfer of pathogens to other patients and or the environment.

9. Waste disposal

- Ensure safe waste management.
- Treat waste contaminated with blood, body fluids, secretions and excretions as clinical waste, in accordance with local regulations.
- Human tissues and laboratory waste that is directly associated with specimen processing should also be treated as clinical waste.
- Discard single use items properly.

10. Patient care equipment

- Handle equipment soiled with blood, body fluids, secretions, and excretions in a manner that prevents skin and mucous membrane exposures, contamination of clothing, and transfer of pathogens to other patients or the environment.
- Clean, disinfect, and reprocess reusable equipment appropriately before use with another patient.

¹ For more details, see: WHO Guidelines on Hand Hygiene in Health Care (Advanced draft), at: http://www.who.int/patientsafety/information_centre/ghhad_download/en/index.html.

² The SIGN Alliance at: http://www.who.int/injection_safety/sign/en/

Annexe 3: Ethical approval



LIETUVOS SVEIKATOS MOKSLŲ UNIVERSITETAS

BIOETIKOS CENTRAS

Kodas 302536989, Tilžės g. 18, LT- 47181, Kaunas, tel.: (8 37) 327233, www.lsmuni.lt, el.p.: bioetika@lsmuni.lt

Medicinos akademijos (MA)
Vientisųjų studijų programa – Odontologija
V k. studentui Ramazan Akgun
Darbo vadovė asist. Sandra Petrauskienė
LSMUL KK Burnos priežiūros ir vaikų
odontologijos klinika

2019-11-26

Nr. *BEC-OF-48*

DĖL PRITARIMO TYRIMUI

LSMU Bioetikos centras, įvertinęs Ramazan Akgun pateiktus dokumentus, studento tiriamajam darbui tema „Awareness & attitude of international dental students toward needle-stick & sharp injuries at LSMU“ pritaria*.

dr. Eimantas Pečiūnas

* Pastaba: šis pritarimas neatleidžia tiriamąjį mokslinį darbą vykdančių asmenų nuo prievolės laikytis Bendrojo duomenų apsaugos reglamento nuostatų ir nuo atsakomybės gauti nacionalinio arba regioninio bioetikos komiteto leidimą, jei toks leidimas būtinas pagal LR Biomedicininį tyrimų etikos įstatyme numatytus reikalavimus.