

## Occupational Exposure to Blood and Body Fluids among Nursing and Dental Students at Internship Year in Assiut City

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**Abstract:** Exposure to blood-borne pathogens poses a serious occupational threat to health care workers including nursing and dental students; it causes substantial illness and it is unavoidable part of daily patient care. This study aims to assess the occupational exposure to blood and body fluids (BBF) among undergraduate nursing and dental students at internship year in Assiut city. A cross sectional research design was used on 140 nursing students and 150 dental students using a convenient sample technique. The study was conducted at Assiut University Hospitals and Al Azhar University Hospital in Assiut city. A questionnaire sheet for collection of data contains the following main parts: socio-demographic data, history and frequency of occupational exposure to (BBF), information about the occupational exposure to BBF and infection control measures. The main findings of this study were: the mean age was 21.8 years for nursing and 22.9 for dental students. 88.6%, 51.3% respectively of nursing and dental students were exposed to needle stick injuries (NSI) and BBF. All dental and nursing students did not report the exposure incidents and the main causes of not reporting: they don not think anything could be done by (72.1%, 55.3% respectively) among nursing and dental students. A high percentage of the dental and nursing students reported use of gloves during the exposure. 93.3% among dental and 65.7% of nursing students were not vaccinated against hepatitis B. About one third (30.0%, 32.0% respectively) of nursing and dental student had good score of knowledge about and only (2.9%, 15.3% respectively) had poor score of knowledge about occupational diseases and infection control measures. Based on the results of the study it can be concluded that the majority of studied students were exposed to NSI and BBF. The majority of studied students did not report the exposure to BBF. The majority of them were not vaccinated against hepatitis B. One third of nursing and dental student had good score of knowledge. This study recommend that mandatory continuing education and supervision involves all undergraduate dental and nursing students at internship year must contain a specific component on the occupational exposure to BBF. Hepatitis B vaccine must be given obligatory to all studied sample.

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**Key Words:** Occupational exposure; Blood and body fluids (BBF); Needle stick injuries (NSI); Infection Control, Undergraduate Nursing and Dental Students

### 1. Introduction:

Occupational exposure is defined as reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that can result from the performance of an employee's duties (Centers for Disease Control and Prevention, 2009).

The risk for occupationally acquired infections is an unavoidable part of daily patient care; it causes substantial illness and occasional deaths among health care workers (Sepkowitz, 2011).

Health care workers (HCW) including nursing and dental students engaged in direct patient care are at considerable risk of acquiring hepatitis B (HB), C viruses and human immune virus (HIV) at their place of work through the exposure to contaminated blood and body fluids (BBF) while executing their routine of patient care (Gustavo et al., 2006). The risk of the transmission of HB for non immune health care

workers ranged from 2% to 40 % (Werner and Grady, 2009).

Body substances such as feces, urine and wound drainage contain potentially infectious microorganisms. For this reason, health care workers are at a risk for exposure to microorganisms in hospitals (Potter et al., 2011).

Exposure to blood-borne pathogens poses a serious occupational threat to health care workers. Safer needle devices for performing procedures and universal infection control precautions will not completely eliminate the risk, and prophylactic treatment will remain an important component of prevention efforts (Gerberding and Wood, 2008).

Most exposure to infectious agents in the dental setup is accidental and can be avoided by using safe work practices and following infection control guidelines. However, some exposure is not preventable; immunization and appropriate post

exposure management become the key defense procedures (McCarthy and Britton, 2010).

Percutaneous exposure to blood, blood products, and infectious body fluids present the greatest risk for transmission of infection in the health care setting (Kandeel et al., 2003). Direct inoculation into cuts and abrasions of unprotected skin or mucosa via contaminated sharps or instruments are other factors (Malik, 2012).

Several studies have documented blood borne pathogen transmission in the health care facilities at Egypt were related to poor adherence to standard infection control precautions (Talaat et al., 2003).

Dental Health Care workers already recognized the potential for transmission of diseases in every direction from dental team to patients and from patients to dental team. Hepatitis B virus (HBV) had been well documented from dentists to patients, as well as herpes transmission from dental hygienists to patients (Gluck and Morganstein, 2003).

Many countries in the Eastern Mediterranean Region still had a lack of effective infection control programs (Talaat et al., 2003). International researches reported that health care workers had a 20 to 40 time's greater risk of contracting hepatitis C virus than HIV from an accidental needle stick (Frotline, 2010).

Health care workers represent approximately 2% to 6% of reported cases from hepatitis B virus in the United States; that are a major infectious occupational hazards to health care workers (Gluck and Morganstein, 2003).

Nursing science contributed to identifying specific infection prevention practices for health care workers. These practices reduce the risk of cross contamination and transmission to health care workers and other patients when caring with patients with known or suspected infection (Centers for Disease Control and Prevention, 2009).

The nurse plays a critical role in minimizing infection spread by understanding the chain of infection; the nurse can intervene to prevent infection from developing by minimizing the number and kinds of organisms transmitted to potential infection site, proper cleaning, disinfection and sterilization of contaminated objectives significantly reduce and often eliminate microorganisms. Eliminating reservoirs of infection, controlling portal of exit, portal of entry and avoiding actions that transmit microorganisms prevent infection from finding a new site in which to grow. The proper use of sterile supplies, barriers protection and proper hand washing are examples of the methods that a nurse must use to control the spread of microorganisms. Having an infection control conscience helps the nurse to apply good aseptic practices at the right time and right

clinical situation. When a client has an infection, the nurse continues preventive care so that health care personnel and other clients are not exposed to infection (Potter et al., 2011).

Community health nurse who provide the quality of care must have basic understanding of infection control. Furthermore, the community nurse must have knowledge of the legal system which mandate the prevention and control of communicable diseases locally, nationally and international (Nies and McEwen, 2011).

#### **Significance of the study:**

The majority of (HCW) infected with a blood borne virus have a greater opportunity for the transmission of infection to their patients. HCW frequently encounters patient BBF (Centers for Disease Control and Prevention, 2009). Egypt has a higher incidence of HCV infection than any other country in the world the infection rate was 25% (Arthur et al., 2007). Several studies suggest that exposure to dental procedures is a risk factor for hepatitis C virus infection in Egypt (Ministry of Health and population, Egypt Infection control Program, 2011).

Clinical research on occupational injuries among health care personnel is necessary. It provides continuous assessment for the efficacy of infection control. Therefore, the current study will provide valuable information which will help to guide the design and implementation of appropriate prevention and intervention strategies targeted to those vulnerable population groups. Hence, it will help to reduce the risk of injuries and occupational diseases for both patients and health care workers (McCarthy and Britton, 2010).

#### **Aim of the study:**

This study aims to assess occupational exposure to (BBF) among undergraduate nursing and dental students at internship year in Assiut city.

This aim is achieved through the following objectives:

##### **A) General objective:**

To decrease the morbidity and mortality due to occupational blood borne diseases among undergraduate nursing and dental students at internship year in Assiut city.

##### **B) Specific objectives:**

1. To assess the prevalence and types of occupational exposure to BBF among Egyptians undergraduate nursing and dental students at internship year.
2. To investigate measures taken post exposure.
3. To assess the rate of reporting and reasons for not reporting of such incidents.

4. To evaluate the knowledge and practices of infection control measures.

## 2. Subject and Methods

**Research design:** A cross sectional design was used in this study.

**Setting:** This study was conducted at Assiut University Hospitals and Al Azhar University Hospital in Assiut city.

**Sample:** A convenient sample was used in this study. It includes all undergraduate female nursing students and male dental students at internship year in the clinical area as they were distributed in small groups according to every rotation at the previously mentioned settings during three month. The total number of the studied sample were (290) students of them 140 nursing and 150 dental students.

**Tools of the study:** A questionnaire sheet was developed by the researchers based on a review of relevant literature to elicit the needed information. It consists of three main parts:

*Part I:* It includes items related to socio-demographic characteristics such as age, sex, profession group, month of experience and the attendance of conferences about occupational exposure to BBF and infection control.

*Part II:* It includes items related to history and frequency of occupational exposure to BBF: during previous week and previous 3 months, parts of the body were exposed. It also included exposure for needle stick injury (NSI), BBF, or both of them. This section also involves causes of exposure, measures taken post exposure to NSI and BBF.

The rate of reporting the incident of occupational exposure, reasons for not reporting of such incident, uses of infection control measure during the exposure and hepatitis B vaccination status are also discussed in this part.

*Part III:* It includes items related to information about the definition of occupational exposure to BBF, diseases transmitted by blood and infection control measures.

## Methods

### I. Preparatory phase:

An official approval letters were obtained from the Dean of Faculty of Nursing, Assiut University, to chairmen of the Assiut University Hospitals and to the Dean of the Faculty of Dentistry, Al Azhar University. Those letters included the nature and purpose of the study, which were briefly explained through direct personal communication.

### II. Pilot study:

A pilot study was conducted to evaluate the applicability, clarity of the sheet and time needed to fulfill it. It was carried out on a sample of (20)

students collected from the previously mentioned settings. According to the result of pilot study, the necessary modifications were done.

### III. Field work:

The researchers started to collect data from May 2012 to July 2012. The researchers met the students in the clinical area at different shifts. They were distributed in small groups according to every rotation. The aim and nature of the study were explained to every sub-group. The researchers explained the main parts of the questionnaire to the students. After that, the questionnaire forms were distributed to students, followed by answering any questions. The questionnaire took about (15-20) minutes. The data was collected two days per week. Finally, the researcher thanked the students for their cooperation.

### IV. Ethical consideration:

At the initial interview, each student was informed of the purpose and nature of the study, and the researchers emphasized that participation would be voluntary; hence, every student had the right to participate or refuses to be included in the work. The consent for participation was taken orally. In addition, the confidentiality of the data was maintained, explained and also printed in the questionnaire.

### VI. Statistical analysis:

The obtained data was reviewed, prepared for computer processing, coded, analyzed and tabulated. Data entry was done using the computer software package, while statistical analysis was done using the SPSS 16.0 statistical software package. Data was presented using descriptive statistics in the form of frequencies and percentages, means, standard deviations and using chi-square test. A statistical significance was considered at P- value <0.05. Using the following score system to assess the level of knowledge (poor = score <50%, satisfactory = score 50-70%, and good = score >70% (Shalkamy, 2012).

### V) Limitations of the study:

A number of limitations need to be acknowledged: Few students refused to participate in the study.

1. The participants were classified in different sub groups at the clinical areas; hence, researcher made great efforts to find the needed students.
2. Few students left some parts of the questionnaire unanswered and this obligated the researchers to revise each questionnaire form and exclude those with incomplete answers.

### 3. Results:

Table (1) shows the distribution of studied undergraduate nursing and dental students at internship year, regarding their socio-demographic characteristics. It was found that nearly the majority

(82.9%) of nursing students aged between 20- < 23 years and (68%) of dental students aged between 23-25 years. Regarding their months of experiences (100.0% and 83.6%) of dental and nursing students had less than 6 month respectively. 60.0%, 70.7% respectively of nursing and dental students did not attend any conferences about occupational exposure to BBF or about infection control.

Concerning the receiving of hepatitis B vaccine, it was observed that (93.3%, 65.7% respectively) were not vaccinated among dental and nursing students and there is a statistically significant difference among dental and nursing students at (P. 0.000\*).

In relation to occupational exposure to BBF, table (2) illustrates that only 4.3%, 10.0% respectively of nursing and dental students were not exposed. On the other hands, 88.6%, 51.3% of nursing and dental students were exposed to both NSI and BBF, and there is a significant relation between dental and nursing at (P.0.000\*). Moreover, the highest percentage of the causes was NSI (84.3%, 64.0%) among the studied nursing and dental students respectively.

Regarding the measures taken post exposure to NSI it was found that 22.4% and 23.6% respectively of nursing and dental students did not take any action. As for the measures taken post exposure to BBF show that, more than half (55.7%) of dental students and more than one quarter (28.2%) of nursing did not take any action.

Table (3) revealed that more than three quarters 76.9%, 72.6 of nursing and dental students had a history of exposure to NSI in the previous week respectively. With regard to the exposure during the previous 3 months it was observed that more than half (59.0%) of nursing students were exposed from 6-10 times. While two thirds (66.0%) of dental student were exposed from 2-5 times, with a statistically significant difference between nursing and dental students at (P. 0.000\*). The distinct percentage of exposure to needled stick was done in the hands followed by fingers among nursing and dental students.

Table (4) illustrates that more than three quarters 75.8% of nursing and two third (62.3%) of

dental students had a history of exposure to BBF in the previous week, with a statistically significant difference between nursing and dental students at (P. 0.026\*). As for the exposure during the previous 3 months it was observed that nearly the half (46.8%) of nursing students were exposed one time and about one third (31.1%) of dental student were exposed from 2-5 times, with a statistically significant difference between nursing and dental students at (P. 0.007\*). The highest percentage of exposure to BBF was the hands among nursing and the face among dental students. Moreover it was found a statistically significant difference between nursing and dental students at (P. 0.000\*).

Table (5) shows the distribution of the studied sample regarding reporting the incident of occupational exposure. It was found that all dental and nursing students did not report. Also, it was noticed that the main cause of not reporting was the fact that they do not think anything could be done by (72.1%, 55.3% respectively) among nursing and dental students.

Table (6) demonstrates the distribution of the studied sample regarding using personal protective equipment during the exposure. It was found that the high percentage of the dental and nursing students reported the use of gloves during the exposure. The minority uses the goggle. Also, it was observed that dental students distinctly use all personal protective equipment than nursing; these differences indicate a statistically significant relation between them.

Figure (1) represents the total score of knowledge about occupational diseases and infection control measures; it was found that one third (30.0%, 32.0% respectively) of nursing and dental students had good score of knowledge and only (2.9%, 15.3% respectively) had poor score of knowledge.

Table (7) demonstrates that 78.0% of the studied sample who were not exposed to NSI had a satisfactory score of knowledge, while 61.7% of the studied sample who were not exposed to BBF had a satisfactory score of knowledge.

Table (8) revealed that there was no statistically significant relation between conference attendance about occupational exposure to BBF or infection control and students' level of knowledge.

**Table (1):** Distribution of the studied sample regarding their socio-demographic characteristics

Socio-demographic characteristics	Nursing students (n= 140)		Dental students (n= 150)		P-value
	No.	%	No.	%	
<b>Age (years):</b>					
20 – <23	116	82.9	48	32.0	0.000*
23 – 25	24	17.1	102	68.0	
Mean ± SD	21.84 ± 0.88		22.98 ± 0.87		
<b>Experience/ month:</b>					
< 6 month	117	83.6	150	100.0	0.000*
6- 12 month	23	16.4	0	0.0	
<b>Conferences attendance :</b>					
Yes	56	40.0	44	29.3	.0.056
No	84	60.0	106	70.7	
<b>Hepatitis B vaccination status:</b>					
Full vaccination	33	23.6	0	0.0	0.000*
Incomplete vaccination	15	10.7	10	6.7	
Not vaccinated	92	65.7	140	93.3	

**Table (2):** Distribution of the studied sample regarding occupational exposure to BBF

Variables	Nursing students (n= 140)		Dental students (n= 150)		P-value
	No.	%	No.	%	
<b>Occurrence of exposure:</b>					
Not exposed	6	4.3	15	10.0	0.000*
NSI	10	7.1	29	19.3	
Exposed to BBF	0	0.0	29	19.3	
Both NSI and BBF	124	88.6	77	51.3	
<b>#Causes:</b>					
NSI	118	84.3	96	64.0	0.000*
Blood splash to eye nose and mouth	92	65.7	66	44.0	0.000*
Sharp instruments	48	34.3	84	56.0	0.000*
Scalpel	26	18.6	11	7.3	0.004*
I.V cannula introducer	90	64.3	8	5.3	0.000*
Winged steel needle butterfly	6	4.3	4	2.7	0.665
Anesthesia needle	5	3.6	42	28.0	0.000*
Coughing or sneezing from patients	78	55.7	74	49.3	0.277
<b>#Measures taken post exposure to NSI:</b>					
Squeezing	26	19.4	41	38.7	0.001*
Antiseptic solution	73	54.5	51	48.1	0.327
Wash with soup and water	47	35.1	39	36.8	0.783
Dressing	11	8.2	0	0.0	0.007*
Nothing	30	22.4	25	23.6	0.827
<b># Measures taken post exposure to BBF:</b>					
Squeezing	3	2.4	7	6.6	0.220
Antiseptic solution	57	46.0	17	16.0	0.000*
Wash with soup and water	46	37.1	31	29.2	0.208
Dressing	3	2.4	0	0.0	0.303
Nothing	35	28.2	59	55.7	0.000*

#More than one answer

**Table (3):** The history of exposure to NSI among the studied sample

Variables	NSI				P-value
	Nursing students (n= 140)		Dental students (n= 150)		
	No.	%	No.	%	
<b>Exposure in the previous week:</b>					
Yes	103	76.9	77	72.6	0.453
No	31	23.1	29	27.4	
<b>Exposure during the previous 3 months:</b>					
None	3	2.2	13	12.3	0.000*

2 – 5 times	43	32.1	70	66.0	
6 – 10 times	79	59.0	11	10.4	
> 10 times	9	6.7	12	11.3	
<b>Parts of the body exposed:</b>					
Hand	50	48.5	23	29.9	0.051
Face	11	10.7	6	7.8	
Face and hand	9	8.8	10	13.0	
Thumb finger	19	18.4	17	22.1	
Index finger	14	13.6	21	27.3	

**Table (4):** The history of exposure to BBF among the studied sample

Variables	BBF				P-value
	Nursing students (n= 140)		Dental students (n= 150)		
	No.	%	No.	%	
<b>Exposure in the previous week:</b>					
Yes	94	75.8	66	62.3	0.026*
No	30	24.2	40	37.7	
<b>Exposure in the previous 3 months:</b>					
None	13	10.5	24	22.6	0.007*
Once	58	46.8	32	30.2	
2 – 5 times	36	29.0	33	31.1	
6 – 10 times	3	2.4	9	8.5	
> 10 times	14	11.3	8	7.5	
<b>Parts of the body exposed:</b>					
Hand	48	51.1	9	13.6	0.000*
Face	17	18.1	30	45.5	
Face and hand	21	22.3	24	36.4	
Thumb finger	3	3.2	3	4.5	
Index finger	5	5.3	0	0.0	

**Table (5):** Distribution of the studied sample regarding reporting the incident of occupational exposure

Variables	Nursing students (n= 140)		Dental students (n= 150)		P-value
	No.	%	No.	%	
<b>The rate of reporting:</b>					
No	140	100.0	150	100.0	
<b>#Reasons for not reporting:</b>					
Do not think anything could be done	101	72.1	83	55.3	0.003*
Do not know the reporting procedure	75	53.6	65	43.3	0.081
Think the patient was no risk for blood borne viruses	27	19.3	39	26.0	0.173
Do not want to know the results	25	17.9	34	22.7	0.309
Do not know the importance of reporting	55	39.3	50	33.3	0.292
Worried about the potential impact on my career	66	47.1	29	19.3	0.000*
Too busy	40	28.6	27	18.0	0.033*
Fear that became ill	57	40.7	36	24.0	0.002*
Little or no perception about the complication of exposure	28	20.0	25	16.7	0.463
Dissatisfaction with waiting times	27	19.3	42	28.0	0.082
Forgotten	47	39.8	28	21.1	0.001*

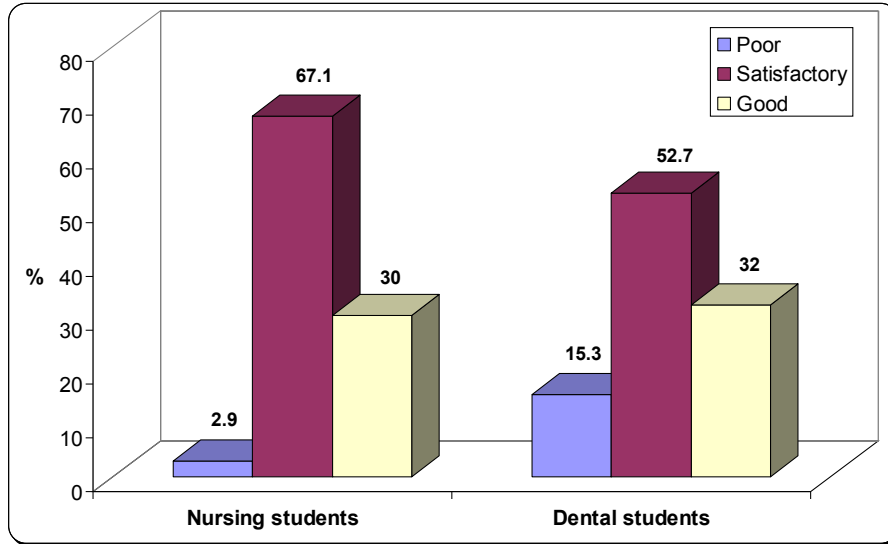
#More than one answer



**Table (6):** Distribution of the studied sample regarding the application of infection control measures during the exposure

P-value	Dental students (n= 150)		Nursing students (n= 140)		Items
	%	No.	%	No.	
					# Personal protective equipments
0.000*	90.4	122	70.9	95	Wear gloves
0.000*	63.7	86	29.1	39	Wear mask
0.000*	41.5	56	1.5	2	Wear gown
0.000*	13.3	18	1.5	2	Wear goggle

# More than one answer



**Figure (1):** Total score of knowledge about occupational diseases and infection control measures

**Table (7):** Relation between total score of knowledge and occupational exposure to NSI and BBF

Level of knowledge	NSI				BBF			
	Yes (n= 240)		No (n= 50)		Yes (n= 230)		No (n= 60)	
	No.	%	No.	%	No.	%	No.	%
Poor	23	9.6	4	8.0	15	6.5	12	20.0
Satisfactory	134	55.8	39	78.0	136	59.1	37	61.7
Good	83	34.6	7	14.0	79	34.3	11	18.3
P-value	0.010*				0.001*			

**Table (8):** Relation between conference attendance and their level of knowledge

Level of knowledge	Conference attendance				P-value
	Yes (n= 100)		No (n= 190)		
	No.	%	No.	%	
Poor	8	8.0	19	10.0	0.786
Satisfactory	59	59.0	114	60.0	
Good	33	33.0	57	30.0	

**4. Discussion:**

Health care workers including dental and nursing undergraduate students are at risk of occupational exposure to a variety of blood-borne pathogens caused by needle stick, sharp injuries and

mucocutaneous contamination (Davanzo et al., 2008 and Deisenhammer et al., 2006).

The findings of the present study showed that the mean age was 21.8 years for nursing and 22.9 for dental students. These results were supported by

Jaber (2011) who found that the mean age was 20 years for dental students. On the other hand, these findings are contradicted with (McCarthy & Britton, 2010) who found that mean age was 26.1 years for dental and 28.5 years for nursing students.

The present study showed that all dental students and the majority (83.6%) of nursing students had less than 6 month of experience. It has been proposed that those students are at increased risk of occupational injury because they did not have sufficient experience when performing invasive procedures.

Regarding the students who attended conferences about occupational exposure to BBF and infection control, the present study show that 60.0% of nursing and 70.7% of dental students hadn't attended any conference and there is no statistically significant relation between conferences attendance and their level of knowledge. This may be attributed to lack the of awareness about the importance of keeping up to date, insufficient time, lack of teaching staff emphasis on this point. On the opposite, our findings are not in line with (Jaber, 2011) who found that the majority (92.1%) of dental students attended meetings about occupational exposure to BBF implemented by Ministry of Health Organization.

In the present study it was observed that the percentage of nursing students (88.6%) was higher than dental students (51.3%) exposed to both NSI, BBF. This may be due to the dental students distinctly practice personal protective equipment such as gloves, mask, gown and goggle than nursing students as demonstrated in the present study. Our study demonstrated the main causes of occupational exposure to BBF: NSI, blood splash to eye nose and mouth, sharp instruments, intravenous cannula introducer, scalpel, winged steel needle butterfly and anesthesia needle. But, the current results are contrasted with McCarthy & Britton (2010) who found that dental students are more exposed to injuries than nursing.

NSI represents an important occupational health issue among HCW and one that can incur serve consequences from blood borne infections like HBV, HCV and HIV (Pellissier et al., SaberiWroozi et al., and Sadoh et al., 2006). In our study, a high percentage of nursing and dental students used only very simple first aid procedures considering it post exposure management measures; so they are at greatest risk for acquiring blood borne occupational diseases. Moreover, they had poor level of knowledge about diseases which can be transmitted through blood. Similar findings were reported by (McCarthy & Britton, 2010).

With regard to the previous history of exposure to NSI, it was observed that more than half (59.0%)

of nursing students experienced from 6 -10 times. While two thirds (66.0%) of dental students experienced from 2-5 times in the previous three months with a statistically significant difference between nursing and dental students at (P. 0.000). These findings are in agreement with the findings of the study carried out by Kandeel et al, (2003) who suggest that HCW are at high risk of NSI and blood borne pathogen infection in Egypt.

These results may be attributed to the higher level of recapping needles, using wrong techniques of recapping with both hands, work related stress, poor handling techniques form both undergraduate nursing and dental students, lack of awareness about the size of the acquiring occupational diseases, in addition to the absence of a certain policy preventing the recapping, or may be due to less access to safety devices. It is possible to state that without compulsive legislation, infection control is not enough.

Concerning the reporting system this study showed that all nursing and dental students didn't report the incident of occupational exposure for many reasons as mentioned by the participant in our study, such as they do not think anything could be done consider the main causes of not reporting, followed by, do not know the reporting procedure, fear to become ill, do not know the importance of reporting, forgotten, worried about the potential impact on their career and little perception about the complication of exposure.

In addition, information related to specific circumstances associated with occupational injury was not collected and more research is required to further investigate occupational exposure among undergraduate students. The participants may be more inclined to make their own risk assessment. Workload pressures and time constraints are suggested reasons for not reporting.

Wicker et al., (2008) who mentioned that at Germany a special consultant in emergency is responsible for reporting occupational accidents and post-exposure prophylaxis measures, the data from Japanese also show a poor reporting rate. Moreover, the exact reasons for under-reporting remain unclear as reported by (Stringer et al, 2002).

Vaccination is one of the best ways to protect HCW from infections, but vaccination is only available for HBV (Sangwan et al., 2011). Our study showed that 93.3%, 65.7% among dental and nursing students respectively not take HBV vaccine. This may be due to in Egypt there is no clear policy to mandatory vaccination for undergraduate students, as the price of the vaccine is high and the Ministry of Health can not afford vaccination and unaware of the students about the importance of vaccine. On the contrary, Wicker et al., (2008) who mentioned that



only 3.1% had no vaccination and about 15.7% of the participants did not know if they had the vaccination.

In the present study, dental students reported they more frequent used gloves, masks and eye protection than nursing students. But only 1.5% of nursing and 13.3% of dental students wear goggles. It is congruence with McCarthy & Britton (2010), who reported that dental students more frequently used gloves, masks and eye protection than nursing students. These findings are in accordance with Fasunloro and Owotade (2004) who found that very few members of clinical dental staff use protective eye wear. Similar results were carried out by Al-Omari and Dwairi, (2005) who stated that approximately 82% of dentists wear gloves during patients' treatment more than mask, gown and goggles. Our results contrasted with Maupomé et al, (2002) who stated that all of health care workers use protective barriers.

These results may be attributed to the lack of protective barriers, lack of awareness about the importance of using personal protective equipments, distorted of role model, lack of supervision and the opinion that they may affect person image.

The present study presented that about one third (30.0%, 32.0% respectively) of nursing and dental students had good score of knowledge and only (2.9%, 15.3% respectively) had poor score of knowledge about occupational diseases and infection control measures. A low level of knowledge may be attributed to the fact that they are not concerned about reading updated information or their curriculum, had a little information about occupational exposure diseases and infection control measures.

### Conclusion

Based on the results of the study, it can be concluded that: The majority of studied students were exposed to NSI and BBF. While more than three quarters of the studied sample had a history of exposure to NSI in the previous week. The majority of studied students did not report the exposure to BBF. The minority of them uses goggles during the exposure. Moreover, it was observed that the majority of them were not vaccinated against hepatitis B. One third of nursing and dental student had good score of knowledge and the minority had poor score of knowledge about occupational diseases and infection control measures.

### Recommendations:

Based on the results of this study we recommended that:

1. Mandatory continuing education and supervision involves all undergraduate dental and nursing

students at internship year with a specific component on the occupational exposure to BBF.

2. Enforcement of strict infection control measures practices must be and disciplinary measures for poor performance.

3. Hepatitis B vaccine must be given obligatory to all undergraduate nursing and dental students by appropriate method with no price.

4. Establishing a special institution under the umbrella of infection control committees, responsible for reporting occupational accidents, blood borne testing and post-exposure prophylaxis measures.

5. More researches are needed to provide comprehensive data about circumstances associated with occupational exposure to BBF.

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