

Risk Factors Contributing to Needle Stick Injuries: Nurses' Self Reporting

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Abstract Needle stick injuries remain a common factor in exposure of healthcare workers especially nurses to blood-borne viruses. **Objective:** To assess risk factors contributing to needle stick injuries reported by nurses. **Design:** A cross-sectional study was conducted. **Setting:** This study was conducted in three University Hospitals: Alexandria, Beni-Suef and Aswan. **Subjects:** 300 nurses (100 nurses from each hospital) working in the previously mentioned setting was taken represent different medical-surgical departments and outpatient clinics. **Tool:** Two tools was developed by the researchers in order to collect pertinent data in this study [10,13]. **Tool I:** Assessment interview questionnaire sheet, it includes; **Part I:** Socio-demographic characteristics of nurses, **Part II:** Nurses' Knowledge Regarding Needle Stick Injuries. **Tool II:** Risk Factors Associated to Needle stick injuries, it includes **Part I:** Factors related to Nurses and **part II:** Factors related to organization. **Results:** The main results revealed that the most common factors contributed to Needle stick injuries were presence of stressors inside work, no hospital protocol regarding Needle stick injuries process management, lack of continuity of supervision regarding Needle stick injuries and lack of training about how to avoid Needle stick injuries respectively. **Conclusion:** The occurrence of Needle stick injuries is most often encountered among nurses in a heavy work area full of stressors in the absence of hospital protocol, supervision, and training program regarding Needle stick injuries prevention. **Recommendation:** Additional educational & training programs, regular reporting protocol, follow up and assessment of exposures are recommended for all nurses in the community involved in this study.

Keywords: risk factors, needle stick injuries, nurses

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1. Introduction

Needle stick injuries (NSIs) are commonly faced by persons dealing with needles in the medical field [1], where the use of sharps and needles are wide spread. Infections through Needle Stick Injuries (NSI) are ubiquitous and prevalent, to a level inescapable in health care provider during the execution of their duties [2].

Needle stick injuries (NSIs) is the penetration of skin by hollow bore needles or suture needles which was in contact with blood, tissue, or other body fluid containing pleural, peritoneal, or cerebrospinal fluid before the exposure [3,4,5]. Injections are one of the most common medical procedures in the world. The Safe Injection Global Network (SIGN) estimates that approximately 16 billion injections are performed annually worldwide [6].

Globally, an estimated two million healthcare workers (HCWs) experience a needle stick injury (NSI) each year putting them at risk of infectious diseases such as hepatitis B virus (HBV), hepatitis C virus (HCV), and

human immunodeficiency virus (HIV) [7,8,9]. Although recapping by hand has been prohibited, NSIs injuries are still related to this practice. NSIs may occur when a health care worker attempts to transfer blood or other body fluids from a syringe to a specimen container [10-15].

Healthcare workers who followed universal precautions were 66% less likely to have NSIs than those who did not adhere to these recommendations [16,17]. The highest attainable standard of health is a fundamental right of every human being so; protecting those who protect the health is a true right for HCWs including nurses [18]. NSIs led to a universal and national attention on the risk factors contributing to of such incidents [19].

1.1. Significance of the study:

Needle Stick Injuries are the most common cause of healthcare work-related exposure to blood borne pathogens, the incidence of needle stick had been reported to be about 66% in Egypt, 45% in Pakistan, 31.4 % in Germany, 46.8% in Saudi Arabia, 45% in Turkey, 50% in Australia and Taiwan and 79.5% in India. It seems that

these injuries are more prevalent in developing countries [19].

In Egypt, unsafe behaviors among HCWs place Egypt at risk of a broader epidemic. These data suggest that HCWs in Egypt who are regularly in contact with the blood and body fluids of patients are at considerable risk to be infected [20]. It was estimated that 24,004 hepatitis C virus and 8617 hepatitis B virus infections occur each year in Egypt as a result of occupational exposure in the health care environment [21]. It is worth mentioning that nurses represent 65% of the total health care worker in Egypt [22].

So, this study focuses on nurses in north, central and upper Egypt to estimate risk factors that contributing to the exposure of needle stick injuries between nurses through nurses reporting.

2. Aim of the Study

Assess risk factors contributing to needle stick injuries that reported by nurses.

2.1. Research Question

What are the risk factors contributing to Needle stick Injuries that reported by nurses?

3. Materials and Method

3.1. Materials

3.1.1. Research Design

A cross-sectional study design was utilized to conduct this study.

3.1.2. Setting of the Study

The study was conducted in three hospitals which are: the Main University Hospital of Alexandria, the University Hospital of Beni-Suef, and the University Hospital of Aswan.

The study was conducted in medical & surgical departments and outpatient clinics of the previously mentioned hospitals in addition to hemodialysis departments. **Medical** departments: dermatology, Cardiology, Gastroenterology, Hepatology, Endocrinology, and Nephrology, **Surgical** departments: ENT units, hematemesis, cardiothoracic surgery, urology surgery, neurosurgery, and oncology surgery. These settings are thought to be representative for medical surgical and community nurses' specialties.

3.1.3. Subjects of the Study

The study subjects comprised 300 staff nurses who are working in the previously mentioned setting; 100 nurse in each hospital; from both sexes and with different education level, represent the study sample. The researchers tries to unify sample size from each hospital to ease the comparison between them.

3.1.4. Tools

Two tools was developed by the researchers after reviewing the recent related literatures [10,13] to

determine risk factors contributing to needle stick injuries for nurses in the previously mentioned setting.

Tool I: Assessment interview questionnaire sheet; It comprised two parts.

Part I: Nurses' Sociodemographic Data; this part consists of seven items which include the following: code number, gender, age, marital status, academic qualification, years of experience and working department.

Part II: Nurses' Knowledge Regarding Needle Stick Injuries (NSIs); This part is subdivided into three sections:

Section one: General Nurses' Knowledge Regarding (NSIs). This section consists of 26 items which include questions related to general knowledge about incidence of NSIs of nurses such as; NSIs exposure, time of NSIs occurrence, exposure shift, procedures leading to NSIs, reasons for not reporting NSIs.

Section two: Specific Nurses' Knowledge Regarding (NSIs).

- This section consists of 14 items which include specific knowledge about incidence of NSIs of nurses such as; definition of NSIs, needle recapping or bent, dispose the sharps container, action following to NSIs exposure.

Section three: The Scoring system for nurses specific knowledge regarding NSIs had two responses, 'correct' response was given the score of "ONE" and 'incorrect' response was given the score of "ZERO". Based upon scoring system utilized, the knowledge level was categorized as follows: satisfactory level is $\geq 70\%$ and unsatisfactory level was $<70\%$.

Tool II: Risk Factors Associated to NSIs: It comprised two parts:

Part I: Factors related to Nurses that include; Lack of nurses' knowledge regarding NSIs safety precautions, Lack of time, Improper time management during shift, Negligence and carelessness regarding NSIs safety measures, Emotionally distress during working shift, Improper use of sharp instrument before and after used it, Overcrowded work field around here during application of patient care, Ignorance by using new technology that can minimize needle stick injury.

Part II: Factors related to Organization that include; No hospital protocol regarding NSIs process management, Shortage of the staff, Lack of basic supplies, Lack of training about how to avoid NSIs, Lack of continuity of supervision regarding NSIs, Presence of stressors inside work, Defect in arrangement new technology in hospital stock as self-retracting needle.

3.2. Method

- An official approval was obtained from administrative authorities to carry out the study after explanation of the purpose of the study.
- One tool was developed by the researchers based on extensive review of the relevant literature to determine risk factors contributing to needle stick injuries for nurses.
- Validity: Tools were tested for content related validity by seven experts (jury) in the related field two prof from medical department, two prof from surgical department, two from medical surgical nursing

department and one from community nursing department.

- Reliability of the developed tool was estimated using the Cronbach's Alpha test, to measure the internal consistency of tools $r = (0.70)$.
- A pilot study was carried out on 10% of the study subjects to test applicability and feasibility of the developed tool, necessary modifications was done. Data obtained was excluded from the actual study.
- Data collection was taken from 1/8/2017 to 31/7/2018 it was extended for period of 12 months.
- The collected data was analyzed to identify risk factors contributing to needle stick injuries among nurses in the medical-surgical departments and outpatient clinics.

3.2.1. Ethical Considerations

- Written informed consent was obtained from nurses after explanation of the aim of the study.
- Privacy and confidentiality are assured to the study subjects.
- Nurses were informed that their participation is voluntary and they have the right to be withdrawn from the study with a full respect.

3.2.2. Statistical Analysis [23,24]

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. Quantitative data were described using number and percent. Significance of the obtained results was judged at the 5% level. *The observed differences and associations were considered as the following:*

- Significant (S) $p \leq 0.05$
- Highly Significant $P < 0.001$
- Non-significant (NS) $p > 0.05$

The used tests were:

Chi-square test: To compare between different groups

Fisher's Exact or Monte Carlo correction: Correction for chi-square when more than 20% of the cells have expected count less than 5.

Regression: Binary Logistic Regression was assessed to

detect the most independent/ affecting; factor, cause and reason for not reporting regarding to NSIs.

Graphical presentations:

The given graphs were constructed using Microsoft excel software.

4. Results

According to [Figure 1](#); Illustrated numbers of Nurses that Exposed to NSIs in Alex, Aswan and Beni-Suef, which revealed that 67.0% of all nurses from three hospitals had exposed to needle stick injuries, 20.0% of them had 3 pricks and 14.0% of the studied subject had 5-10 prick in all occupational period while 33.0% of them mentioned for not espoused to NSIs.

[Figure 2](#) found that Aswan University Hospital had the a higher rate 76.0% & 70.0% regarding nurses that exposed to NSIs and also they reported there was no training program they taken before about NSIs prevention respectively.

As regard to the nurses knowledge about the absence of hospital NSIs protocol, the same figure showed that Beni-Suef University Hospital nurses had the higher rate among the other hospitals nurses, 53.0% said there was no protocol, while Alex University Hospital nurses 42.0% said they didn't know if there was NSIs protocol or no.

[Figure 3](#) illustrated that 86.0% from nurses that exposed to NSIs did not report injuries, 37.81% of them not reported because they didn't know the process for reporting, while 21.89% of the nurses think there was no importance for reporting, in addition to 15.42%, 13.93% and 9.45% refer the reason for not reporting to injury done by sterile needle, they didn't had enough time for reporting and finally may be the fear of blaming others respectively.

[Figure 4](#): Portrays that 50.0% & 35.0% from Aswan & Alex University Hospital Nurses said the most common procedure that can cause NSIs was intravenous injection respectively and 30.0% & 28.0% from Alex & Beni-Suef University Hospital Nurses reported to for shunt needle removal after dialysis respectively.

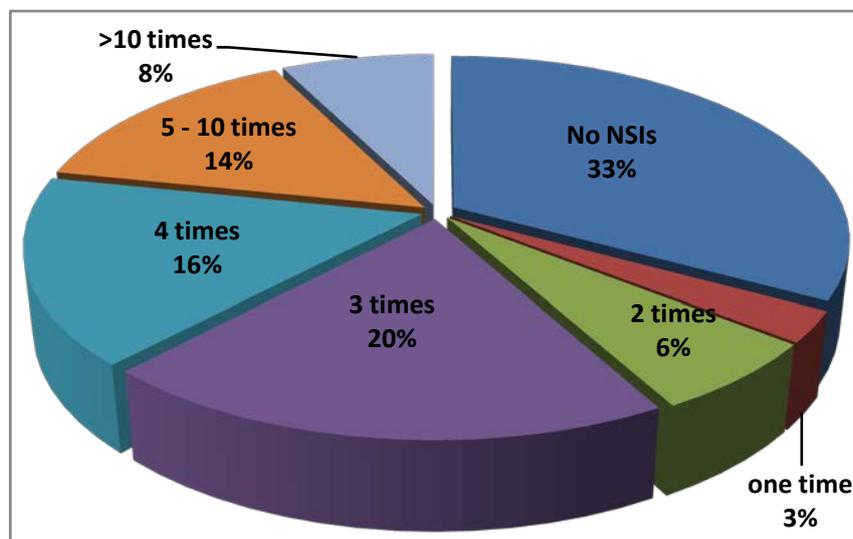


Figure 1. Distribution of Nurses According to Numbers of their Exposure to NSIs [Exposed to NSIs =201 & non Exposed to NSIs= 99]

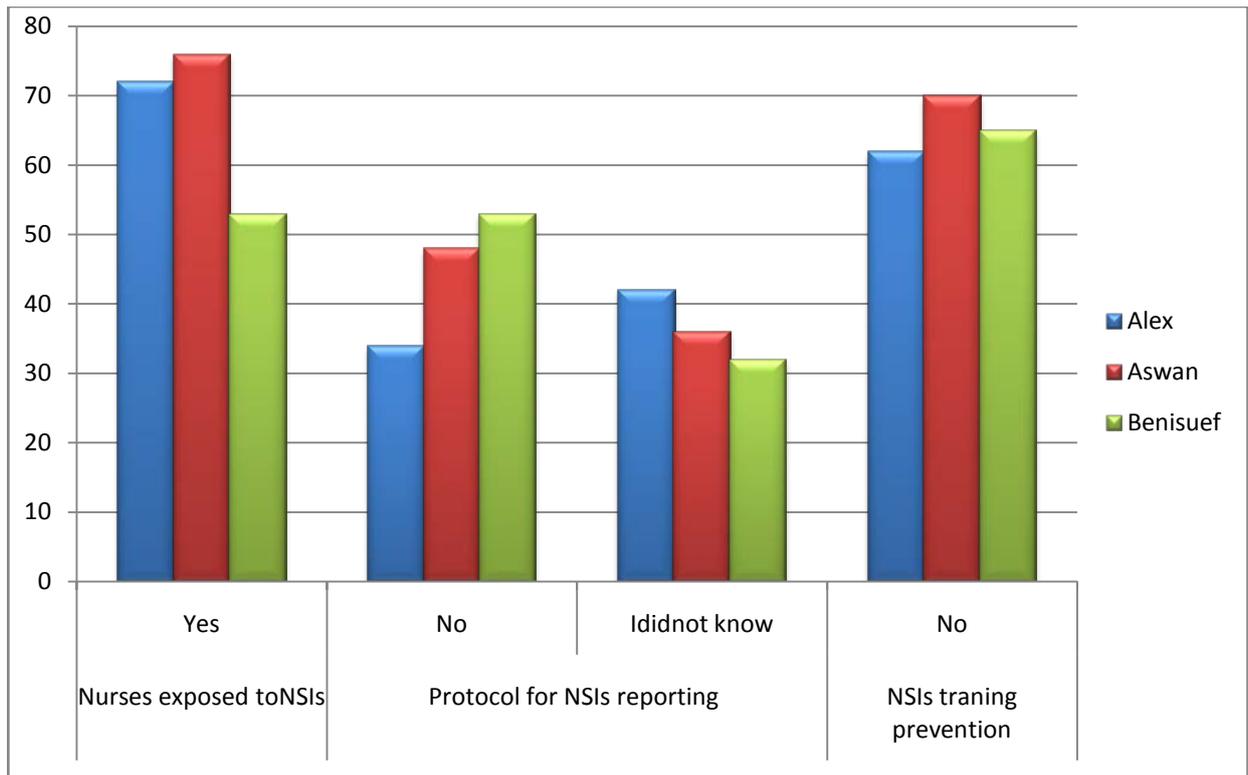


Figure 2. Distribution of Nurses According to their Knowledge Regarding their Exposure to NSIs, Hospital Protocol, Reporting Process and Training program to NSIs [no. 100 Nurse from Each Hospital]

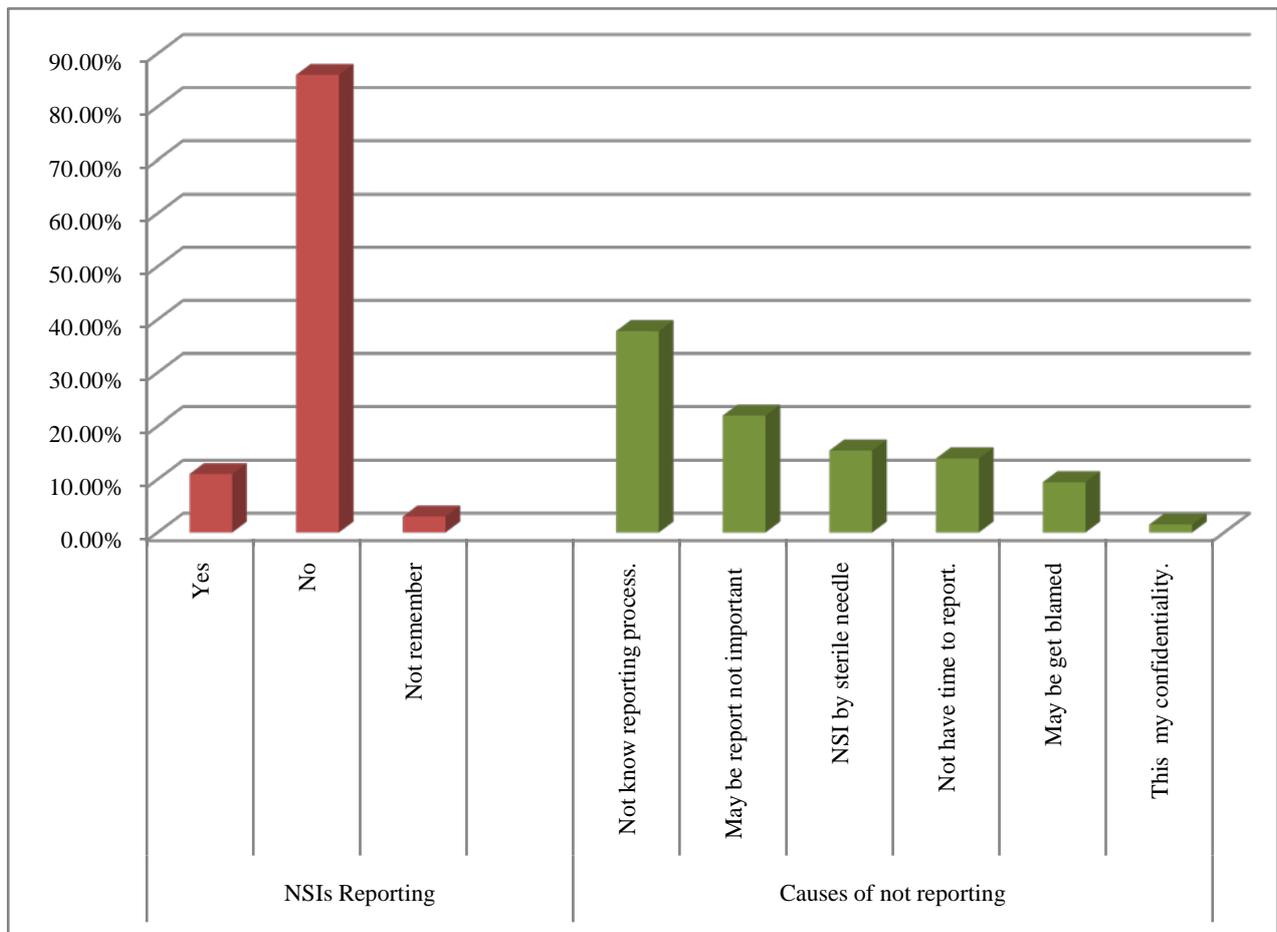


Figure 3. Distribution of Nurses According to their Knowledge Regarding their NSIs Reporting and Causes of not Reporting to NSIs [no. 201 Nurse Exposed to NSIs]

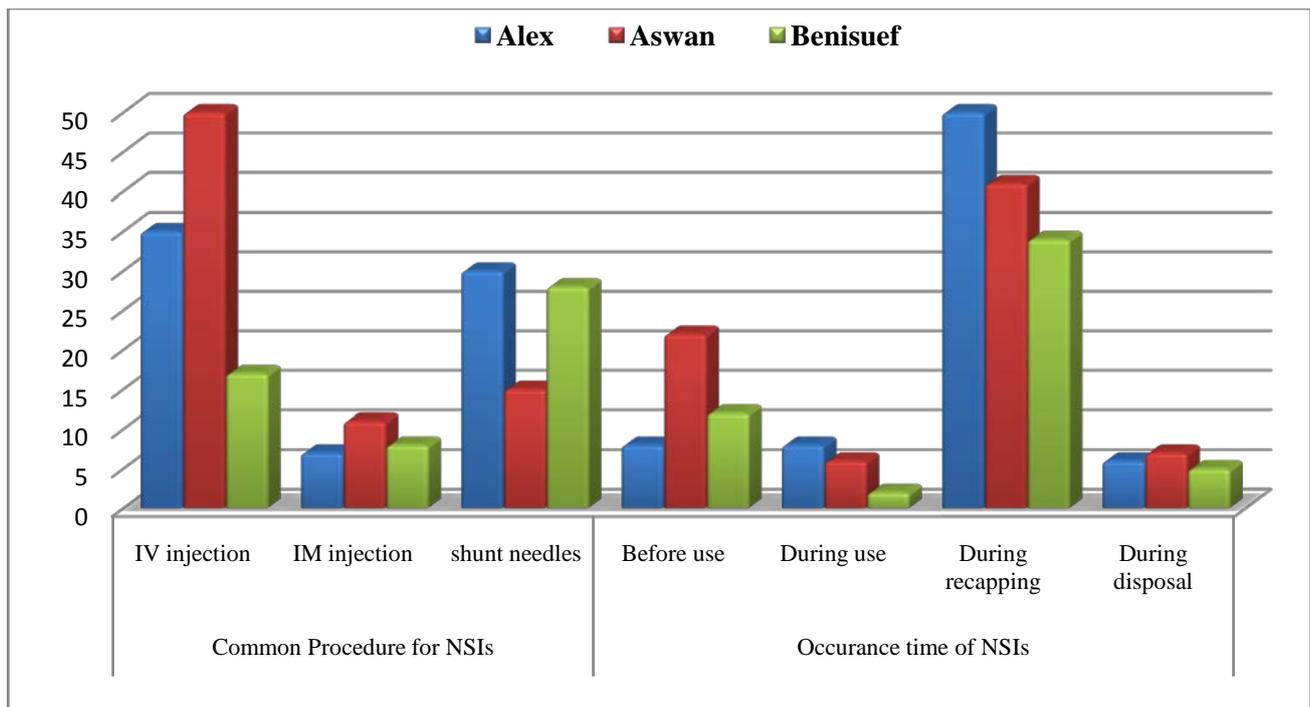
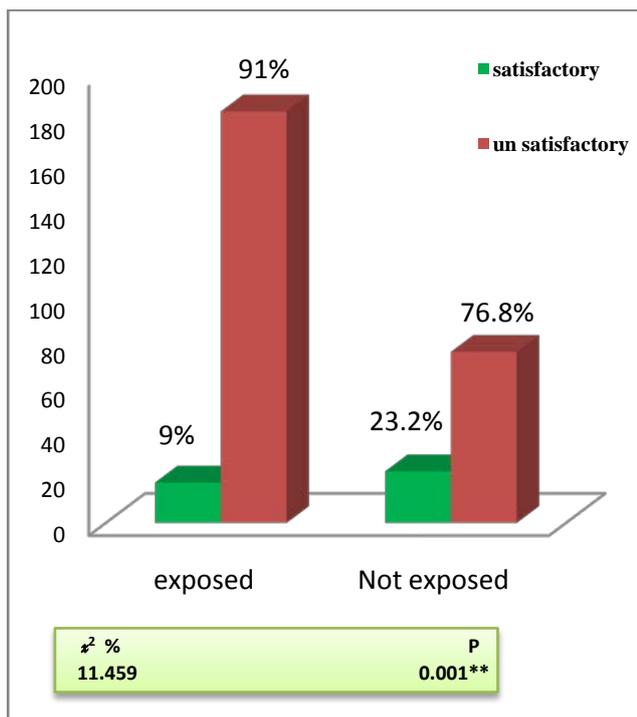


Figure 4. Distribution of Nurses According to their General Knowledge Regarding to procedures that can lead to NSIs and when it can exactly occur [no. 100 nurse from each hospital]



χ^2 : Chi square test, ** Highly statistically significant at $p \leq 0.001$
 p: p value for association between NSIs exposure with total specific knowledge score

Figure 5. Relation between NSIs Exposure and Total Specific Knowledge Score Regarding NSIs [exposed to NSIs =201 & non exposed to NSIs= 99]

As regard to time of Needle Stick Injuries can exactly occur, the same figure showed that; 50.0%, 41.0% and 34.0% from Alex, Aswan and Beni-Suef University Hospital Nurses reported NSIs occur during needle recapping respectively.

Figure 5: Reflected that there was a highly statistical significant relationship between NSIs exposure and

specific knowledge score regarding NSIs at P-Value ≤ 0.001 .

Table 1. Relation between Socio Demographic Data and Exposure to Needle Stick Injury [exposed to NSIs =201 & non exposed to NSIs= 99]

	Exposure				χ^2 %	P
	Yes (n = 201)		No (n = 99)			
	No.	%	No.	%		
Department					55.846*	<0.001**
Chest	44	21.9	8	8.1		
Dialysis	91	45.3	34	34.3		
Surgical	14	7.0	39	39.4		
Operating room	0	0.0	0	0.0		
Hematemesis	19	9.5	7	7.1		
Dermatology	2	1.0	4	4.0		
Pediatric	31	15.4	7	7.1		
Age						
< 25 y	83	41.3	20	20.2		
25 < 30 y	44	21.9	26	26.3		
≥ 30	74	36.8	53	53.5	14.452*	0.002*
Years of Experience						
< 5 y	106	52.7	32	32.3		
6-10 y	21	10.4	8	8.1		
11-15 y	22	10.9	20	20.2		
> 15y	52	25.9	39	39.4		

χ^2 : Chi square test MC: Monte Carlo p: p value for association between sustained a needle stick injury during the last 12 months with Socio demographic*: Statistically significant at $p \leq 0.05$, ** highly statistically significant at $p \leq 0.001$

Table 1: Clarifies that there was a highly statistically significant relationship between department & age of studied nurses and exposure to NSI while there was statistically significant relationship between years of experience and exposure to NSI.

Table 2. Relation between NSIs Exposure and General Nurses' Knowledge Regarding NSIs [exposed to NSIs =201 & non exposed to NSIs= 99]

Items	Needle Stick Injury Exposure				χ^2 %	P
	Yes (n = 201)		No (n = 99)			
	No.	%	No.	%		
1. Shift of exposure:						
- Morning	105	52.2	0	0.0	300.0*	<0.001**
- Evening shift	65	32.3	0	0.0		
- Night shift	31	15.4	0	0.0		
- No stick injury	0	0.0	99	100.0		
2. Most common cause of NSIs:					17.656*	<0.001** MC p
- Emergency situation	21	10.4	18	18.2		
- Sudden movement of the patient	60	29.9	47	47.5		
- Heavy work load	116	57.7	34	34.3		
- Work distress	4	2.0	0	0.0		
3. Organizational protocol for NSIs reporting:					15.034*	0.001**
- Yes	40	19.9	15	15.2		
- No	75	37.3	60	60.6		
- I don't know	86	42.8	24	24.2		
4. Training program for NSIs prevention:					29.461*	<0.001**
- Yes	90	44.8	13	13.1		
- No	111	55.2	86	86.9		
5. Numbers of patients received in shift:					20.332*	0.002* MC p
- 1:2	19	9.5	5	5.1		
- 1:3	49	24.4	10	10.1		
- 1:4	7	3.5	7	7.1		
- 1:5	12	6.0	4	4.0		
- 1:6	0	0.0	4	4.0		
- 1:7	9	4.5	4	4.0		
- >7	105	52.2	65	65.7		

χ^2 : Chi square test, MC: Monte Carlo, p: p value for comparing between the different categories, *: Statistically significant at $p \leq 0.05$, ** Highly statistically significant at $p \leq 0.001$

Table 3. Logistic Regression for Common Cause Leading to NSIs, Most Common Reason for not Reporting NSI and the Most Common Factor which Contributed to NSI

Items	B	P	OR	95% C.I	
				L.L	U.L
1. The most common cause leading to NSIs:					
- Emergency situation	-0.644	0.064	0.525	0.265	1.038
- Sudden movement of the patient	-0.753	0.003*	0.471	0.286	0.774
- Heavy work load	0.959	<0.001**	2.609	1.582	4.303
- Work distress	20.515	0.999	8x10 ⁸	-	-
2. The most common reasons for non-reporting of NSIs exposure:					
- I did not report because injury due to sterile needle	25.788	0.996	2940.0	178.5	48435.07
- I did not know the reporting process.	7.986	<0.001**	17.193	2.309	128.032
- I thought I might get blamed	25.788	0.998	1.58x10 ¹¹	0.0	-
- I did not think it was important to report	25.788	0.997	1.58 xE ¹¹	0.0	-
- I did not have time to report.	25.788	0.997	1.58 xE ¹¹	0.0	-
- I was concerned about my confidentiality.	25.788	0.999	1.58 xE ¹¹	0.0	-
3. The most common factor which contributed to NSI (Hospital and nurses factors)					
- No hospital protocol regarding NSIs process management.	0.946	0.001*	2.575	1.473	4.502
- Shortage of the staff.	0.062	0.833	1.064	0.599	1.888
- Lack of basic supplies, as; gloves.	-0.271	0.380	0.763	0.417	1.396
- Lack of training about how to avoid NSIs.	-0.639	0.048*	0.528	0.280	0.994
- Lack of continuity of supervision regarding NSIs.	1.092	0.005*	2.980	1.395	6.369
- Presence of stressors inside work.	-1.194	<0.001**	0.303	0.164	0.559
- Defect in arrangement new technology in hospital stock as self-retracting needle.	-0.334	0.322	0.716	0.370	1.387

B: Unstandardized Coefficients, LL: Lower limit, Beta: Standardized Coefficients, UL: Upper Limit, SE: standard Error, *: Statistically significant at $p \leq 0.05$, CI: Confidence interval, ** highly statistically significant at $p \leq 0.001$.

Table 2 shows that a highly statistical significant differences between needle stick injuries and Shift of exposure, causes that can leads to NSI, needle stick injury protocol, and training program that can arrange to prevent

NSIs at P-Value <0.00, while there was statistical significant differences between needle stick injuries and Numbers of patients that received in shift, at P-Value <0.05.

Table 3: Indicates that the most common causes which leading to NSIs were heavy work load and sudden movement of the patient respectively. While the same table revealed that the most common reason for non-reporting of NSIs exposure was the nurses did not know the reporting procedure. On the other hand, the most common factors which contributed to NSI, according to this table illustrate that, presence of stressors inside work, no hospital protocol regarding NSIs process management, lack of continuity of supervision regarding NSIs and lack of training about how to avoid NSIs respectively.

5. Discussion

Needle stick injuries (NSIs) pose a significant hazard for health-care providers specially nurses. So, the aim of the present study was to assess risk factors contributing to needle stick injuries that reported by nurses.

The current study findings revealed that more than two thirds (67%) of nurses had exposed to needle stick injury (Figure 1), this may be due to lack of experience and lack of training. Similarly, in Egypt Hanafi et al., (2011) [23] found that (62.3%) of nurses reported at least one NSI, this was in accordance with Martins et al., (2012) [24] who found that nearly two thirds (64.5%) of nurses were exposed to NSIs. On the other hand Laishram and colleagues, (2013) [25] in India reported that 28% of the nurse had at least one needle stick injury during the last 1 year. Also Galougahi, (2010) [26] in Iran found that only 22.15% of nurses had at least one exposure to NSIs in last year. This may be due different number of nurses in the facility, different work environment, culture and availability of resources.

Figure 1 also clarified that 20% of nurses had 3 pricks and 14% of the studied subject had 5-10 prick in all occupational period, this was in accordance with Gabr et al., (2018) [27] in Menoufia, Egypt who found that 24.7% of nurses had 3 pricks and 19.5% had 5-10 pricks. However, in a previous study conducted in in India, about 80% of health care workers reported they had one or more NSIs during their career [28].

The present study findings showed that the highest percentage of nurses exposed to NSIs found in Aswan (76%) while the least percentage found in Beni-suef (53%). This difference may be due to different levels of commitment with or availability of safety measures precautions. Also these high prevalences may be explained by unavailability of training programs for prevention in the two hospitals as reported by the current study (70% & 65%) respectively not receiving training for NSIs prevention (Figure 2).

The current study results clarified that there was a statistically significant relationship between age, years of experience and exposure to NSIs, as younger ages (<25 years) with less years of experience (<5 years) were more exposed to NSIs (41.3%) and (52.7%) respectively (Table 1). This may be due to lack of experience and knowledge of young nurses. In accordance with current

study findings Ahmed, (2014) [29] in Egypt found that there was a statistically significant relationship between years of experience and exposure to NSIs, in the study conducted in zagazig, the researcher found that 88.3% of nurses with less than 5 years of experience exposed to NSIs. In the same line Salelkar, et al. (2010) [30] found that 36.6 of nurses with less than 5 years of experience were exposed to NSIs. On contrary Martins et al., (2012) [24] found that the experience seems to be a risk factor in these injuries, as nurses with 10 or more years of experience in practice were sustaining NSIs compared with those with less than 10 years of work experience.

This study also found that the highest exposure to NSIs (45.3%) was reported in dialysis department (Table 1). This may be explained by the heavy workload and usage of sharp instruments in dialysis department. On the other hand Ahmed, (2014) [29] in Egypt found that the highest exposure (71%) was in surgical department. This difference may be explained by the difference in sample characteristics, age, years of experience, qualification,...etc

According to the results of this study, there was a statistically significant relationship between NSIs exposure and working shift, as nurses reported more cases of NSIs (52.2%) in the morning shift (Table 2). This may be due to: heavy workload, large number of patients, paperwork, performing surgical procedures and other medical services in the morning shift; which could lead to increase the risk of errors in nurses's performance, including the risk of NSIs. In the same line Jahangiri et al., (2016) [31] in Iran found that more than half (57.8%) of nurses experienced NSIs in morning shift. The same findings were reported by Pili et al., (2013) [32] in Iran, which found that the highest rate of needle stick injuries (58%) occurred in the morning shift. On the other hand In Masoumi-Asl et al. (2016) [33] study in Iran, reported that more NSIs occurred in the evening and night shifts.

There was also a statistically significant relationship between NSIs exposure and number of patients the nurse cared for during the shift, as more than half (52.2%) of nurses assigned for more than 7 patients experienced NSIs (Table 2). This may be due to the fact that increased number of patients assigned to one nurse per shift already increases the tasks over the nurse, which in turn increases workload and increase the error leading to NSIs. On contrary, Nsubuga & Jaakkola, (2005) [34] found a higher injury rate among those attending to less patients per day compared with those attending to more patients. Also Cho et al. (2014) [35] failed to find a statistically significant relationship between NSIs and number of patients per nurse. The difference may be due to different study designs, sample and timing of the study.

The occurrence of needle stick injuries is significantly related to clinical practice behaviors and attitudes [36]. The present study found that most exposures occurs during needle recapping (Figure 4), this may be due to negligence, as the procedure was ended and the nurse thought she completed her mission. In the same line Isara et al., (2015) [37] and Mshelbwala et al., (2016) [38] in Nigeria found that recapping of needles was the most common circumstances leading to NSIs. Also Memish et al., (2013) [1] in Saudi Arabia found that most NSIs occurred during recapping. Contradictory results have been reported by Jayanth et al., (2009) [39] in a study

conducted at Vellore which reported that exposure during recapping constituted 8.5%, while disposal represented 18.6%. This denotes lack of hazard awareness among HCWs and use of safer needle disposal methods at the Saudi, Nigeria institute.

This study identified IV injection as the most common procedure leading to NSIs (Figure 4), as the IV injection is the most repeated and simple procedure done routinely during patient care. This was in accordance with Elsherbeny and Niazy (2018) [40] in Saudi Arabia who found that IV injection was the most common procedure (28.2%) during which NSIs occurred. These results are similar to the study done in India 2017 reporting that blood sample collection was the most common procedure during which NSIs occurred [2]. This can be explained by the fact that nurses administer most of the injections and are responsible for venipuncture, intravenous fluid administration and other procedures which require the use of needles [41]. On contrary, many other studies reported that only 19% of NSIs occurred due to IV injection [42,43] in Kenya. This difference may be explained by the availability of better facilities, number of nurses or number of patients.

In present study, there was a statistically significant relationship between nurses' specific knowledge regarding NSIs and exposure to injury (Figure 5), as most of nurses with unsatisfactory knowledge (91%) had exposed to NSIs. This was in accordance with Zungu et al., (2008) [44]. in Gauteng, South Africa, who found that a significant proportion of the nurses rated the lack of knowledge about NSIs to exposure.

Regression analysis of current study identified heavy work load, sudden movement of the patient, emergency situation and work distress (57.7%, 29.9%, 10.4 % & 2%) respectively as the main causes of NSIs among nurses (Table 3). This was in congruence with findings of Kaweti and Abegaz (2016) [45] in Ethiopia, who reported that emergency situation and sudden movement of the patient were the top reported reasons for the occurrence of needle sticks injury followed by work overload, suturing, waste disposal and needle recapping respectively

Concerning NSIs reporting, the current study found that the underreporting rate was high (86%) (Figure 3), agreeing with Baig and colleagues, (2014) [46] findings, which indicates underreporting rate 76%. Conversely other study in Pakistan found that only 15% of NSIs were not reported [47]. Also Malik and colleagues, (2012) [48] noted that only 7% of participants who experienced an NSIs were not reported it.

Figure 3 clarified the most common cause of not reporting NSIs as "not knowing the process of reporting" as more than one third of studied nurses (37.8%) didn't know the process of reporting. Similarly in Ayrancı & Köşgeroğlu study (2004) [49] it was found that 94.2 % of nurses were unaware of reporting process; while in Ersin et al., (2016) [50] study, most of the nurses expressed that they did not report their injuries as they were unaware of the necessity to report the injury, they did not find reporting necessary, they did not find it necessary after making the proper intervention and they did not have enough time. On the other side

Jahangiri et al., (2016) [31] found that the most common causes of underreporting were heavy clinical schedule and perception of low risk of infection.

Concerning awareness of the presence of hospital policy for NSIs reporting, Table 2 shows that 42.2% of studied nurses didn't know if there was a reporting protocol. However, Nsubuga & Jaakkola (2005) [34] found that a high proportion of nurses (75%) were not aware of the existence of a hospital policy on needle stick injuries, a fact that also suggests insufficient training at the workplace. Lack of awareness of the policy had borderline significance with respect to the risk of needle stick injuries

Regression analysis of the present study identified work stressors as the most common factors contributed to NSIs (Table 3). This was in consistence with Jahangiri et al., (2016) [31] who found that health workers who had job related stress were more likely to face needle stick and sharp than those who did not have job related stress. However, this contradicts Walle, (2013) [51] study conducted at Felege Hiwot Referral Hospital, where those who were satisfied on their job were more likely to sustain needle stick and sharp injuries than those who were not satisfied on their job.

This study also identified lack of training as one of the most common factor contributing to NSIs (Table 3). This was in accordance with (Nsubuga and Jaakkola, 2005) [34] Portuguese study in which training has been identified as the crucial factor in predicting the occurrence of NSIs. On contrary, Martins et al., (2012) [24] found that nurses who had not attended any training on prevention of NSIs in their workplace had less risk of sustaining an injury compared with those who had attended some kind of training.

6. Conclusion

6.1. Findings of the Present Study Concluded That

The occurrence of needle stick injuries is most often encountered among nurses that dealing with large number of patients in a heavy work area which full by stressors in the absence of supervision, hospital protocol, training program regarding NSIs prevention.

7. Recommendations

- Additional educational programs should be recommended for all health care workers (HCWs) especially nurses.
- Nurses who entering the profession should be warned about universal safety precautions and protection that must be strictly maintained in view of potentially serious infections.
- The study areas need to improve the training of nurses and to provide infection prevention materials.
- Regular reporting, follow up and assessment of occupational exposures need to be carried out in health institutions.

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