IJPHCS
Open Access: e-Journal

*International Journal of Public Health and Clinical Sciences*
*e-ISSN: 2289-7577. Vol. 2:No. 4*
*July/August 2015*

# Needle Stick Injuries Prevalence Among Nurses In Jordanian Hospitals

Firas Shehadeh Khraisat[1], Muhamad Hanafiah Juni[1*], Salmiah Md Said[1], Anita Abd Rahman[1], Hamdan-Mansour A[2].

[1]Department of Community Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.
[2]Department of Community Health Nursing,Faculty of Nursing, The University of Jordan

**Corresponding author: Associate Professor Dr. Muhamad Hanafiah Juni*
*Email: hanafiah_juni@upm.edu.my*

## ABSTRACT

**Background:** Needle Stick Injuries (NSI) is one of the most significant hazard threatening the well-being of nurses and other healthcare workers inside hospitals. The current situation of NSI, practices and its associated factors, among nurses has not been thoroughly examined in Jordanian hospitals.

**Objectives:** The objectives of this study are to determine the prevalence of NSI among Jordanian nurses, and to identify the risk factors associated with these injuries**.**

**Methods:** A cross-sectional study was conducted in February 2015 as a pilot study among108 nurses in Jordan University Hospital, and The Specialty Hospital. The subjects were selected using stratified random sampling. The data were collected using a self-administered questionnaire. The data were analyzed using International Business Machines Corporation Statistical Product and Service Solutions (IBM SPSS) version21.

**Results:** The results showed that within the last 3 months, 67.6% (95% CI: 1.88%, 2.19%) of the nurses reported having at least one NSI. Most of these injuries were caused by recapping procedure, while working with syringe needles, and occurred during morning shifts. The prevalence of NSI was found to be significantly associated with age group ($P<0.001$), working experience ($P<0.001$), and marital status ($P<0.004$).

**Conclusion:** The reported prevalence of NSI among Jordanian nurses is alarming, thus further investigations are needed to understand the underlying factors behind this high prevalence rate, and also to investigate the knowledge of the nurses about NSI and their practices while working with needles.

**Keywords:** Prevalence, Needle Stick Injuries, Nurses, Hospitals Jordanian

International Journal of Public Health and Clinical Sciences
e-ISSN: 2289-7577. Vol. 2:No. 4
July/August 2015

## 1.0 Introduction

Needle Stick Injuries (NSI) have been considered and identified as one of the most serious occupational hazards among health care workers (HCW) and it may affect their health and well-being. The Centers for Disease Control and Prevention (CDC) reported that 385,000 needle sticks and other sharps related injuries are sustained by hospital-based HCW each year. However, the occurrence of needle stick injuries is underreported which leads to difficulty in estimating the true magnitude of this problem. Approximately 60% to 95% of all the NSI fail to be reported by the healthcare workers (Waqar et al., 2011). According to Ashat et al. (2011) the numbers of NSI are significantly higher than current estimates and for that reason a low incidence or prevalence of NSI should not be interpreted as a non-existing problem. Mehrdad et al., (2014) found that more than half of the nurses did not report a NSI after exposure. A study by Fourie and Keogh (2011) in New Zealand revealed that lack of experience and inadequate communication were two major barriers to report needle stick injuries.

One of the most common health hazards that can occur following a NSI is the transmission of blood-borne infection such as Human Immunodeficiency Virus (HIV), Hepatitis B, and Hepatitis C viruses (Clarke et al., 2002). The World Health Organization (WHO, 2002) indicated that NSI were responsible for approximately 40% of Hepatitis B and Hepatitis C infections and 2.5% of HIV infections among healthcare workers worldwide. The danger of NSI on the health of healthcare workers is serious due to the fact that only 1/10,000 ml of infected blood plasma with Hepatitis B virus is enough for the microorganism to be transmitted to the blood stream of a human being (Costigliola et al., 2012). Adams (2012) stated that the financial costs of NSI are also high, including the costs of post-exposure prophylaxis (PEP), serological investigations, healthcare consultations and/or assessments, and time associated with attending clinic appointments.

Among all health occupational groups providing direct care to the patients inside hospitals, nurses are the most frequent group to have NSI (Trivedi et al., 2013), which put nurses under the threat of acquiring a serious blood-borne diseases like Hepatitis B, Hepatitis C and/or HIV (Kebede et al., 2012). Memish et al. (2013) conducted a study in Saudi Arabia in the Middle East reported that nurses were the major occupational group to have NSI and he explained it by the fact that nurses are the most occupational group responsible for blood sampling and other intra-venous procedures among hospital inpatients. Nurses also provide a lot of high risk activities that can lead to NSI, for example; administering medication, withdrawal of blood, suturing, and inserting intravenous lines (Lovaglio, 2012).

Several factors that were found to contribute to NSI among nurses are recapping needles after use, lack of experience, not using sharp containers properly, and working under emotional distress (Zafar et al.,2009). Hence, in order to understand and identify solutions to prevent this type of injures, identifying the contributing factors associated with NSI becomes crucial. As previous study have shown that approximately 80% of NSI can be prevented through the use of appropriate precautionary measure (Zaidi et al., 2010)., emphasis on such research can no longer be ignored. It is important to address that about 80% of NSI are preventable using appropriate precaution measures

In Jordan, the current situation or status of NSI among hospital nurses has not been properly investigated or systematically examined. Previous descriptive cross-sectional study among health care workers in Jordan reported a very high prevalence of sharp injury (91.4%) within 12 months and majority of them (81.0%) involved nurses (Hassan & Wahsheh, 2009). In addition, studies that were done to identify the associated factors to such high NSI prevalence were also limited. However there is limited study on the factors associated with this high prevalence of needle stick injuries among nurses. Thus, this study was conducted to determine the prevalence and factors associated with NSI among nurses in Jordanian hospital.

## 2.0 Materials and Methods

This is a pilot study among 108 nurses from Jordan University Hospital and a tertiary public hospital in Jordan. The nurses were selected using stratified random sampling technique from six work places inside each hospital namely Intensive Care Unit (ICU), Operation Room(OR), Emergency Room (ER), Medical ward, Surgical ward, and Pediatric ward. A cross-sectional study was conducted using a self-administered questionnaire to collect informations on the socio-demographic data, needle stick injury, procedures causing needle stick injuries, time and location of NSIs, type of needles, and the experience of nurses who encountered the NSI. The age of respondents was calculated based on the date of birth and the date of filling the questionnaire. Needle stick injury is defined as "introduction into the body of health care providers during the routine performance of their duties, of blood or other potentially hazardous material by a hollow bore needleor sharp instruments" (Waqar et al., 2011).The data was analyzed using International Business Machines Corporation Statistical Product and Service Solutions (IBM SPSS) version 21. The categorical variables were presented as percentages and Chi-square test was used to determine the relationship between two categorical variables. Level of significance was set at $\alpha$=0.05.

## 3. Results

Table 1 demonstrates the socio-demographic and job characteristics for the nurses who participated in this study by age, gender, occupation, educational level, marital status, working experience as well as place of work. Approximately 60% of the respondents were females compared to 40% male respondents; ranging between 22 to 48 years of age with overall mean of 30.1±5.7 years. The overall mean age for all the respondents was 30.1 with standard deviation of 5.7 and it ranged between 22 years to 48 years old, 95 respondents were working as staff nurses (88%) and 13 respondents only worked as practical nurses (12%), nurses who work in managerial positions were not included. 83 of the respondents have a bachelor degree in nursing (77%) while 13 respondents have only diploma degree in nursing (12%), and 12 participant only hold master degree (11%), no bed-side nurses were found to have a PhD. Among all participating nurses, 52% were married and 46% were single, only 2% were divorced (Table 1).

Regarding the working experience of the 108 nurses, 42 nurses had experience less than 5 years (39%), while 36 of the respondents had experience between 5-9 years (33%), and only 30 respondents had experience of 10 years or more. Among these groups, 31 nurses who had experience between 1-4 years have had suffered at least one stick injury in the past 3 months

International Journal of Public Health and Clinical Sciences
e-ISSN: 2289-7577. Vol. 2:No. 4
July/August 2015

of the study (42%), while the nurses who had experience between 5-9 years had suffered 29 NSI in the same period of time (40%). On the other hand, the most experienced group (10 years or more) have had suffered less NSI than the other two groups with only 13 injuries (Table 1).

Concerning the place of work or the location where NSI took place, ICU had the most occurrence of injuries; with 16 injuries out of the total 73 injuries (22%). The surgical ward came in second place with 15 NSI representing 21% of all the injuries occurred inside the two hospitals, followed by ER with 12 injuries (16%), and medical ward had the same number of injuries which was 11 (15%). The work place with the lowest number of NSI was the pediatric ward with 8 injuries only representing 11% of the total injuries (Table 1).

Analysis of the NSI prevalence showed that almost two thirds of the nurses (73 nurses) suffered at least one NSI occurred in a three months period. Among 108 nurses who returned the questionnaire, 73 nurses reported having at least one NSI in the previous three months of the study (67.5%), among them 39 nurses reported having the injury more than once (Table 2)

***Table 1.****Socio-demographic and job characteristics of respondents*

| Variable | Description | Frequency | |
|---|---|---|---|
| | | n | % |
| **Age (years)** | 20-24 | 15 | 14 |
| | 25-29 | 46 | 43 |
| | 30-34 | 24 | 22 |
| | 35-39 | 15 | 14 |
| | 40 or above | 8 | 7 |
| **Gender** | Male | 43 | 40 |
| | Female | 65 | 60 |
| **Occupation** | Staff nurse | 95 | 88 |
| | Practical nurse | 13 | 12 |
| **Educational level** | Diploma | 13 | 12 |
| | Bachelor | 83 | 77 |
| | Masters | 12 | 11 |
| **Marital status** | Single | 50 | 46 |
| | Married | 56 | 52 |
| | Divorced | 2 | 2 |
| **Working experience (Years)** | 1 – 4 | 42 | 39 |

International Journal of Public Health and Clinical Sciences
e-ISSN: 2289-7577. Vol. 2:No. 4
July/August 2015

| | | | |
|---|---|---|---|
| | 5 – 9 | 36 | 33 |
| | 10 and more | 30 | 28 |
| **Work place** | ICU | 20 | 18.5 |
| | ER | 18 | 16.7 |
| | OR | 19 | 17.6 |
| | Medical ward | 18 | 16.7 |
| | Surgical ward | 18 | 16.7 |
| | Pediatric ward | 15 | 13.8 |

Based on the answers reported by the responding nurses, the procedure that caused most of the injuries was recapping needles after use. Recapping contributed to 36% of all the injuries occurred to the nurses, followed by blood collection procedures causing 23% of the NSIs, and giving injection procedures contributed with 15% of the injuries. Cannulation and disposal of needles each contributed to 10% of all injuries, followed by suturing causing 5% of all NSIs only (Table 2).

The type of needle that was responsible for most of the reported NSIs was the syringe needle causing 60% of all NSIs, which is considered high, followed by the intravenous catheter (cannula) contributing with 25% of the NSIs, and the suture needles causing 8% of all the reported NSIs (Table 2).

Regarding the time of the last NSI experienced by the nurses, most of the reported NSIs have had occurred in the morning shift with 42 NSIs out of 73 (58%), while 20 NSIs (27%) of the NSIs had happened in the evening shift, and 11 NSIs (15%) only have occurred on the night shift (Table 2).

***Table2**. Distribution of respondents by NSI, procedure, type of needle, and time of occurrence*

| Variable | NSI | Frequency | |
|---|---|---|---|
| | | n | % |
| NSI | No | 35 | 32 |
| | Yes (one time) | 34 | 32 |
| | Yes (more than one time) | 39 | 36 |
| Procedure | Recapping | 26 | 36 |
| | Intravenous line insertion | 7 | 10 |
| | Blood collection | 17 | 23 |

International Journal of Public Health and Clinical Sciences
e-ISSN: 2289-7577. Vol. 2:No. 4
July/August 2015

| | | | |
|---|---|---|---|
| | Giving injection | 11 | 15 |
| | Suturing | 5 | 7 |
| | Disposal of needles | 7 | 10 |
| Type of needle | Syringe needle | 43 | 60 |
| | Suture needle | 6 | 8 |
| | Intravenous catheter | 18 | 25 |
| | Other | 6 | 8 |
| Time of occurrence | Morning shift | 42 | 58 |
| | Evening shift | 20 | 27 |
| | Night shift | 11 | 15 |

**(Table 3)** explains the relationship between experience and the needle stick injury occurrence, while **Table 4** explains the relationship between the work place of the nurses and the needle stick injury occurrence. The overall relationship between the prevalence of NSIs and the socio-demographic characteristics of the nurses is demonstrated in **Table 5**.

***Table 3**. association between the nurses working experience and NSI*

| Experience | Total respondents | | Frequency of NSI | | Value | |
|---|---|---|---|---|---|---|
| | N | % | N | % | $X^2$ | P |
| 1-4 years | 42 | 39 | 31 | 42 | | |
| 5-9 years | 36 | 33 | 29 | 40 | 20.6 | <0.001* |
| 10 years or more | 30 | 28 | 13 | 18 | | |
| Total | 108 | 100 | 73 | 100 | | |

*significance level, $p < 0.05$

***Table 4**. Association between place of work and NSI*

| Work place | Total respondents | | Frequency of NSI | | Value | |
|---|---|---|---|---|---|---|
| | N | % | N | % | $X^2$ | P |
| ICU | 20 | 19 | 16 | 22 | | |
| ER | 18 | 17 | 12 | 16 | | |
| OR | 19 | 18 | 11 | 15 | 9.7 | 0.47 |
| Medical ward | 18 | 17 | 11 | 15 | | |
| Surgical ward | 18 | 17 | 15 | 21 | | |

International Journal of Public Health and Clinical Sciences
e-ISSN: 2289-7577. Vol. 2:No. 4
July/August 2015

| | | | | | |
|---|---|---|---|---|---|
| Pediatric ward | 15 | 14 | 8 | 11 | |
| Total | 108 | 100 | 73 | 100 | |

2 cells (11.1%) have expected count less than 5. The minimum expected count is 4.72.
*significance level, p < 0.05

***Table 5**. Relationship between socio- demographic characteristics and NSI*

| Variable | Description | NSIs | | | | Value | |
|---|---|---|---|---|---|---|---|
| | | Frequency | | | | | |
| | | Yes | | No | | $X^2$ | P |
| | | N | % | N | % | | |
| Age (years) | 20-24 | 13 | 12 | 2 | 2 | 30.3 | <0.001* |
| | 25-29 | 34 | 31 | 12 | 11 | | |
| | 30-34 | 18 | 15 | 6 | 6 | | |
| | 35 and above | 8 | 7 | 15 | 14 | | |
| Gender | Male | 29 | 27 | 14 | 13 | 4.6 | 0.10 |
| | Female | 44 | 41 | 21 | 19 | | |
| Occupation | Staff nurse | 65 | 60 | 30 | 28 | 0.52 | 0.77 |
| | Practical nurse | 8 | 7 | 5 | 5 | | |
| Educational level | Diploma | 8 | 7 | 5 | 5 | 1.4 | 0.85 |
| | Bachelor | 58 | 54 | 25 | 23 | | |
| | Masters | 7 | 7 | 5 | 5 | | |
| Marital status | Single | 40 | 37 | 10 | 9 | 15.4 | 0.004* |
| | Married | 35 | 31 | 25 | 23 | | |

*significant level, p < 0.05

## 4.0 Discussion

Analysis of the NSI prevalence showed that almost two thirds of the nurses (68%) suffered at least one NSI occurred in the past three months period. This is considered as a significant finding which clearly indicates the presence of concerns regarding the magnitude of the problem in Jordan. This current finding supports the previous findings from Hassan & Wahsheh (2009) who found in their study that 92% of nurses in Jordan have had at least one NSI in a period of 12 months. These numbers are very high as compared to similar studies worldwide and require further investigations to assess the factors behind the high prevalence

of NSI among nurses in Jordan. The socio-demographic factors suggested a significant association between needlestick injuries and age group with more affecting younger nurses (P value < 0.001). This also could explain the significant association between working experience and NSI where being young and early in career development poses more risk for NSI.

Cho et al., (2013) reported that 70.4% of the nurses in South Korea have reported at least one NSI during the past year of the study. Irmak et al., (2012) reported that only 30% of the nurses included in his study in Turkey reported acquiring at least one NSI in the past 12 months of his study, which is considered lower than similar studies. These numbers show how critical the situation in Jordan is, the prevalence of NSI among Jordanian nurses is much higher than their peers from other countries over the world. The most frequent procedure causing NSIs is found to be recapping; which is consistent with Martines et al., (2012) who reported that recapping was one of the major problems contributing to NSI in Portugal. The same finding was reported by Irmak et al., (2012) in Turkey and Azadi et al., (2011) in Iran who stated that recapping was the most frequent cause of NSI. The majority of the NSI occurred during the morning shift, which can be attributed to the high volume of procedures performed on the morning shift compared to evening and night shifts, thus increasing the probability of error.

## 5. Conclusion and Recommendation

The reported prevalence of NSI among nurses in Jordan is alarming, and the underlying factors must be uncovered in order to help plan for appropriate prevention strategies for NSI. As factors such as recapping of needle is associate to one's knowledge, this factor must also be explored in assessing nurses knowledge, attitude and work practices on NSI hazards and its relation to blood-borne diseases As NSI is a preventive health issue, identifying these gaps will facilitate the government to have better understanding in developing mitigation strategies customized for Jordanian nurses.

## Declaration

No conflict of interest is declared.

## Author's contribution

Author 1: Literature Review, preparing Research Proposal and executing the research activities

Author 2: Contributing in methodological aspects, planning the research activities and analysis aspect of this research

Author 3,4 & 5: Contributing in methodological and analysis aspects of the research.

## References

Adams, D. (2012). Needlestick and sharps injuries: practice update. Nursing Standard, 26(37), 49-57.

Ashat, M, Bhatia, V, Puri, S, Thakare, M, &Koushal, V. (2011). Needle stickinjury and HIV risk among health care workers in North India. Indianjournal of medical sciences, 65(9), 371.

Azadi, A., Anoosheh, M., &Delpisheh, A. (2011). Frequency and barriers of underreported needlestick injuries amongst Iranian nurses, a questionnaire survey. Journal of Clinical Nursing, 20(3-4), 488-493.

Centers for Disease Control and Prevention (CDC).Workbook for Designing, Implementing, and Evaluating a Sharps Injury Prevention Program.Available at: http://www.cdc.gov/sharpssafety/index.html.

Clarke, S. P., Sloane, D. M., & Aiken, L. H. (2002). Effects of hospital staffing and organizational climate on needlestick injuries to nurses. American Journal of Public Health, 92(7), 1115-1119.

Cho, E., Lee, H., Choi, M., Park, S. H., Yoo, I. Y., & Aiken, L. H. (2013). Factors associated with needlestick and sharp injuries among hospital nurses: A cross-sectional questionnaire survey. International journal of nursing studies, 50(8), 1025-1032.

Costigliola, V., Frid, A., Letondeur, C., & Strauss, K. (2012). Needlestick injuriesin European nurses in diabetes. Diabetes & metabolism, 38, S9-S14.

Fourie, W. J., & Keogh, J. J. (2011).The need for continuous education in the prevention of needlestick injuries.Contemporary nurse, 39(2), 194-205.

Hassan, Z.M., &Wahsheh, M.A. (2009). Occupational exposure to sharp injuries among Jordanian health care workers.Infectious Diseases in Clinical Practice, 17(3), 169-174).

Irmak, Z. (2012). Needlestick and sharps injury among nurses at a state hospital in Turkey.Australian Journal of Advanced Nursing, The, 30(2), 48.

Kebede, G., Molla, M., & Sharma, H. R. (2012). Needle stick and sharps injuries among health care workers in Gondar city, Ethiopia. Safety Science, 50(4), 1093-1097.

Khushdil, A., Farrukh, H., Sabir, D., Awan, T., & Qureshi, T. (2013).. JPMI: Journal of Postgraduate Medical Institute, 27(4).

Lovaglio, P. G. (2012). Patient safety analysis linking claims and administrativedata. International journal of health care quality assurance, 25(8), 698-711

Martines, A., Coelho, A. C., Vieira, M., Matos, M., & Pinto, M. L. (2012). Age and years in practice as factors associated with needlestick and sharps injuries among health care workers in a Portuguese hospital. Accident Analysis & Prevention, 47, 11-15.

Mehrdad, R, Atkins, E. H., Sharifian, S. A., &Pouryaghoub, G. (2014). Psychosocial Factors at Work and Blood-Borne Exposure among Nurses.The international journal of occupational and environmental medicine, 5(1 January).

Memish, Z. A., Assiri, A. M., Eldalatony, M. M., Hathout, H. M., Alzoman, H., &Undaya, M. (2013). Risk analysis of needle stick and sharp object injuries among health care workers in a tertiary care hospital (Saudi Arabia). Journal of epidemiology and global health, 3(3), 123-129.

Trivedi, A., Kasar, P. K., Tiwari, R., Verma, P., & Sharma, A. (2013). Aneducational interventional programme for prevention and management ofneedle stick injuries among nursing students at a tertiary care hospital,jabalpur, madhyapradesh. National Journal of Community Medicine, 4(1).

Waqar, S. H., ulSiraj, M., Razzaq, Z., Malik, Z. I., &Zahid, M. A. (2011).Knowledge, Attitude and Practices about Needle Stick Injuries inHealthcare Workers. Pakistan Journal of Medical Research, 50(3), 111.

World Health Organization (WHO), (2002). The World Health Report. WHO,Geneva, Switzerland. http://www.who.int/whr/2002chapter4/en/index8.html (accessed 02.12.11).

Zafar, A., Habib, F., Hadwani, R., Ejaz, M., Khowaja, K., Khowaja, R., & Irfan, S.(2009). Impact of infection control activities on the rate of needle stickinjuries at a tertiary care hospital of Pakistan over a period of six years: anobservational study. BMC infectious diseases, 9(1), 78.

Zaidi, M. A., Beshyah, S. A., & Griffith, R. (2010). Needle Stick Injuries: AnOverview of the Size of the Problem, Prevention & Management. IbnosinaJournal of Medicine & Biomedical Sciences, 2(2).