



## Students nurses' knowledge and prevalence of Needle Stick Injury in Jordan



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### ABSTRACT

**Background:** Student nurses are at high risk of blood-borne pathogens transmitted via Needle Stick Injury (NSI). Understanding various aspects of NSI is essential if they are to avoid the risks associated with it.

**Objectives:** The study was conducted to measure student nurses' level of knowledge about NSI and to examine its prevalence and post-exposure measures in Jordan.

**Design:** A cross-sectional and descriptive design was used.

**Sample and Setting:** A sample of 279 student nurses studying at one private and four government universities distributed throughout Jordan.

**Method:** The study used an online survey composed of 22 questions developed from NSI literature. The questionnaire was divided into three parts: background, to measure students' demographics; knowledge, to measure nurses' understanding of NSI; and prevalence, to measure exposure to NSI and the follow-up measures. Student nurses were recruited through Facebook. The survey was available online for one full semester in 2016/2017.

**Results:** The total number of completed surveys was 279 (response rate = 61%). Most of the students were female (n = 198; 71%), in their fourth year (n = 114; 40.9%). Their mean age was 21 years (SD = 2.5). The mean score for the knowledge part was 7 out of 10 (SD = 1.7). Almost a third of the students had at least one incident of exposure to NSI (n = 73; 26.2%). Most of the students who had suffered NSI did not inform their clinical instructors (67.1%) or write an incident report (86.3%). The results showed that there was no significant difference in the knowledge total scores between males and females or between students across different universities. However, a significant difference was found between students in different years of study (F (276, 2) = 6.77, p = 0.001).

**Conclusion:** Student nurses in Jordan have a moderate understanding of issues regarding NSI. This knowledge improved with seniority. However, exposure to NSI and its under-reporting is a prevalent problem. This study recommends focusing on NSI in the nursing curriculum, and providing more protection and post-exposure intervention for students during their clinical practice.

### 1. Introduction

Needle Stick Injury (NSI) is a serious hazard in any healthcare setting. It is defined as accidental skin penetration by a needle containing another person's blood or body fluid. Exposure to contaminated needles may expose the recipient to blood that contains pathogens which pose a potential risk (Moloughney, 2001). The primary threat pathogens are Hepatitis B (HBV), Hepatitis C (HCV) and Human Immunodeficiency Virus (HIV) (Centers for Disease Control and Prevention, 2010). The risks of post-exposure transmission of those diseases are 30%, 5–10%

and 0.4% respectively (Askarian and Ghavanini, 2002).

Similar to other healthcare providers, nurse students are exposed to the fatal risks associated with NSIs whilst performing their clinical activities such as blood extraction, medication or intramuscular injection, or intra-venous catheter implantation. However, student nurses are at a higher risk of NSI because of their lack of experience (Bandlish, 2015). Other factors include lack of knowledge, insufficiency of appropriate resources, and non-compliance with infection-control standards (Zungu et al., 2008). The main causes of NSI are two-hand recapping, and unsafe collection and disposal of needles (World Health Organization,

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2003). Exposure to NSI is associated with students' feelings of fear, insecurity and low self-esteem (Reis et al., 2004).

Many psychological consequences of NSI have been reported in the literature. Hambridge et al. (2016) conducted a systemic literature review to discover the impact of NSI on student nurses' physical and psychological wellbeing. The study found that previous studies reported fear, anxiety and depression as the main psychological effects of NSI. The study suggested that more supporting and counseling services were required in the clinical field for students who were exposed to that kind of injury. Green and Griffiths (2013) conducted a case control study with patients who were referred to a psychiatric trauma clinic and found that exposure to NSI can produce mental problems such as depression, similar to other psychiatric traumas. The study indicated that healthcare personnel need to be aware of the physical and mental consequences of NSI.

A substantial risk for NSIs exists because nurse students conduct invasive procedures with minimal knowledge and experience. Thus, nurse students should be prepared for clinical training by use of simulations or skills laboratories before caring for actual patients. Other measures exist to protect students from infections associated with NSI: having three doses of HBV vaccine during childhood, taking post-doses of HBV prior to any clinical training, and training in proper handling and discarding of needles. In addition, a follow-up system of reporting and treating post-NSI exposure is essential (Wilburn and Eijkemans, 2013).

The positive impact of NSI education on prevention and reporting of NSIs has been reported in previous studies. Zafar et al. (2009) conducted an observational study over a period of six years to measure the impact of education on NSIs rates among healthcare workers in Pakistan. The study reported a significant reduction of NSIs, especially during the education period. Regular education sessions that emphasize raising awareness about the risk of NSIs to nurse students are highly recommended. Van der Molen et al. (2011) conducted a study in the Netherlands using a randomized controlled trial by introducing two different interventions (conducting traditional workshops and using needle safety devices vs. using needle safety devices only) to reduce the rate of NSIs. The study found that combining educational workshop and using needle safety devices reduced the incidence of NSI among nurses. In addition, educating nurse students about hospitals' policies and protocols regarding handling needles and sharp objects at the beginning of their clinical training would encourage them to follow those policies.

In Jordan, Hassan and Wahsheh (2009) found that the prevalence of sharp injuries among nurses in their last year was 81%. Nurses have a higher risk of exposure to NSI than other healthcare workers. The main cause of injury was needles injection (58.75%), whereas surgical dressing set was the least (8.5%). Khraisat et al. (2015) found that factors associated with NSI were being a nurse, female, younger than 30 years, with more than two years' experience, working in a public hospital, working on a morning shift, holding a bachelor's degree, and working in an intensive care unit.

Most of the studies conducted in Jordan include practicing nurses and ignore the fact that nurse students are more vulnerable to NSIs because of their lack of clinical experience. Studying the problem of NSIs among nurse students will shed light on the magnitude of the NSI problem and the characteristics that make some students more prone to NSI injury than others. In addition, student nurses are at the beginning of their nursing journey so they should be aware about NSI risks that could affect their entire professional life. This study is the first to measure the magnitude and the nature of the NSI problem among student nurses in Jordan. Thus, the purpose of this study was: 1) to examine the prevalence of NSI and post-exposure measures, and 2) to measure their level of knowledge and awareness about NSI.

## 2. Method

### 2.1. Design

This study used a cross-sectional and descriptive online-survey design. The online survey is an increasingly acceptable and reliable method of data collection in nursing research, enhancing the process of recruitment and data collection through reaching participants from different geographical regions. It also provides true anonymity for participants, which is especially important in sensitive topics such as reporting NSI (East et al., 2008).

### 2.2. Sample and Setting

Nursing programs in Jordan are usually completed over four academic years. Students start their clinical practice from their second year and continue until the fourth year. This study targeted nursing students from the second to the fourth years from different universities in Jordan. During their clinical practice students are at risk of NSI through certain procedures such as blood extraction or applying intra-venous cannula. The first-year students were excluded because they have not yet attended clinical courses. The study includes nursing students from one private and four public universities, chosen because they have the main schools of nursing and are distributed across the different regions of Jordan. The private university was added to make our sample more representative of both the public and the private sectors in Jordan.

### 2.3. Instrument

The content of the survey was developed based on NSI literature. The content validity was established through a review by three doctors of nursing and infection control. The doctors read through the questionnaire to evaluate whether the questions effectively captured the majority of information that students required to prevent Needle Stick Injury and its complications. In addition, they evaluated the language of the questions as being clear and easy to understand. The researcher used a survey website to develop the online survey. The survey contained 22 questions divided into three parts. Part one contained seven background questions: name of university, student's age, gender, year of study, previous vaccination for HBV, previous education about NSI, and perception of adequate knowledge about standard precautions to prevent NSI (see Table 1). Part two comprised 10 knowledge questions about risks associated with NSI, prevention of NSI, and intervention in case of injury. The knowledge items were divided between true/false questions and multiple-choice questions; an 'I don't know' option was provided for participants who were not confident about their answers. The total possible score of the knowledge section ranged from 0 to 10. Part three had five questions about previous occurrence of NSI in clinical settings: number of previous incidents of NSI experienced, whether the student submitted a written incident report or informed his/her clinical instructor, the reason for not reporting the incident, and whether any blood investigation or treatment had been undertaken.

### 2.4. Procedure

The study was approved by the ethical review committee of the author's university. The researcher recruited student nurses through student groups on Facebook, which is widely used by university students in Jordan to communicate issues related to their study. An announcement about the study was sent to Facebook nurses' groups across the selected universities. The announcement included the subject and goal of the survey, with a link to guide volunteers to the NSI online survey. Completing the survey indicated agreement to participate in the study. The announcement was posted every week over one full semester (from the beginning of October to the end of December 2016) to remind students about the study. Participants were asked to complete the

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