



Prevention behavior for NSI among nursing students and nurses in Indonesia: A comparative study[☆]



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Abstract

Objective: This study analyzes the different rate of incidence and prevention behavior for needlestick injuries (NSIs).

Method: This is a quantitative study using a cross-sectional design. Respondents were selected using a stratified sampling method. The total number of respondents taking part in this research is 258, consisting of 51 academic nursing students, 70 clinical nursing students, and 137 in-service nurses who were selected randomly.

Result: A Kruskal–Wallis test indicates that there is no significant difference (p 0.162). Beliefs and values influence the practice of breastfeeding, but a chi-squared test indicates that there is a significant difference in the NSI (p < 0.001) in the prevalence of NSI among academic nursing students, clinical nursing students, and in-service nurses.

Conclusion: NSIs among nursing students and nursing staff can be minimized by adopting safer practices when handling hypodermic syringes. Supervision must be conducted to make sure that nursing students and nurses adopt safer behaviors.

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Introduction

Nurses have a fairly high rate of needlestick injury (NSI) incidents. As many as 3 million out of 35 million health

care workers around the globe pick up a needle stick injury annually, and nurses are the health care workers with a high rate of NSI incidents.¹ A survey conducted by the Royal College of Nursing (RCN) (2008) estimates that 48% out of 4000 nurses have picked up NSI.² Another study conducted by a hospital in Turkey reveals that 44.3% of the nursing staff has suffered an NSI and 58.4% of them have experienced 1–3 incidents of NSI.³ A research project in Indonesia finds that 46 out of 79 nurses have picked up NSI.⁴

Previous studies also find that nursing students are at high risk of NSI incidents. The nursing students in France have the highest incidence of NSI among health care workers. In India and Singapore, nursing students are ranked third among

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healthcare personnel after doctors and in-service nurses for NSIs.⁵ The rate of NSIs in Taiwan, India, East Ethiopia, and Malaysia is 56%, 91.85%, 62.8%, and 71% respectively.⁶⁻⁸ The result of a preliminary study conducted on 10 January 2018 shows that 10 out of 12 academic students and clinical students at FIK UI have experienced an NSI during their clinical practicum period at the hospital.

Unsafe behavior is one of the causes of NSI incidents. Previous studies have shown that the possibility of an NSI incident is significantly related to clinical practicum behaviors.⁶ The high rate of NSIs at Jombang Hospital is caused by the unsafe behaviors of the nurses.⁷ It is important, therefore, for students and nurses to learn NSI preventive measures during clinical practicum sessions for evaluation.

Most nurses and students still adopt unsafe behaviors when dealing with hypodermic needles. Makayaino and Qomaruddin state that 56.6% of the nursing staff at Jombang Hospital demonstrate inadequate preventive measures against an NSI.⁷ Research conducted in Ethiopia finds that 264 (44%) nursing students and midwifery students recap needles using both hands.⁸ Also, 66.2% of the students failed to wear gloves when giving treatment.⁹ In Indonesia, Prastya states that 93% of the students consider using plastic bags for needle disposal as proper, 75% of them recap the needles using both hands, and 56% of them bend the needles prior to disposal.¹⁰ These studies indicate that only a few nurses have adopted good practices for the prevention of NSIs. With the frequent incidents of NSIs and improper preventive measures against NSIs, the nursing students and in-service nurses should raise awareness of the value of workplace safety and promote proper behaviors. The lack of safe behaviors among nurses is a primary concern, and immediate actions must be taken to address the problem because the nurses are the role models for the practicum nursing students. For this purpose, the researcher would like to compare the rate of NSI incidents and the preventive behaviors for NSIs among nursing students, clinical nursing students, and in-service nurses in one last year.

Method

This is a quantitative study using cross-sectional methods. Samples were taken using a stratified sampling technique with the same proportion of the three populations (50 academic nursing students at the Faculty of Nursing Universitas

Indonesia, 70 clinical nursing students at the Faculty of Nursing Universitas Indonesia, and 140 nurses from X Hospital in Bogor). The samples should meet both the inclusion and exclusion criteria. The inclusion criteria for the samples are as follows: samples must be undergraduate students of FIK UI; samples have been through phase 1 and 2 of the clinical practicum at the hospital; samples must be active students of the clinical nursing program for the period of 2017/2018; samples are the nurses working at X Hospital in Bogor. The samples meeting the exclusion sampling criteria for this research are the nurses at X Hospital in Bogor who are currently taking a leave and the nurses working at the polyclinic.

The research was conducted from January 2018 to June 2018 at Universitas Indonesia and X Hospital in Bogor. The validity and reliability of the research instruments were tested prior to their use for data collecting. The value of Cronbach's alpha in the NSI prevention questionnaire is 0.758. The instrument validity test against 258 respondents shows that the r -count > r -table (0.361). Data processing was conducted using a computer program. The Kruskal-Wallis test was used as an alternative to the ANOVA test to study the different level of incidence between the nursing students and in-service nurses. A chi-square test was used to analyze the different NSI preventive measures taken by nursing students and in-service nurses.

Result

The data analysis result shows that the average age of nursing students is 21.39 (20–23) years. The average age of clinical nursing students is 24.77 (22–38) years. The average age of the nurses at X Hospital in Bogor is 29.06 (21–51) years. The average length of the clinical practicum for nursing students at the hospital is 0.25 years or approximately three months while the average length of clinical practicum for the clinical nursing students is 3.17 years with a minimum clinical experience of 0.20 years and a maximum of 30 years. The average length of service among the nurses is 5.39 years. The minimum length of service among the nurses is 0.5 years, and the maximum length of service is 30 years (Table 1).

The analysis shows that most of the academic nursing students, clinical nursing students, and in-service nurses are female (Table 2). The percentage of females among academic nursing students, clinical nursing students, and

Table 1 Characteristics of respondents based on the age of the academic nursing students, clinical nursing students, and in-service nurses ($n = 258$).

Variable	Mean	Median	SD	Min–Max
<i>Age</i>				
Academic nursing students	21.39	21.00	0.63	20–23
Clinical nursing students	24.77	23.00	4.48	22–38
Nurses	29.06	27.00	6.47	21–51
<i>Length of service/clinical practicum</i>				
Academic nursing students (year)	0.25	0.25	0.00	0.25–0.25
Clinical nursing students (year)	3.17	0.70	5.68	0.20–30
Nurses (year)	5.39	4.00	5.53	0.50–30

Table 2 Characteristics of respondents based on gender and educational background of the nursing students, clinical nursing students, and in-service nurses ($n = 258$).

Variable	Nursing students	Clinical nursing students	Nurses	Total
<i>Gender</i>				
Female	50 (98.1)	61 (87.1)	98 (71.5)	209 (81.0)
Male	1 (1.9)	9 (12.9)	39 (28.5)	49 (19.0)
<i>Education</i>				
High school	51 (100)	-	-	51 (19.8)
Diploma in nursing	-	-	121 (88.3)	121 (46.9)
Undergraduate nursing	-	70 (100)	2 (1.5)	86 (27.9)
Clinical nursing program	-	-	14 (10.2)	14 (5.4)

nurses is 98.1%, 87.1%, and 71.5% respectively. The data also show that all of the academic nursing students are high school graduates and the clinical nursing students are nursing diploma graduates. This is due to the fact that the respondents are currently completing their nursing education. Most of the nurses are nursing diploma graduates. Only 2 out of 137 nurses are undergraduate nursing program graduates, and only 14 out of 137 nurses are clinical nursing program graduates (Table 2).

As seen in Table 3, the percentage of academic nursing students, clinical nursing students, and nurses with NSI incidents is 17.6%, 32.9%, and 27.0% respectively. The percentage of academic nursing students, clinical nursing students, and nurses with good NSI prevention behaviors is 23.5%, 41.4%, and 56.9% respectively. The percentage of academic nursing students, clinical nursing students, and nurses with fewer NSI preventive behaviors is 76.5%, 58.6%, and 43.1% respectively.

Table 4 shows that there is no significant difference in the NSI incidence rate among academic students, clinical students, and nurses ($p > 0.05$). However, there is a significant difference in the prevention behaviors used by academic students, clinical students, and nurses ($p < 0.001$). The nurses (56.9%) tend to demonstrate more proper prevention behaviors compared to nursing students (23.5%) and clinical nursing students (41.4%).

Discussion

The age of academic students, clinical students, and nurses is categorized as a young adult. A person in his or her young adult stage of life (20–40 years old) tends to learn from experience and can make personal decisions regarding his or her job and social role.¹¹ For this reason, the respondents who are in this age range should be able to change their behavior and choose to behave properly as a nursing student and as a nurse. For the purpose of this research, the experience shall mean the clinical practicum period for the nursing students and the length of service for the nurses. There is a significant gap between the minimum and maximum value of clinical nursing students' clinical practicum period. This is due to the fact that the clinical nursing students are graduates of the undergraduate program and their

minimum–maximum age range is 22–38 years. The gap in the clinical practicum period of clinical nursing students is also due to the fact that some of the students are nursing diploma graduates and have previously worked at the hospital. This is also one of the reasons why many of them spent more of their clinical practicum at the hospital. The average length of service of a nurse at the hospital is 5.39 years. The lowest length of service is 0.5 years while the highest length of service is 30 years. The nurses whose length of service is the lowest are the young, entry-level nurses. The nurses whose length of service is the highest, on the other hand, are the senior nurses. The longer the students conduct a clinical practicum at the hospital, the more experience they will receive and the longer a nurse dedicates him or herself at the hospital, the more experience they will have. Previous studies also prove that work experience affects one's nursing skills.¹² A person's lack of experience may increase the risk of NSI incidents.¹³ In addition, work experience contributes positively to the nurse's caring behaviors.¹²

The academic students, clinical students, and nurses are mostly women. This research confirms the findings of the previous studies.^{14,15} That most of the nurses are women sparks a perception that this profession is a female occupation. Studies, however, prove that there is a significant difference in perception that nursing is a female occupation ($p < 0.001$).¹⁵ Female nurses are deemed capable of giving health care for both male and female patients, but it is sometimes inappropriate when male nurses provide health care services for female patients, especially during gender-sensitive treatments such as urinary catheter insertion.¹⁶ Most of the respondents are nursing diploma graduates. Educational background determines one's skills and significantly affects a nurse's professional development.¹⁷ With better education, one can think systematically and improve one's skills and competence by always seeking to broaden one's knowledge.¹² The clinical nursing students are the sample population with more NSI incidents compared to nursing students and in-service nurses. The students' lack of clinical practicum experience is the cause of frequent incidents of NSIs among them. This research confirms the finding of previous studies, which claim that a lack of clinical experience, inadequate skills, and inadequate training are the factors that cause NSI incidents among nursing students.¹⁸ Work experience also plays a part in the incidents that put health

Table 3 NSI incidents and prevention behaviors among nursing students, clinical nursing students, and nurses ($n=258$).

Variable	Academic nursing students	Clinical nursing students	Nurses	Total
<i>NSI incidents</i>				
Yes	9 (17.6)	23 (32.9)	37 (27.0)	69 (26.7)
No	42 (82.4)	47 (67.1)	100 (73.0)	189 (73.3)
<i>Prevention behaviors</i>				
Good	12 (23.5)	29 (41.4)	78 (56.9)	119 (46.1)
Poor	39 (76.5)	41 (58.6)	59 (43.1)	139 (53.9)

Table 4 Comparison of NSI incidence rate and prevention behaviors among academic nursing students ($n=9$), clinical nursing students ($n=23$), and nurses ($n=37$).

Variable	Academic nursing students	Clinical nursing students	Nurses	p
NSI incidence	9 (17.26)	23 (32.9)	37 (27.0)	=0.162
<i>Prevention behaviors</i>				
Good	12 (23.5)	29 (41.4)	78 (56.9)	<0.001
Poor	39 (76.5)	41 (58.6)	59 (43.1)	

care workers in danger. Previous studies prove that there is a significant correlation between work experience and NSI incidents. Someone with longer service is less prone to NSIs in the past six months ($p \leq 0.05$).¹⁹ The prevalence of an NSI depends on one's skills that he or she acquire through experience. This is in line with the findings of other studies.²⁰ However, Jahangiri et al. show that NSI incidents are caused by a heavy workload that leads to fatigue and stress, which in turn cause human error.²¹ They find that most of the nurses with a reported incident of NSI are overworked.

There is no significant difference in the incidence rate among academic students, clinical students, and nurses ($p > 0.05$). However, more clinical students experience NSI than do nursing students. Sharma et al. note that 57.57% of the students report an NSI incident during their first clinical practicum year, but the number decreases during the second year and third year (42.4%).²² Ozer and Bektaş state that in Turkey the clinical practicum begins in year 1 and ends in year 4.²³ During this period, the number of student nurses affected by NSIs gradually increases. However, with increasing activities involving hypodermic syringe and sharp objects, one's clinical competence and skills will develop.²³

The NSI incidents may be minimized by adopting the behaviors stated in the SOP. NSIs must be minimized because it harms both the students and nurses. An NSI may lead to the transmission of pathogens through blood (bloodborne virus/BBV). The Centers for Disease Control and Prevention (CDC) (2010) in Suliman et al. state that the life-threatening pathogens may include Hepatitis C Virus (HCV), Hepatitis B Virus (HBV), and Human Immunodeficiency Virus (HIV).⁴ Nursing students are also prone to psychological disorders. Green and Griffiths states that NSI patients show severe depression symptoms which resemble those of 125 non-NSI patients.²⁴ Studies find that preventive behaviors affect the NSI rate ($p = 0.029$). This is in line with the finding of the previous studies.⁶ It is important to implement safe behaviors when dealing with hypodermic syringes to prevent an NSI. To ensure that safe behaviors are implemented and the SOP

is obeyed by the practicum nurses and in-service nurses, a supervision program must be designed.

There is a significant difference in the preventive behaviors for NSIs demonstrated by nursing students, clinical nursing students, and nurses ($p < 0.001$). Ernawati et al. show that 51.9% of the nurses demonstrate adequate NSI preventive behaviors.²⁵ Good behaviors come from good knowledge (67.3%). The nurses adopt good behaviors because they have good knowledge. This is in line with Makayaino and Qomaruddin, who states that there is a strong correlation between knowledge and NSI prevention ($p = 0.027$).⁷ Aini in Makayaino and Qomaruddin notes that a nurse with the proper knowledge of how to handle sharp objects will be aware of the early warning standard, while a nurse who lacks such knowledge will not pay attention to the early warning standard and thus be more prone to NSI.⁷

One can obtain knowledge by attending a training program. The more knowledge one gets, the better one's behaviors will be. Previous studies also confirm that there is a significant difference in the rate of NSI incidents before and after training ($p < 0.05$) and there is also a significant difference in the preventive measures taken before and after the training ($p < 0.05$). In short, training programs play an important role in improving one's knowledge in order that he or she can behave properly.²⁶

Our research finds that there is no significant difference in the rate of NSI incidents among nursing students and nurses, but there is a significant difference in NSI prevention behaviors among them. The outcome of this research may serve as information to be used in the evaluation of clinical behaviors to promote work safety. As a role model for the nursing students, a nurse must improve their NSI prevention behaviors. Supervision must be conducted to ensure that nursing students and nurses adopt good preventive behaviors. Further research must be conducted to analyze the preventive behavior factors to find effective and efficient actions to be taken to minimize NSI incidents.

Conflict of interests

The authors declare no conflict of interest.

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