SHORT COMMUNICATION

Knowledge attitude and practice regarding prevention of needle stick injuries among nursing students in Henan province, China

Dongyang Wang, Amornrat Anuwatnonthakate, Kessarawan Nilvarangkul

Abstract

Nursing students are more vulnerable to needle stick injuries (NSIs) among all the nurses due to lack of work experience and poor awareness of occupational protection. A cross-sectional study of 400 nursing students was carried out to assess the participants' knowledge, attitudes, and practices regarding prevention of NSIs. The results indicated that 67% of nursing students suffered at least one NSI during their internship. The most common causes of injury were the injection process, venous catheter management process, and the process of disposal of all kinds of needle waste. Intentionally breaking the needle after injection, capping needles, and separating the needle from the syringe by hand are the risk factors for NSIs among nursing students. It is necessary to develop and increase occupational safety protection courses and establish regulations for the prevention of NSIs.

Keywords: Needle stick injuries; prevention; occupational exposure.

DOI: https://doi.org/10.47391/JPMA.03-429

Introduction

Healthcare workers (HCWs), including doctors, nurses, technicians, and assistants, are at risk of being exposed to infectious diseases through continuous contact with the patients' blood and body fluids during clinical work in medical institutions.[1] Nursing students are more vulnerable to NSIs due to lack of work experience, poor awareness of occupational protection, and being responsible for most of the blood withdrawals, medications, recapping needles, and needles passed during surgery in the course of clinical work.[2] In recent years, scholars have paid close attention to NSIs among nursing students, but the prevalence of NSIs among them in Asia is still high. In China, 60.3% of nursing students report at least one NSIs during their internship.[3] Therefore, the high risk of NSIs among nursing students during clinical practice will increase the possibility of occupational exposure and nosocomial infection.

A previous study found that neglect of general preventive measures, non-compliance with established safety rules and regulations, implementation of high-risk nursing procedures which increases the risk of blood exposure, and use of sharp equipment without safety measures were the factors exposing them to NSIs.[4] Standard precautions are essential for nursing students to prevent NSIs. However, epidemiological studies on nursing students' knowledge, attitudes, and practices (KAP) of standard prevention of NSIs is currently limited in China. Considering the shortage of health manpower in China and the importance of strengthening the occupational protection of nursing students, the present study was intended to assess the KAP of preventing NSIs among nursing students in Henan province, China.

Patients/Methods and Results

A cross-sectional study was conducted to investigate the intern nursing students in Henan province, China, from June to July 2019. The researcher used simple random sampling to select 400 nursing students in seven nursing education institutions. Nursing students over the age of 18 participating in an internship over the length of more than six months were included in the study. However, nursing students with serious organic diseases, mental disorders, and other diseases that affect nursing internship content were excluded.

A structured questionnaire was designed, based on the World Health Organisation (WHO)'s standard guidelines for NSIs.[5] The internal consistency coefficient Cronbach α was 0.89, the content validity was 0.91 and the test-retest reliability was 0.78. There are 17 items in the questionnaire, including 5 items of knowledge, 5 items of attitude, and 7 items of practice, respectively. The following sociodemographic implications were considered in this study: gender, age, and education. The aim of the study was to assess the frequency of NSIs among the nursing students, during their internship in the past 12 months. The occupational exposure of nursing students to NSIs was mainly during the injection process, blood collection, venous catheter management process, surgical serving, and disposal of all kinds of needle waste.

Researchers used contingency tables and chi-square tests to assess correlations between variables. Pearson correlation is used to analyse the relationship among knowledge, attitude, and behaviour. Multivariate

Department of Public Health, School of Health Science, Mae Fah Luang University, Chiang Rai, Thailand.

Correspondence: Kessarawan Nilvarangkul. e-mail: kessarawan2559@gmail.com

Table-1: Frequency of nursing students contacts with needle stick injuries within 12 months preceding the study.

Exposure type	Education background	Frequency of needle stick injuries				
		-3 times n (%)	4-6 times n (%)	>6 times n (%)	Statistical analysis x^2	*p*-value
Injection process	Bachelor programme	13 (17.1)	-	-	0.124	<0.05
	College programme	43 (56.6)	13 (59.1)	4 (20)		
	Secondary school programme	20 (26.3)	9 (40.9)	16 (80)		
Blood collection	Bachelor programme	3 (13.6)	-	-	0.120	0.145
	College programme	16 (72.7)	6 (85.7)	2 (40)		
	Secondly school programme	3 (13.6)	1 (14.3)	3 (60)		
Venous catheter management process	Bachelor programme	9 (23.1)	-	-	0.152	<0.05
	College programme	20 (51.3)	8 (66.7)	1 (12.5)		
	Secondary school programme	10 (25.6)	4 (33.3)	7 (87.5)		
Surgical serving	Bachelor programme	-	-	-	0.274	0.306
	College programme	1 (50.0)	1 (100)	-		
	Secondary school programme	1 (50.0)	-	-		
Dispose all kinds of needle waste	Bachelor programme	10 (27.0)	-	-	0.401	<0.05
	College programme	23 (62.2)	8 (100)	-		
	Secondary school programme	4 (10.8)	-	9 9100)		

x^2 = chi-square test of independence

Table-2: Comparison of KAP of NSIs prevention among nursing students with different characteristics.

Variables		Knowledge		Attitude		Practice	
		Score	F/t value	Score	F/t value	Score	F/t value
Gender	Male	78.43±0.48	5.32*	82.41±1.06	3.14*	71.37±0.52	2.59*
	Female	89.37±1.32		77.35±0.49		75.42±1.61	
Age	<20	74.82±1.03	8.53*	76.01±0.51	9.03	68.37±0.99	7.92*
	20-22	79.39±0.96		82.32±0.64		69.92±0.91	
	>22	84.34±1.49		84.05±0.83		77.31±0.95	
Education background	Secondly school	74.37±0.83	5.40*	78.46±0.31	4.56*	65.57±0.54	6.42*
	College	80.02±0.65		79.44±0.53		74.33±0.76	
	Bachelor	84.38±0.91		81.86±0.99		80.32±0.68	

*= p<0.05

regression analysis was used to test the factors of attitudes and practices related to prevention of NSIs.

As the results, 369 (92.2%) respondents were female. The mean age of the nursing students was 21.23±1.98 years. 218 (54.5%) respondents were enrolled in college programme, 80 (20.0%) respondents studied in bachelor programme and others were in secondly school programme.

The prevalence of NSIs among nursing students in this study was 67%. During the internship within the past 12 months, most cases of NSI in respondents occurred during the injection process, and the chance of NSIs through blood collection and surgical serving was limited. (Table-1).

The mean standard scores of knowledge, attitude, and behaviour among nursing students were 79.80±14.46, 77.62±8.34, and 71.26±12.38, respectively. Pearson correlation analysis showed that there was a correlation between knowledge and attitude (r=0.28, p<0.01), between knowledge and behaviour (r = 0.32, p<0.01), and between attitude and behaviour (r=0.24, p<0.01)(Table-2).

Knowledge of prevention of NSIs was regarding the risk in using of PPE (OR 0.25, 95% CI 0.13-0.64) and using the sharp device recycling container (OR 0.13, 95% CI 0.08-0.42). The attitude towards prevention of NSIs was not willing to seek help from other health workers when the patient was uncooperative (OR 3.68, 95% CI 1.85-7.33), seeking help from others when patients do not cooperate with them (OR 0.48, 95%CI 0.28-0.82), evaluating for penetration or leakage before removing the container (OR 0.36, 95% CI 0.14-0.92) and following the guidelines of prevention NSIs (OR 0.50, 95% CI 0.15-0.74). The practice of prevention of NSIs was taking the risk of deliberately bending or breaking the needles after use (OR 2.50, 95% CI 1.03-6.08), capping needles always using two hands (OR 0.40, 95%CI 0.19-0.85) and separating the needle from the syringe by hand after injection (OR 0.23, 95%CI 0.16-0.57) (Table-3).

Conclusion

This study reveals high prevalence of NSIs among nursing students and deficiencies in knowledge, attitude, and practice regarding prevention. Our study recommends that the nursing education institutions should develop and increase occupational safety protection courses and trainings for the prevention of NSIs. Hospitals can establish regulations for the prevention of NSIs, and provide supervision to healthcare workers, including nursing students, on occupational protection based on the lack of knowledge in this study. Future research can develop related protective tools and methods based on the risk factors of NSIs, and experimentally explore the practicality of these tools to reduce the risk of NSIs for nursing students.

Table-3: Multivariate logistic regression analysis of odds ratio (OR) for practices and attitudes of prevention NSIs among residents.

Characteristics	Odds Ratios with 95% Confidence Interval (CI) from Logistic Regression Models							
	Knowledge of prevention of NSIs		Practice of prevention of NSIs			Attitude of prevention of NSIs		
	Gloves should be worn when operating in contact with blood and body fluids	If the sharps box exceeds 3 / 4, it should be closed and discarded	Deliberately bend or break the needles of the syringes after use	Capping needles always used by two hand	Separate the needle from the syringe by hand after injection	Patients who do not comply with the injection treatment should be assisted by other nursing staff	Before removing the sharp container, it should be evaluated for penetration or leakage	Should follow the prevention guidelines of needle stick injuries
Gender) Female	--	--	2.50 (1) (1.03-6.08)* (1)	--	--	--	--	--
Age (< 20)	--	--	--	--	--	3.68 (1.85-7.33) ** (2)	--	--
Age (20-22)	--	--	--	--	--	2.57 (1.35-4.91) ** (2)	--	--
Education background (Bachelor programme)	0.25 (0.13-0.64)*	0.13 (0.08-0.42)**	--	0.40 (0.19-0.85)* (3)	0.23 (0.16-0.57)* (3)	0.14 (0.06-0.37)** (3)	--	--
Education background (College programme)	--	--	--	--	--	0.48 (0.28-0.82) ** (3)	0.36 (0.14-0.92)* (3)	0.50 (0.15-0.74)* (3)

* $p<0.05$, ** $p<0.01$; (1) Ref. = male (2) Ref. = Age > 22 (3) Ref. = Education background (Secondary school programme)

Disclaimer: The Manuscript is part of MPhil research of Mr Dongyang Wang.

Conflict of interest: None

Funding disclosure: This study received financial support from Mae Fah Luang University (grant no.: 77026/0581).

References

1. Bouya S, Balouchi A, Rafiemanesh H, Amirshahi M, Dastres M, Moghadam MP, et al. Global Prevalence and Device Related Causes of Needle Stick Injuries among Health Care Workers: A Systematic Review and Meta-Analysis. Ann Glob Health 2020; 86: 35.
2. Handiyani H, MeilyKurniawidjaja L, Irawaty D, Damayanti R. The effective needle stick injury prevention strategies for nursing students in the clinical settings: a literature review. Enferm Clin 2018; 28 Suppl 1: 167-71.
3. Zhang X, Chen Y, Li Y, Hu J, Zhang C, Li Z, et al. Needlestick and Sharps Injuries Among Nursing Students in Nanjing, China. Workplace Health Saf 2018; 66: 276-84.
4. King KC, Strony R. Needlestick. In: StatPearls [Online]. Treasure Island (FL): StatPearls Publishing; 2021.
5. World Health Organisation. Joint WHO/ILO policy guidelines on improving health worker access to prevention, treatment and care services for HIV and TB. Geneva; 2010.