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KNOWLEDGE OF NURSING STUDENTS REGARDING ANAPHYLAXIS: A CROSS-SECTIONAL STUDY IN HO CHI MINH CITY

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ABSTRACT

Background: Anaphylaxis is a rapidly occurring allergic reaction that is recognition of the early life-threatening signs if not treated promptly. However, little is known about the level of knowledge of nursing students caring for patients with this condition in hospitals. Nursing research synthesizes the evidence to improve their knowledge and provide a reference for optimizing teaching methodologies used to implement undergraduate teaching in nursing curricula.

Objective: This study aimed to explore the knowledge of anaphylaxis and related factors of nursing students at Nguyen Tat Thanh University in Ho Chi Minh City.

Method: In this cross-sectional study, a total of 407 nursing students participated. Data collection was started in December 2023 and completed by March 2024.

Results: Among the nursing students, 40.3% of them experienced a good level of knowledge regarding anaphylaxis, while 59.7% were at a poor level. The Chi-square test shows that there is a relationship between the current academic year ($p < 0.05$) and students' knowledge of managing anaphylaxis. In addition, the number of patients in nursing care per day was a predictor of knowledge in nursing students ($r=0.571$, $p < 0.05$).

Conclusion: In summary, students have unsatisfactory knowledge regarding anaphylaxis. Specifically, there is still a knowledge gap that can positively affect practice. It is recommended that universities focus on nursing students' knowledge of managing anaphylaxis and modify the curriculum to enhance their practices in this field.

Keywords: knowledge, anaphylaxis, nursing students.

1. INTRODUCTION

Anaphylaxis is defined as a severe, systemic hypersensitivity reaction and may cause death. Diagnosis and treatment of a severe allergic reaction requires early recognition of the signs and symptoms, along with classification of severity. It is the most serious manifestation of a clinical emergency, and healthcare providers should have the knowledge for recognition and management.1 Recent publications show a global incidence of 50 to 112 episodes per 100,000 person-years while the estimated lifetime prevalence is 0.3–5.1%[2]. Medications are one of the common causes of anaphylaxis. Recent studies in Bach Mai Hospital have shown that the frequency of anaphylaxis tends to increase by approximately 0.056-0.07% from 2009 to 2013[3].

Research by Timothy E. Dribin et al. (2022) shows that despite a better understanding of anaphylaxis, there remain knowledge gaps. The lack of knowledge about anaphylaxis is negatively affected by a lack of knowledge, which emphasizes the importance of education and dissemination to the nurses. The nurse is an integral part of the healthcare team and is oftentimes the first responder to anaphylaxis. Besides that, the most common cause of death from drug-induced anaphylaxis is delayed adrenaline administration. So, it is necessary to educate nursing students on anaphylaxis recognition and appropriate adrenaline use. Anaphylaxis action plans are essential to the safety of every undergraduate nursing. Furthermore, an improved understanding of these conditions would aid ongoing efforts to reduce morbidity and mortality from anaphylaxis and could provide important clues for preventing anaphylactic shock[4]. Therefore, the study was conducted with the goal of surveying their knowledge of them on this topic in Ho Chi Minh City.

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2. SUBJECTS AND RESEARCH METHODS

2.1. Study design and study location, time of implementation

Cross-sectional study using convenience sampling was conducted in December 2023 at university in Ho Chi Minh City.

The formula for calculating sample size is as follows.

$$n = Z^2_{1-\alpha/2} \frac{p(1-p)}{d^2}$$

n = the desired sample size from a large population size.

α: level of significance, choose α = 0.05. Two-tailed Z-score confidence level (1.96).

p = Population proportion (0.52). Sample size was calculated according to a study done at Le Huu Trac National Burn Hospital by Le Ba Ngoc Thach[5].

d = Absolute error (0.05).

Consequently, the study surveyed 407 nursing students who met the sampling criteria.

2.2. Materials and data analyze

The self-reporting questionnaire was built based on research conducted by Pham Ngoc Quang in Hanoi, Vietnam (2021) and includes two parts: 10 questions about participant information and 31 knowledge questions regarding anaphylaxis with Cronbach's alpha of 0.955 and Content Validity Index = 0.92. Participants were required to complete a self-administered questionnaire including socio-demographic characteristics, including age, gender, educational level, training, and experience regarding anaphylaxis. Knowledge of anaphylaxis was measured by a scale constructed by Pham Ngoc Quang et al., which was proved to be suitable for Vietnamese nurses[6]. The question framework consists of questions in multiple choice questions format, such as "What is anaphylaxis", "Signs and symptoms of anaphylaxis", etc., and 1 point for correct answer, 0 for others. The total knowledge score (0–31 points) was categorized as good if the score was between 16 and 31 points and poor if the score was less than 16 points. Google forms platform, a professional software for data collection questionnaires, was used to distribute questionnaires.

Collected data is classified and processed using Epidata 3.1 software. Chi-square/Fisher's exact test was used in the study to examine the relationship between knowledge about anaphylactic reactions and the characteristics of students participating in the study. A $p < 0.05$ was statistically significant.

2.3. Research Ethics

This research was conducted with the informed consent of all participants. Participants' personal information is kept confidential.

3. RESULTS

Table 1. Demographic characteristics of the respondents (N=407)

Independent variables	Categories	n	%
Gender	Male	62	15.2
	Female	345	84.8
Current academic year	Junior (3rd)	223	54.8
	Final year (4th)	184	45.2
Training	Yes	349	85.8
	No/Did'nt remember	58	14.2
Ever seen case(s) with anaphylaxis	Yes	168	41.3
	No	239	58.7
Experience regarding anaphylaxis	Yes	117	28.8
	No	290	71.2

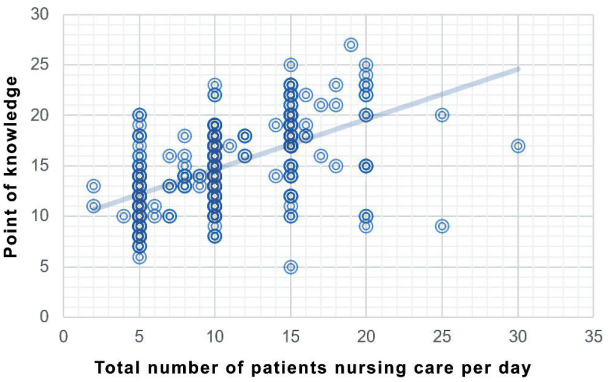
Table 1 describes data about the characteristics of 407 nursing students participating in the study. Most of the respondents (345 students) in this study were female (84.8%). Data indicated that 41.3% of them had encountered patients experiencing anaphylaxis and about 28.8% of participants mentioned that they had an experience regarding anaphylaxis management in their life (117 students).

Table 2. Number and percentage of correct responses to the questionnaire (N = 407)

Sub-Category	Questionnaire item	n	%
Recognition of an anaphylactic reaction	Characteristics of anaphylactic response (N_3)	302	74.2
	To identify symptoms of anaphylactic reaction (N_4)	292	71.7
	Recognition of mild anaphylactic reaction (N_7)	227	55.8
	Symptoms of severe anaphylactic reaction (N_8)	135	33.2
	Late symptoms of critical anaphylactic shock (N_9)	119	29.2

Sub-Category	Questionnaire item	n	%
Preventing towards an anaphylactic reaction	Useless medicines in the emergency drugs box (P_4)	342	84.0
	Plan to list current history of anaphylactic reaction (P_2)	332	81.6
	Essential medicines list for the emergency drugs box (P_3)	314	77.2
	Identification of indications for skin testing with a suspected drug (P_7)	145	35.6
	The optimal time for reading skin prick tests results (P_9)	133	32.7
Perception towards accurate diagnosis and appropriate management	The principal strategy for dealing with an anaphylactic reaction (X_1)	319	78.4
	The first drug of choice should be administered in acute anaphylaxis (X_5)	290	71.3
	Treatment of mild anaphylactic reaction (X_3)	246	60.4
	Use a solution with diluent of intravenous adrenaline transfusion to treat an anaphylactic reaction (X_8)	160	39.2
	An early anaphylactic treatment plan when didn't have a drug (X_2)	141	34.6
Overall score	Good (≥ 16 score)	164	40.3
	Poor (< 16 score)	243	59.7

Table 2 presents the characteristics of knowledge about anaphylaxis of nursing students. A few common misconceptions were "Late symptoms of critical anaphylactic shock" (29.2%), "The optimal time for reading skin prick tests results" (32.7%), and "An early anaphylactic treatment plan when didn't have a drug" (34.6%). About three-quarters of the respondents (74.2%) knew the characteristics of anaphylactic response. The majority of students know the principal strategy for dealing with an anaphylactic reaction (n = 319; 78.4%), students have high level of knowledge about useless drugs in the emergency box (n = 342; 84.0%). Overall, only 40.3% of the answers were correct.



Picture 1. Correlation between the number of patients nursing care per day and point of knowledge

The number of patients nursing care were positively correlated with point of knowledge (r=0.571, p < 0.05).

Table 3. Associated factors related to knowledge regarding anaphylaxis among nursing undergraduates

Variables		Knowledge		p-value
		Poor (< 16 score) (N=243)	Good (≥ 16 score) (N=164)	
		n (%)	n (%)	
Gender	Male	41 (66.1)	21 (33.9)	0.263
	Female	202 (58.6)	143 (41.4)	
Current academic year	Third	116 (52.0)	107 (48.0)	< 0.01
	Final year	127 (69.0)	57 (31.0)	
Training	Yes	207 (59.3)	142 (40.7)	0.692
	No/Didn't remember	36 (62.1)	22 (37.9)	
Encounter patients experiencing anaphylaxis	Yes	101 (60.1)	67 (39.9)	0.887
	No	142 (59.4)	97 (40.6)	
Experience regarding handling anaphylaxis	Yes	72 (61.5)	45 (38.5)	0.632
	No	171 (59.0)	119 (41.0)	

Current academic year was the only group with statistically related anaphylactic knowledge between third and final year ($p < 0.01$) .

4. DISCUSSIONS

4.1. Socio demographic characteristics of nursing students

A total of 407 subjects participated in this study, of which 223 were 3rd-year students and 45.2% were final years studying bachelor-level nursing programs in Vietnam. The majority of participants (85.8%) claimed that they ever actively explored data on anaphylaxis learning, only a small percentage of participants (8.5%) had never received any anaphylaxis care training programs. Nguyen Hai Lam et al. (2019) at Nam Dinh General Hospital found similar results with 92.2% of the participants had ever actively exploring data on anaphylaxis care.7 The response to the encounter patients experiencing anaphylaxis and experience regarding anaphylaxis questions was almost similar (41.3%, 28.8%) among students, respectively, compared to the nursing (90.1%) in research conducted by Irwani Ibrahim in National University Hospital, Singapore.8 As a nurse with several years of experience, they have encountered a diverse range of clinical scenarios, including multiple cases of anaphylaxis.

4.2. Knowledge of nursing students

Research shows that 74.2% of students recognize characteristics of anaphylactic response. The majority of students know medicines in the emergency drugs box (84.0%), and the principal strategy for dealing with an anaphylactic reaction (78.4%); this finding is lower than a study conducted by Ryan C. Jacobsen (2012) in Missouri, USA. They found that 98.9% correctly recognized a case of classic anaphylaxis but just 46.2% identified adrenaline as the initial drug of choice[9]. Clinical staff should be familiar with available drugs and should check them regularly. In our study, 290 subjects (71.3%) who had answered adrenaline as the first-line drug. Similar results were also recorded in the study by Shalini Adiga and colleagues (2018) in Udupi, India with a rate of right answers were 73.3%.10 However, research by Irwani Ibrahim (2014) in Singapore reported that 40.3% indicated adrenaline therapy, 47.4% chose the intramuscular route, but 76.9% incorrectly diagnosed anaphylaxis among the nurses in the Emergency Department, meaning the level of knowledge may not affect when treating an anaphylactic reaction[8]. The aim of the early initial treatments is to keep the patient alive and achieve some clinical improvement. Several studies reveal that there is a lack of knowledge regarding the dose and route of administration of adrenaline and confusion in using drugs for treating the emergency condition. Pharmacology knowledge has an important role because early adrenaline administration is an important strategy to cope with anaphylaxis due to the use of contrast agents.

The item with the lowest score (34.6%) was “An early anaphylactic treatment plan when didn’t have a drug”, indicating that nursing undergraduates were not able to give relevant anaphylaxis management correctly. Meanwhile, the item with the lowest correct rate was “The optimal time for reading skin prick test results” (23.26%). This result might be explained by a gap between theoretical knowledge and practical education on anaphylaxis management among nursing undergraduates.

Regarding knowledge about the late symptoms of critical shock, there is a high rate of incorrect knowledge among students. The similar results in lack of knowledge were also recorded in the study Pham Ngoc Quang (2022) in Hospital 19-8, Vietnam with a rate of right answers were 33.0%[6]. There is reason that knowledge about anaphylaxis in experience nursing is better (88.7% nursing in this research have more than 5 years working) and few studies indicate that fresh nursing graduates encounter many challenges after graduation. Nursing graduates who give parenteral medications should have initial training and annual updates in dealing with anaphylactic reactions. When asked about the intravenous adrenaline transfusion research shows that students have poor knowledge about the use a solution with diluent of intravenous adrenaline transfusion to treat an anaphylactic reaction with a low rate (39.2%), this result is lower than to the study in Brazil (2018) with a rate of 49.8%. The early use of adrenaline (intramuscular, intravenous) by nurses to treat an anaphylactic reaction is emphasized. Another study by Cambaz Kurt et al. revealed that the proportion of specialist physicians who knew the appropriate dose, route of administration, and place of administration of adrenaline was 82.8%, 88.9%, and 89.7%, respectively[11]. H. S. Drupad et al. concluded that medical students had better knowledge than interns and nursing students. Differences between positions can be explained by nurses preferring to use more experiential knowledge, whereas physicians enjoy using more theoretical knowledge[12]. This study revealed that there was a moderate correlation between the difference in knowledge and the number of patients in nursing care per day ($r = 0.571$, $p < 0.05$). In terms of prior knowledge, nurses are essentially multi-tasking caregivers, so the nursing care hours and nurse manpower is a measure of the quality of nurse care. In this study, we focused exclusively on the number of patients cared for by students each day. This decision was influenced by the fact that students typically engage in clinical practice during the morning, with theory classes scheduled for the afternoon.

4.3. Factors affecting nursing student’s knowledge towards people with anaphylaxis

The study recorded the proportion of male students

with good knowledge was higher than that of female students (41.4% and 33.9%), the difference was not statistically significant ($p > 0.05$). The research results of Sibusiso F. Buthelezi et al (2015) argued that male nursing students are faced with more challenges in the clinical setting than their female colleagues[13]. Therefore, male and female students have different learning experiences in nursing faculties. In most situations, providing care differs between males and females from a clinical practice perspective during their university experience.

It is interesting to find that training was not significantly associated with knowledge in relation to the management of anaphylaxis ($p > 0.05$). Possible reasons include the fact this management is not emphasised in the registration programme and need to retain material learned in training over a long time until an emergency occurs. These factors may explain why relying solely on the existing education programme does not improve nursing students' knowledge in relation to anaphylaxis. Instead of years of experience influencing knowledge to the principal strategy for dealing with, this study found that participants who had more years of education and applied their knowledge to practice were more likely to have better knowledge. Results are consistent with those of Mina Hashemiparast et al. (2019), who revealed that teaching the theory of the subjects and clinical skills throughout the semester would improve their knowledge of the course content. In our study, nursing undergraduates who received education related to anaphylaxis scored higher, confirming that a well-developed curriculum could improve knowledge. Nursing students' awareness of anaphylaxis was identified by correct answers, with an overall average of 40.3%. The similarities in this study are found in the study of Yoongoo Noh et al. (2021). The level of knowledge is quite similar to the study in Korea, where there was low and incomplete knowledge[14]. This suggests that nursing students' knowledge of anaphylaxis is low and should be supplemented by routine education. However, many students still have a lot of shortcomings in updating information related to anaphylactic reactions. In addition, with inadequate knowledge of anaphylaxis, nursing students may be influenced by myths about the use of adrenaline – for example, that adrenaline-administered drugs are medications that need to be given by a hospital or by a doctor. Because of this misconception, nurses themselves are reluctant to give adrenaline to their patients. Poor knowledge of management for suspected anaphylaxis and reluctance to prescribe adrenaline may be other possible reasons to explain why nurses delay the use of pharmacological approach alone. According to circular No. 51/2017/TT-BYT dated December 29, 2017, of the Ministry of Health of Vietnam on prevention, diagnosis and management of anaphylaxis, healthcare staff (nurses included) must immediately identify and treat anaphylaxis with adrenaline[15]. Another important aim of this study was to examine differences to investigate issues of training and strategies for emergency response under the impact of different educational approaches. Thus, it is necessary to provide specific and practical guidance and guidelines for management for suspected anaphylaxis to nurses so that they can effectively lead nursing students during practice.

4.4. Limitations

This study has several limitations. First, since this was a cross-sectional study, causal relationships between knowledge and the influencing factors are not able to be determined. Second, all participants were recruited from undergraduate level within a single university, which may limit the transferability of these findings.

4.5. Funding

This research is funded by Nguyen Tat Thanh University, Ho Chi Minh city, Vietnam.

5. CONCLUSIONS

Our study found an overall lack of anaphylactic knowledge among nursing undergraduates. The influencing factor was the current academic year. Therefore, there is an urgent need to provide more continuing medical education to enhance education and advocacy to raise students' awareness. These results do suggest that one of the responses to teaching in nursing is to modify the curriculum in response to the realistic learning needs of nursing students and ongoing changes in workplace demands.

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