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Main Causes of Medication Administration Errors among Final Year Student Nurses in University College of Islam Melaka (KUIM)

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Abstract: Medication errors can occur at any stage of medication administration includes: ordering, transcribing, dispensing, administering and also monitoring. The most common factors are physician communication, knowledge, attitude, and rights violations. However, some circumstances may increase the chance of their involvement in medication errors, especially for an undergraduate nursing student. The purpose of the study is to investigate and to find out the main causes leading to medication administration errors among final year nursing students in University College of Islam Melaka (KUIM).A cross-sectional study and convenience sampling method were used to select the sample. Ninety-eight respondents involved in the study and the data was collected using a self-administrative questionnaire. The researcher comes out with result that the most popular causes that contribute to medication administration error were right violations (mean: 35.53, SD: 6.26) followed by knowledge (mean: 32.03, SD: 6.42), attitude of the students (mean: 22.62, SD: 2.97) and physician communication (mean: 20.88, SD: 5.41). Administration of medication is the most important part of patient safety, and medication errors should be reported and avoided. This is very important for third-semester nursing students to take full consideration and best practice to avoid medication errors before their graduates and become a registered nurse.

Keyword: Medication errors, Medication process, Medication safety, Nursing students, Student perceptions.

INTRODUCTION

Medication error (ME) is a major safety issue especially when it dealt with the patient. Not just it can lead to negative consequences for the patients but also to the hospital, especially on the costing issue. The medication process is complex and involves a number of different individuals and disciplines, thereby increasing the risk of error [1]. MEs can occur at any stage of the medication process includes prescribing, transcribing, dispensing, administering, and monitoring [2]. The most frequently reported types of ME were incorrect time, omission error and incorrect dose; and reasons are the shortage of staff, heavy workload, distraction, and misinterpretation of the prescription [3].

Nurses are well-known as a person who closest to patients and is the final link in the medication process [4]. As the nurses' shared values and beliefs, medication safety can be taught, developed and internalized in the undergraduate nursing program to nurture the culture that ensures patient safety [5]. Student nurses are an important part of the patient care team and can enrich the patient's experiences during hospitalization [6]. However, some circumstances may increase the chance of their involvement in the medication error as mention by Reid-Searl *et al.* [7] stated that medication errors committed by nursing students have the potential to impact significantly on patient safety, quality of health care, and student's perceptions on their professional competency. Thus, it is important to detect or prevent medication errors before it becomes the worst scenario either to the patient or healthcare providers.

From the year 1983 to 1993 the numbers of deaths from medication errors and adverse reactions to medicines used in United States hospitals increased from 2876 to 739 115, and from the year 1990 to 2000 the annual number of deaths in the United Kingdom increased from about 20 to just under 200 [8]. The most current evidence-based research outcomes used

evidence-based practice (EBP) to establish policies and procedures for everyone to follow, but medication administration issues, not much to tell. Medication administration should be considered as critical as piloting plane due to patients place their lives in the hands of a healthcare professional [9].

ME is a worldwide issue, and physicians, pharmacist, and nurses are the most common teams that deal with it. However, there are little known about ME among student especially nursing students. Reid-Searl *et al*. [10] in his review stated that the education of undergraduate nursing students in relation to medication administration occurs in two clinical environments: on-campus setting, student is introduced to the principles of medication administration, using stimulated medication, mannequins, and role play, essentially in a low-risk environment; and during practical session in hospital which is close supervision and proper guidance can enhance the knowledge and skill when dealing with the real situations. Hence, this study aims to find out the most common factor contributing to medication errors among the student nurse. According to Hardill and Petrick [1], there are few of contributing factors were identified: right violations, knowledge, attitude and physician communications. The medication errors among the student nurses should be identifying since they will be graduated soon. This study also might help academicians to enhance the education system and improve the method of teaching so that the student nurses might have a clear view on these issues. It will guide the student to do the right things especially to prevent the medication errors.

METHODOLOGY

The purpose of this study was to explore the students' perception regarding the main causes of medication administration errors.

Sampling

Population

The sample of the study was conducted among nursing student in the third-year diploma program at University College of Islam, Melaka (KUIM).

Sample size

This study used convenience sampling, where each element of the population will be included. The sample size for this study is 98.

Instrument

Close-ended questionnaires were used which consist of two parts

Part A: Socio-demographic and clinical characteristic: age, gender, clinical experience, educational background, and frequent ward they have the chance to served medications.

Part B: Medication Administration Error Survey: 25-item questionnaire which addressed physician communication, right violations, the attitude of the students, and knowledge.

Validity and reliability

Validity

The questionnaire was checked by the expert to validate the content.

Reliability

The questionnaire was tested with Cronbach alpha is 0.741.

Ethical consideration

This study has been approved by the Ethical committee of Open University Malaysia (OUM), and Dean Faculty of Nursing in University College of Islam, Melaka.

DATA ANALYSIS

The data of this study were analyzed and transformed using the Statistical Package for Social Sciences version 19.0.

RESULTS AND DISCUSSION

Results

Socio-Demographic Characteristic

Table 1 presents the socio-demographic and clinical characteristics of the respondents. The age of respondents ranging from 21 to 29 years old. The clinical experience of respondents ranging from 33 to 41 month with the mean for clinical experience is 33.2 (SD = ±1.39). For the classification of the ward, 65 of the respondents were in the medical ward (66.3%), 11 respondents were in the surgical ward (11.2%), and 22 respondent in others ward (22.4%).

Main Causes Of Medication Administration Error

Table 2 describes the percentage and frequency of respondent regarding the main causes of medication administration error in ascending order as follow: physician communication (20.88), attitude (22.62), knowledge (32.03), and right violations (35.53).

Physician communication.

Table 3 described the mean and standard deviation for items in the physician communication subscale of the Reasons Why Medication Errors Occur. The response scale ranges from 1 = strongly disagree to 6 = strongly agree, with a higher mean score indicating more agreement that the item contributes to the reasons why medication errors occur.

Right violations

Table 4 described the mean and standard deviation for items in the application of right violations of the student's subscale of the Reasons Why Medication Errors Occur. The response scale ranges from 1 = strongly disagree to 6 = strongly agree, with a higher mean score indicating more agreement that the

item contributes to the reasons why medication errors occur.

The attitude of the students.

Table 5 described the mean and standard deviation for items in the medication packaging subscale of the Reasons Why Medication Errors Occur. The response scale ranges from 1 strongly disagree to 6 strongly agree, with a higher mean score indicating more agreement that the item contributes to the reasons why medication error occurs.

Knowledge

Table 6 described the mean and standard deviation for items in the transcription-related subscale of the Reasons Why Medication Errors Occur. The response scale ranges from 1 = strongly disagree to 6 = strongly agree, with a higher mean score indicating more agreement that the item contributes to the reasons why medication errors occur.

Table-1: Socio-Demographic and Clinical Characteristics (mean) of the Respondent. N=98

	Mean (+/-SD)	n (%)
Age (years)	21.1 (0.83)	
Gender		
Male		9 (9.2)
Female		89 (90.8)
Education level		
SPM		98 (100)
Others		0 (0)
Race		
Malay		98 (100)
Clinical experience since joining Diploma In Nursing(Month)		
	33.2 (1.39)	
Frequent ward they have the chance to served medication at:		
Medical		65(66.3)
Surgical		11(11.2)
Others		22(22.4)

Table-2: Main Causes of Medication Administration Error

Causes of MAE	Mean(+/-SD)	Minimum	Maximum
Physician communication	20.88(5.41)	5	45
Right Violations	35.53 (6.26)	24	77
Attitude	22.62(2.97)	16	29
Knowledge	32.03 (6.42)	21	82

Table-3: Physician Communication Subscale of the Reasons Why Medication Errors Occur Questionnaire. N=98

Items	Mean	Standard Deviation
Physicians' medication orders are not legible.	4.98	1.07
Physicians' medication orders are not clear	4.38	1.24
Physicians change orders frequently	3.70	1.33
Abbreviations are used instead of writing the orders out completely.	4.28	3.29
Verbal orders are used instead of written orders either from Doctor's or Staff nurse	3.55	1.66

Table-4: Right Violation Subscale of the Reasons Why Medication Errors Occur Questionnaire. N=98

Items	Mean	Standard Deviation
Do you prepare and carry medications for more than two patients with you at a time	2.57	1.68
Do you bring your medication sheet/chart with you while serving medication?	5.64	0.97
Do you check the patients' name again before administering medications	5.74	0.54
Do you check the order again before administering medication?	6.10	5.10
All medications for one team of patients cannot be passed within an accepted time frame	3.80	1.48
When schedule medication is delayed, nurses do not communicate the time when the next dose is due.	3.52	1.43
Do you think nurses are interrupted while administering medications to perform other duties	4.56	1.36
The patient is off the ward for other care	3.66	1.48

Table-5: Attitude of the student's Subscale of the Reasons Why Medication Errors Occur Questionnaire. N=98

Item	Mean	Standard Deviation
Do you check the patient's ID band prior to administering medication?	5.74	0.80
Do you label the medication cup with the patient's name and room/bed number?	4.78	1.30
Do you administer medication that another nurse has prepared?	3.74	1.63
Do you prepare medication with another student without any supervision?	2.52	1.63
Do you ask Staffnurse or clinical Instructor if not sure regarding medications?	5.84	0.48

Table-6: Knowledge the Transcription Related Subscale of the Reasons Why Medication Errors Occur Questionnaire. N=98

Items	Mean	Standard Deviation
Do you know the function of the drugs	5.43	5.12
Do you know the other name of medication (Generic/trade) name?	4.67	0.80
Do you know side effect of medications	4.59	0.71
Do you explain the function of medication before serve?	4.60	0.80
Do you explain the medication side effect before giving medications	4.76	1.01
The names of many medications are similar.	2.89	1.62
Different medications look alike.	4.32	1.27

DISCUSSION

This study originally was undertaken specifically to understand and to find out about the main causes of medication errors. The researcher comes out with result that the most popular causes that contribute to medication administration error were right violations followed by knowledge, attitude and physician communication. Every step in patient's care for a nurse either the registered nurse or student nurse involves a potential for errors and some degree of risk to patients safety.

Right violation

Right violation including seven right of steps in administer medications such as the right patient, right drugs, right dose, right time, right route, right documentation and right patient to refuse [11]. However, the right violation of medication administration can occur at any of the mentioned steps. Right violations are including from the steps of carrying out Doctor's order, checked and make sure the right medications and the right dose, right route (oral/ intravenous/ intramuscular/ subcutaneous), and right time before administering medication. Checked and make sure drugs administered to the right patients by checking two identifications by asking the right name and checked identification wristband. After delivering the medication need to document in the right prescription for the patients. Finally, the patient has a right to refuse where the nurses need to give assurance and the doctor will take action about it. The application of those steps is very important.

To practice, safe medication administration nurse must ensure those correct procedures are followed [12]. This ensures that the patient receives the correct medication and dose at the correct time and by the correct route [11]. Bailey *et al*. [11] stressed out the legislation in Queensland, Australia need not only clarifies from the nurses who can legally administer medication but also specifies about supervision requirements in order to minimize the error. Undergraduate nursing students as trainees are authorized to administer medications and controlled medications only if they are under the personal and direct supervision of an authorized person. Therefore it is important for student nurses to get the correct exposure and role model to follow.

Knowledge and attitude

Knowledge and attitude toward medication process can be gained through education includes the tertiary environment in the on-campus and the ward environment of the healthcare facility in which the student undertakes their clinical practicum [11]. Within the on-campus setting, students are introduced to the principles of medication administration which require critical decision making, a need to consider environmental factors, the context in which the medications are being given and most important of all, patient safety. Within this setting, the risks are low as students utilize simulated medications, mannequins and role play [11]. Students apply the principles that they have learned in medication administration to real patients using real medications.

In this study, clinical experience was not associated with causes of medication administration error occurred. The researcher chooses the third-year student and they have been more than two and a half year experience in clinical practicum. According to [8], lack of experience determined by the number of years practicing as a nurse did not appear to be a factor in the study as contribute to medication error. According to [9] suggested that human factors such as lack of experience or skill predispose individuals related to errors. According to [2] lack of knowledge is one of the most common system failures contributing to unsafe practices.

It was reported that an individual practitioner may contribute to a medication error through a lack of general knowledge about medications [6]. This lack of knowledge may include the inability to accurately calculate medication dosages which, according to research, significantly contributes to a nurse's likelihood of making an error [13]. Experienced student nurses are vigilant in recognizing changes in a patient's condition and take action in a timely manner so they can prevent near misses from becoming accidents by informing the staff nurse in charge. A nursing unit staff with such nurses, student nurses and doctors will likely have fewer medication errors.

Physician's communication

The level of medication administration may have an effect from Doctor or physician communication and, in turn on the administration of medications and its effects on the client being cared for in the healthcare setting. Physician communication involves transcribing, ordering including written and verbal, handwriting of prescription and wrong dosage. According to [14] only a small survey was done regarding this issues, however, 15% of cases the drug dosage is not clear. The prescription is the legal responsibility of the doctors [14]. Nurses frequently have come across poorly written and even illegible prescription, which conflict with the policies for the safe administration of medications.

Howell [15] concluded that nurses were frequent administering medications in an unsafe manner due to the poor standard of a written prescription. Right violations application is very important to administer the medications. In order to avoid medication administration errors, all the steps need to follow in proper sequence regardless of the timely manner or other obstacles.

CONCLUSIONS

In conclusion, medication administration errors might contribute directly to patient's morbidity and mortality. So that, a desire to provide patients with optimum and safe care is essential in order to create strategies to reduce the likelihood of administration errors. Prescribing, preparing and administering medications is therefore reliant on a variety of processes intended to ensure that patients receive appropriate treatment. However, if a problem arises in any phase of either an organizational system or the medication process, it increases the likelihood that a patient will not receive the correct medication, compromising their safety.

Ensuring appropriate medication administration is a complex process involving multiple professionals from various disciplines who have drug knowledge and timely access to complete and accurate patient information and errors may enter into these processes at various points. Many medication errors are preventable, although reducing errors will require multiple interventions. A more holistic management approach is required, which targets several areas: the individual, the team, the task, the workplace and the institution as a whole.

The above study is the most important part of the major issues of patient safety. Medication errors can give implication to patient indirect or directly as it can cause harm to the patient and increase the cost of hospitalization. Medication errors also can lead to increase morbidity and mortality rate of the patients. It is very important to search for the most important causes of medication administration errors among the student nurses and it is very important to guide and improve the institutions the produce the future quality nurses in Malaysia.

Limitations

There are limitations of this study includes the sample size and the setting which focus on one college where it cannot be generalized.

RECOMMENDATION

Right violations are is the highest contribution to the main causes of medication administration error. So, in order to reduce the problem, it is important for educator includes clinical instructor, lecturer and also local preceptor in each ward to supervise the students closely. Nurses need to be knowledgeable about system vulnerabilities and understand how knowledge, skills, and attitudes promoting the utilization of safety science it will lead to higher quality care for patients. Thus, training or seminar related to the medication issues might help the nurses to gain more knowledge and awareness; hence they can be a good role model to the students.

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