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## Knowledge, attitude regarding prevention of medication errors among registered nurses

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### Abstract

**Background:** Medication error (ME) is a preventable incident that might lead to patient harm or cause inappropriate medication use while the patient, healthcare professional, or consumer controls the medication. Such incidents might be related to the procedures and systems, including pre-labelling order communication, product labelling, packaging, nomenclature, compounding, dispensing, distribution, administration, education, monitoring, and use, professional practice and health care products. According to World Health Organization (2016), 6-7% of inpatients are exposed to medication errors daily, mostly admitted to the intensive care unit (ICU) and long-term care. Medication errors could result in negative events affecting patient safety, such as adverse events causing disability, injury and even in-hospital death.

**Purpose:** To assess the knowledge regarding the prevention of medication errors and the attitude regarding the prevention of medication errors among registered nurses in a private hospital, particularly in Sarawak.

**Method:** A descriptive quantitative research design cross-sectional survey has been chosen. A set of questionnaires adapted from Di Simone et al. (2018) about knowledge on the administration of IV drugs and attitude, while knowledge on serving medications was adapted from Johari et al. (2013), has been distributed to 122 registered nurses of the private hospital to obtain information about the nurses' knowledge and attitude on the prevention of medication error. The data has been analyzed using the IBM Statistical Package for Science (SPSS) version 20. In this study, a purposive sampling method has been used to enrol eligible participants. Participants' knowledge and attitude were analyzed using frequency and percentage. The Pearson correlation coefficient test has been used to determine the relationship between knowledge and the socio-demographic data among registered nurses in a private hospital.

**Results:** The study revealed that most of the registered nurses, 93 (76.2%) in one of the private hospitals in Sarawak, East Malaysia, have moderate knowledge of serving medications and a strong correlation between the level of education and knowledge regarding preventing medication error.

**Conclusion:** Nurses have moderate knowledge and positive attitudes in preventing medication errors.

**Keywords:** Attitude; Knowledge; Medication Errors; Prevention; Registered Nurses

### INTRODUCTION

Medication error (ME) is a preventable incident that might lead to patient harm or cause inappropriate medication use while the patient, healthcare professional, or consumer controls the medication. Such incidents might be related to the procedures and systems, including pre-labelling order communication, product labelling, packaging, nomenclature, compounding, dispensing, distribution, administration, education, monitoring,

and use, professional practice and health care products (Goedecke et al. 2016). 6-7% of inpatients are exposed to medication errors daily, mostly admitted to the intensive care unit (ICU) and long-term care. Medication errors could result in negative events affecting patient safety, such as adverse events causing disability, injury and even in-hospital death (World Health Organization, 2016).

A medication error is a failure in the treatment process that causes or has the potential to cause harm to the patient. A medication error is any difference in prescribing, dispensing and administering medications that differ from what had been prescribed in the original order (Feleke Mulatu, & Yesmaw, 2015). Although medication errors can be serious, they are frequently minor and uncommon. However, it is critical to recognize them since system failures that result in minor errors might eventually rise to significant problems. Medication error is a preventable incident that might cause or lead to inappropriate medication use and causes potential harm to the patients. The most frequent causes of medication error in hospitals are the administration of intravenous drugs. The causes of the medication error include a prescription error, wrong labelling or packing, a wrong transmission of a prescription, or denomination and inappropriate use of medication (Márquez-Hernández, Fuentes-Colmenero, Cañadas-Núñez, Di Muzio, Giannetta, & Gutiérrez-Puertas, 2019). Besides, organizational factors such as workplace conditions, learning processes, overcrowding, shift work, risk management strategies, and a lack of employees, as well as human factors such as personal and professional characteristics, can contribute to potentially harmful or harmful occurrences. The factors that could contribute to the medication error in the hospital environment, especially in the Intensive Care Unit, were the sound of noise and alarms. Medication errors are a constant problem associated with nursing practice, especially drug administration. Lack of knowledge is the human factor associated with medication errors. Besides, negligence in nursing care is the attitude that contributes to a medication error, as stated by Shahrokhiet al.(2013). In addition, healthcare is one of the members of the healthcare providing team, so their performance should be health care in the workforce condition, drug manufacturing that might impact nurses' performance and rules and regulations, so it could not be possible to prevent medication errors without paying attention to our healthcare system in a holistic approach.

## RESEARCH METHOD

This cross-sectional study was conducted in 2021 at one of the private hospitals in Kuching, Malaysia. The study population (N=135) included the

KPJ Kuching Specialist Hospital staff nurses. The sampling method used in this study was purposive sampling; all the registered nurses working in KPJ Kuching Specialist Hospital. The exclusion criteria were nurses in managerial positions (such as Unit Managers).

An Anonymous self-administered questionnaire has been adopted from the study by Di Simone et al. (2018) on socio-demographic data, knowledge of the administration of IV drugs and attitude. The study by Johari et al. (2013) adopted knowledge of serving medications. The first section of the questionnaire consists of 4 items, including age, gender, graduation degree, and working experience. The second section consists of 7 items on knowledge on administering IV drugs and 12 questionnaires on serving medications. The third section consists of 7 questionnaires regarding attitude in preventing medication errors. A 5 points Likert scale referring to disagree, little agree, quite agree, very agree, and agree was used for knowledge on the administration of IV drugs and closed-ended questions (dichotomous questions which were the right and incorrect answers for knowledge on serving medications. The total score was converted into percentages and divided into three ranges which are low level of knowledge (score less than 11), medium level of knowledge (score 11-17) and high level of knowledge (score more than 17). A 3-level Likert scale referring to agree, neutral and disagree has been used in the attitude questionnaires. The interpretation of Cronbach's alpha value for knowledge on administering IV drugs, knowledge on serving medications and attitude was 0.715, indicating acceptable internal consistency. The questionnaires were distributed using an online survey tool, Google Form, including the explanatory statement information related to the purpose of the study and the informed consent. The online survey link was sent to the respondents via the WhatsApp application. The data were analysed by using the SPSS Version 20 software. The data analysis included checking the normality test, frequency distribution and percentage of each variable of demographic data, the level of knowledge, and attitude on preventing medication error. The Pearson Correlation test was used to determine the relationship between knowledge regarding the prevention of medication error and socio-demographics among registered nurses in a private

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Knowledge, attitude regarding prevention of medication errors among registered nurses

hospital and the relationship between the attitude and the socio-demographics among registered nurses in a private hospital.

Committee (RMC). The proposal for this study has been reviewed and approved by RMC. The purpose of the study, informed consent and the respondent criteria regarding privacy and confidentiality are attached and explained in the Google form briefly.

**Ethical considerations**

The ethical clearance was obtained from the University affiliation's Research Management

**RESEARCH RESULTS**

**Table 1. Demographic Characteristic of Respondents (N=122)**

<b>Variables</b>		<b>Result (n/%)</b>
Age	Less than 30 years old	41 (3.6)
	31 to 40 years old	73 (59.8)
	41 to 50 years old	7(5.7)
	Above 51 years old	1(0.8)
Gender	Male	11(9)
	Female	111(91)
Graduation degree	University degree	20(16.4)
	No university degree	102(83.6)
Working experience (Years)	1 to 5	35(28.7)
	6 to 10	56(45.9)
	More than 10	31(25.4)

The majority of the respondent,91%, were female, and 9% were male.Fifty-nine percent of the respondents were aged 31 to 40 years old. The respondents without university degrees have a higher frequency (83.6%) than those without a university degree. Forty-five percent of the respondents had 6 to 10 years of working experience. The results are shown in Table 1.

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**Table 2. Knowledge on The Administration of IV Drugs (N=122)**

Items	Disagree n (%)	Slightly Agree n (%)	Agree Moderately n (%)	Agree Strongly n (%)	Agree Very Strongly n (%)	Mean	SD
Dosage calculus on intravenous drugs reduces preparation error	0	0	4 (3.3%)	22 (18%)	96 (78.7%)	4.75	0.503
Computerizing drugs prescription (CPOE) computerizing medical entry system	1 (0.8%)	5 (4.1%)	22 (18%)	36 (29.5%)	58 (37.5%)	4.19	0.930
Pre-packaged package dispensation by pharmacy reduces medication error risk	0	6 (4.9%)	18 (14.8%)	20 (16.4%)	78 (63.9%)	4.39	0.914
Informative protocols, posters & brochures in wards promote error risk decrease	0	1 (0.8%)	11 (9%)	35 (28.7%)	75 (61.5%)	4.51	0.695
Pharmacist assistance during drug preparation reduces error risk	1 (0.8%)	4 (3.3%)	12 (9.8%)	29 (23.8%)	76 (62.8%)	4.43	0.862
Alarms, noises & emergencies may cause inattentions during drug preparation & administration	0	1 (0.8%)	4 (3.3%)	26 (21.3%)	91 (74.6%)	4.70	0.573
Workload(double shift/extra time) contributes to pharmacological error	1 (0.8%)	2 (1.6%)	1 (0.8%)	15 (12.3%)	103 (84.4%)	4.78	0.623

Knowledge regarding preventing medication errors consists of administering IV drugs and serving medications. Based on Table 2, the level of knowledge on the administration of IV drugs found that 96 (78.7%) respondents agree, 22 (18%) respondents strongly agreed, and 4 (3.3%) moderately agreed that the dosage calculus of intravenous drugs could reduce preparation error. For the statement of computerizing drugs prescription (CPOE) computerizing medical entry system, 58 (47.5%) respondents agreed, 36 (29.5%) respondents strongly agreed, 22 (18%) respondents strongly agreed, 5 (4.1%) respondents slightly agreed, and 1 (0.8%) respondent disagreed. Most respondents, 78 (63.9%), agree that pre-packaged package dispensation by pharmacy reduces medication error risk. Meanwhile, 20 (16.4%) respondents agree/moderately agreed 18 (14.8%) respondents strongly agreed, and 6 (4.9%) expressed their disagreed. A total of 75 (61.5%) respondents were agreeable that informative protocols, posters & brochures inwards would decrease the error risk, 35 (28.7%) respondents strongly agreed, followed by 11 (9%) respondents moderately agreed, and one respondent (0.8%)

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## Knowledge, attitude regarding prevention of medication errors among registered nurses

disagreed. The majority of the respondents, 76 (62.8%), agree that pharmacist assistance during drug preparation reduces error risk, 29 (23.9%) respondents strongly agreed, 12 (9.8%) respondents moderately agreed, 4 (3.3%) slightly agreed, while one respondent expressed disagreeable. On alarm, noises & emergencies may cause inattentions during drug preparation & administration, 91 (74.6%) strongly agreed, 26 (21.3%) respondents moderately agreed, 4 (3.3%) respondents agreed, and one respondent (0.8%) was little agreement. A total of 103 (84.4%) respondents agreed that workload (double shift/extra time) contribute to pharmacological error, 15 (12.3%) respondents strongly agreed, 1 (0.8%) respondent moderately agreed, 2 (1.6%) respondents slightly agree, and 1 (0.8%) respondent disagreed.

**Table 3. Knowledge on Serving Medications (N=122)**

Items	Yes n (%)	No n (%)
Do you always bring your medication sheet with you every time you serve medication to the patient? Right answer: Yes	114 (93.4)	8 (6.6)
Do you ever administer medication that another nurse has prepared? Right answer: No	19 (15.6)	103 (84.4)
Doctors order an antibiotic four times per day. Thus, I should administer the medication from 8 am-12 pm-4 pm-8 pm. Right answer: No	14 (11.5)	108 (88.5)
I ask the patient to put Nitroglycerin tablets sublingually. Right answer: Yes	116 (95.1)	6 (4.9)
My colleague asked me to document the medication that had been given to a patient; thus, I helped her to sign the medication administration record Right answer: No	3 (2.5)	119 (97.5)
Drug Order: KCl 40 mg PO. Drug Label: KCl 10 mg/15 ml. Thus, the amount given is 60ml. Right answer: Yes	115 (94.3)	7 (5.7)
Do you always check the patient's ID band before administering medication? Right answer: Yes	118 (96.7)	4 (3.3)
Do you label syringes and bags with the medication name? Right answer: Yes	115 (94.5)	7 (5.7)
Do you prepare and carry medications for more than two patients with you at a time? Right answer: No	1 (0.8)	121 (99.2)
Drug Order: Lanoxin 0.25 mg PO Drug Label: Lanoxin 0.125 mg tablets; thus, two tablets will be given to the patient. Right answer: Yes	115 (94.3)	7 (5.7)
The site frequently recommended for heparin injections is at the abdomen. Right answer: Yes	105 (86.1)	17 (13.9)
Before giving the medication, I need to sign the medication administration record. Right answer: No	4 (3.3)	118 (96.7)

Table 3 shows the result of the knowledge on serving medications. The highest right answer out of the 12 questions in knowledge on serving medications was regarding "Do you prepare and carry medications for more than two patients with you at a time?" as 121 (99.2%) respondents answered the question correctly and only 1 (0.8%) respondent given the incorrect answer. Meanwhile, the least correct answer was the question, "Do you ever administer medication that another nurse has prepared?" whereby 103 (84.4%) respondents chose the correct answer while 19 (15.6%) answered incorrectly. 114 (93.4%) respondents always brought the medication sheet with them every time they served medication to the patients. However, 8 (6.6%) respondents did not do so. When serving antibiotics, doctors order an antibiotic four times daily. Thus, the medication should be

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## Knowledge, attitude regarding prevention of medication errors among registered nurses

administered at 8am-12pm-4pm-8pm. The majority, 108 (88.5%) of the respondents, answered correctly, but 14 (11.5%) answered incorrectly. Most of the respondents, 116 (95.1%) aware that Nitro-glycerine tablets should be placed sublingually, but 6 (4.9%) answered incorrectly. 119 (97.5%) respondents did not help their colleagues sign the medication administration record when asked to document the medication given to a patient. However, 3 (2.5%) respondents answered incorrectly. Regarding a dose calculation of Potassium Chloride, 115 (94.5%) respondents answered correctly, but 7 (5.7%) respondents got the wrong answer. Most of the respondents, 118 (96.7%), had always checked the patient's ID band before administering the medication, and only 4 (3.3%) respondents failed to do so. In labelling the syringes and bags with the medication name, 115 (94.3%) respondents had the right answer, and 7 (5.7%) respondents did not label their diluted medication in syringes and bags. In a dose calculation of Lanoxin, 115 (94.3%) respondents answered it correctly. However, 7 (5.7%) respondents gave the incorrect answer. Most of the respondents, 105 (86.1%) aware that the frequent site recommended for heparin injections is at the abdomen, but there were 17 (13.9%) respondents were unaware. Lastly, 118 (96.7%) respondents did not sign the medication administration record before giving the medication. However, there were 4 (3.3%) respondents answered incorrectly. The maximum score obtained by 1 (0.8%) respondents was 20, and the minimum score was 14 with 1 (0.8%) respondent. The mean score for this total score was 17.12, with a standard deviation (SD) of 0.809. The total score was converted into percentages and divided into three ranges which are low level of knowledge (score less than 11), medium level of knowledge (score 11-17) and high level of knowledge (score more than 17). Among 122 respondents, more than half of 93 (76.2%) have a medium level of knowledge, while 29 (23.8%) have a high level of knowledge in serving medications. There was no respondent with a low level of knowledge in serving medications.

**Table 4. Attitude regarding Prevention of Medication Error (N=122)**

Items	Agree n(%)	Neutral n(%)	Disagree n(%)	Mean	SD
Systematic and specific training on intravenous drug safe management would reduce error risk	92 (75.4)	29 (23.8)	1 (0.8)	1.25	0.456
Error prevention and clinical risk management awareness would reduce risk during drugs preparation and administration	90 (73.8)	31 (25.4)	1 (0.8)	1.27	0.464
Operator's motivation may improve professional performance during the therapeutic process	78 (63.9)	35 (28.7)	9 (7.4)	1.43	0.630
For the safe management of intravenous drugs, it is necessary to have authoritative guidelines drafted taking into account available scientific evidence	95 (77.9)	27 (22.1)	0	1.22	0.417
Protocols/guidelines/procedures may influence professional behaviours granting safe management of therapeutic prices	85 (69.7)	31 (25.4)	6 (4.9)	1.35	0.574
Clinical skills in the safe management of pharmacological therapy should be systematically evaluated	101(82.8)	19 (15.6)	2 (1.6)	1.19	0.433
Pharmacological therapy errors must be noted to become an improvement opportunity for assistance	98 (80.3)	24 (19.3)	0	1.20	0.399

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Knowledge, attitude regarding prevention of medication errors among registered nurses

Table 4 shows the frequencies and percentage of respondents because of the attitude regarding medication error prevention. In terms of systematic and specific training on intravenous drug safe management would reduce error risk, 92 (75.4%) respondents agreed, 29 (23.8%) respondents expressed neutral, and 1 (0.8%) respondent disagreed. Most of the respondents, 90 (73.8%), agreed that error prevention and clinical risk management awareness would reduce risk during drug preparation and administration, 31 (25.4%) respondents acted neutral, while 1 (0.8%) respondent disagreed. 78 (63.9%) respondents agreed that the operator’s motivation might improve professional performance during the therapeutic process, and 35 (28.7%) respondents answered neutral. However, 9 (7.4%) respondents disagreed with the statement. For the safe management of intravenous drugs, it is necessary to have authoritative guidelines drafted, taking into account available scientific evidence. Most (77.9%) respondents agreed, and 27 (22.1%) were neutral. 85 (69.7%) respondents were agreeable, 31 (25.4%) respondents answered neutral, whilst 6 (4.9%) respondents disagreed regarding protocols/guidelines/procedures that may influence professional behaviours granting safe management of therapeutic prices. In the statement that clinical skills on the safe management of pharmacological therapy should be systematically evaluated, the majority of the respondents, 101 (82.8%), agreed, 19 (15.6%) respondents expressed neutral, and 2 (1.6%) respondents disagreed. Lastly, 98 (80.3%) respondents agreed, and 24 (19.3%) answered that pharmacological therapy errors must be noted to improve assistance.

**Table 5. Relationship Between Age Group and Level of Knowledge in Prevention of Medication Error (N=122)**

		Correlations	
		Age	Knowledge
Age	Pearson Correlation	1	.073
	Sig. (2-tailed)		.424
	N	122	122
Knowledge	Pearson Correlation	.073	1
	Sig. (2-tailed)	.424	
	N	122	122

Table 5 shows the relationship between age group and level of knowledge regarding preventing medication error among registered nurses of a private hospital. The correlation between age group and knowledge level has been performed using Pearson Correlation analysis. The Pearson correlation coefficient was 0.73, and the p-value was 0.424, which is >0.05, indicating no correlation between age group and level of knowledge.

**Table 6. Relationship Between Education and Level of Knowledge in Prevention of Medication Error (N=122)**

		Correlations	
		Degree	Knowledge
Degree	Pearson Correlation	1	.258**
	Sig. (2-tailed)		.004
	N	122	122
Knowledge	Pearson Correlation	.258**	1
	Sig. (2-tailed)	.004	
	N	122	122

\*\* . Correlation is significant at the 0.01 level (2-tailed).

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Table 6 shows the relationship between the level of education and knowledge regarding preventing medication errors among registered nurses of a private hospital. The correlation between education level and knowledge level has been performed using Pearson Correlation analysis. The Pearson correlation coefficient was 0.258, and the p-value was 0.004, which is  $<0.05$ , indicating a strong correlation between the level of education and knowledge.

**Table 7. Relationship Between Working Experience and Level of Knowledge in Prevention of Medication Error (N=122)**

Correlations			
		Experience	
		Knowledge	
Experience	Pearson Correlation	1	-.048
	Sig. (2-tailed)		.602
	N	122	122
Knowledge	Pearson Correlation	-.048	1
	Sig. (2-tailed)	.602	
	N	122	122

Table 7 shows the relationship between years of experience and level of knowledge regarding the prevention of medication error among registered nurses of a private hospital. The correlation between years of experience and knowledge level has been performed using Pearson Correlation analysis. The Pearson correlation coefficient was -0.048, and the p-value was 0.602, which is  $>0.05$ , indicating that there has a negative, weak correlation between years of experience and level of knowledge.

**Table 8. Relationship Between Age Group and Attitude in Prevention Of Medication Error (N=122)**

Correlations			
		Age	
		Attitude	
Age	Pearson Correlation	1	-.177
	Sig. (2-tailed)		.052
	N	122	122
Attitude	Pearson Correlation	-.177	1
	Sig. (2-tailed)	.052	
	N	122	122

Table 8 shows the relationship between age group and attitude regarding preventing medication error among registered nurses of a private hospital. The correlation between age group and attitude was performed using Pearson Correlation analysis. The Pearson correlation coefficient was -0.177, and the p-value was 0.052  $>0.05$ , indicating no correlation between age group and attitude.

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**Table 9. Relationship Between Level of Education and Attitude in Prevention of Medication Error (N=122)**

Correlations			
		Degree	Attitude
Degree	Pearson Correlation	1	-.045
	Sig. (2-tailed)		.620
	N	122	122
Attitude	Pearson Correlation	-.045	1
	Sig. (2-tailed)	.620	
	N	122	122

Table 9 shows the relationship between the level of education and attitude regarding preventing medication errors among registered nurses of a private hospital. The correlation between the level of education and attitude has been performed using Pearson Correlation analysis. The Pearson correlation coefficient was -0.045, and the p-value was 0.620, which is >0.05, indicating no correlation between the level of education and attitude.

**Table 10. Relationship Between Years of Experience and Attitude in Prevention of Medication Error (N=122)**

Correlations			
		Experience	Attitude
Experience	Pearson Correlation	1	-.150
	Sig. (2-tailed)		.100
	N	122	122
Attitude	Pearson Correlation	-.150	1
	Sig. (2-tailed)	.100	
	N	122	122

Table 10 shows the relationship between years of experience and attitude regarding preventing medication errors among registered nurses of a private hospital. The correlation between years of experience and attitude was performed using Pearson Correlation analysis. The Pearson correlation coefficient was -0.150, and the p-value was 0.100 >0.05, indicating no correlation between years of experience and attitude.

## DISCUSSION

### Level of knowledge

In this study, the researcher found that the respondents have good medication knowledge. The findings were consistent with the study conducted in Selected Hospital at Mysore, whereby nurses had good knowledge regarding preventing medication errors (Lissa, Saraswathi, & Kumar, 2015). Nurses had good knowledge, and none had poor knowledge of medication errors and prevention (Mohanty, 2016). Nurses had an average knowledge of preventing medication errors. However, nurses

need to improve their knowledge, especially on different routes of medication administration (Samundeeswari & Muthamilselvi, 2018).

### The attitude

This study aimed to assess the attitude regarding preventing medication errors among registered nurses of a private hospital in Kuching, Sarawak. The researcher found that most of the respondents, 102 (82.8%), expressed that clinical skills in safely managing pharmacological therapy should be systematically evaluated. This result is similar to the

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study conducted of Italian nurses in 2015, that preventive measures such as continuous evaluation of clinical skills, frequent training, and authoritative guidelines are necessary to prevent medication errors (Di Muzio, Tartaglini, Marzuillo, La Torre, & De Vito, 2016). Besides, structured and specific training on safe intravenous drug management would reduce error risk (Di Simone, Giannetta, Auddino, Cicotto, Grilli, & Di Muzio, 2018). Awareness regarding error prevention and clinical risk management would reduce risk during drug preparation and administration, pharmacological therapy errors must be reported, and clinical skills in addition to enhancing professional performance during the therapeutic process, operator's motivation will be helpful (Giannetta, Dionisi, Cassar, Trapani, Renzi, Di Simone, & Di Muzio, 2020).

### Demographic Characteristic

In this study, the researcher found no significant relationship between age group and level of knowledge regarding preventing medication error among registered nurses of a private hospital in Kuching, Sarawak. The finding aligns with the previous study conducted, whereby age did not influence the nurses' knowledge of preventing medication errors (Samundeeswari & Muthamilselvi, 2018). Nurses have good knowledge. However, age and knowledge do not relate (Mohanty, 2016).

The researcher found that the level of education has a strong relationship with the level of knowledge ( $r = .258$ , and the  $p$ -value was  $.004$ ). A similar study was found in a study conducted by Di Muzio et al. (2016) that graduated nurses have more appropriate knowledge than those who have no university graduation. Although the respondents with high education determined to have high knowledge, however, there is no significant relationship between the level of education and knowledge (Marques, La Falce, Marques, De Muylder, & Silva, 2019).

The majority of the respondents in the study had a working experience between 6 to 10 years ( $n = 56$ , 46.9%). The finding revealed no relationship between years of working experience and the level of knowledge regarding preventing medication errors among registered nurses in a private hospital in Kuching, Sarawak. This is in line with the previous study, whereby there were no significant differences between the level of knowledge and the extent of work experience (Giannetta et al., 2020).

The researcher found no relationship between age and attitude regarding preventing medication errors. This is supported by study at a Brazilian Public University that age and attitude are not related but concerning that better management of clinical risks and specific and continuous training on intravenous medicine was necessary (Marques et al., 2019).

Regarding the relationship between the level of education and the attitude. Marques et al. (2019) mentioned no positive relationship between the level of education and attitude. Still, respondents who had postgraduate courses related to the preparation and administration of intravenous medication had significantly increased positive attitudes.

hestudy found no relationship between years of experience and attitude regarding medication error prevention. A similar result in a previous study, showed no significant association between attitude and years of experience (Di Muzio et al., 2016). However, there was a statistically significant association between attitude and feminine gender in another study conducted, whereby the nurses with working experience of more than 11 years had never reported any medication error within 12 months of working (Dyab, Elkalmi, Bux, & Jamshed, 2018).

### LIMITATION AND RECOMMENDATION

This study has limitations as the surveyed respondents were only a sample of registered nurses from KPJ Kuching Specialist Hospital and may not be reliable for rationalization of finding in this study and unable to generate the result in a larger population. If the same study is to be done in future, it should involve more registered nurses in other KPJ hospitals. Besides, the study must be completed quickly before completing the Bachelor of Science in Nursing. The self-administered questionnaire forms were not distributed due to the pandemic on Covid 19 but were created with Google Forms online instead. Therefore, the finding of this study may not be too accurate as respondents may exceed the time limit to submit their responses. In addition, the medication knowledge could be biased as the respondents might refer the answer to other resources such as books or the internet instead of answering according to their knowledge and experience.

The study result showed that the respondents have average knowledge of serving medications. Knowledge in the prevention of medication error

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could be increased if the nurses can calculate the drug correctly, along with the availability of informative guidelines, protocols and brochures in the wards that will promote awareness of the prevention of medication error. Besides, the competency in serving medications should be evaluated to enhance nurses' knowledge, especially in the seven rights of medication safety such as right patient, right medication, right dosage, right route, right frequency, right time and right documentation. Most respondents agreed that clinical skills in pharmacological safety management should be systematically evaluated in addition to the training. The result strongly recommends that the organisation conduct special and specific drug management training, such as workshops or seminars, and the nurses must attend. Awareness and continuous nursing programs should be made mandatory to prevent medication errors. In addition, the wrong time error can be prevented by using an electronic medication administration record (EMAR). Further study is recommended to detect when nurses mostly commit medication errors, for example, in the morning, when most medications are being administered. Therefore, the strategies to prevent medication occurrence could be evaluated and improved.

## CONCLUSION

The study showed that the registered nurses have moderate knowledge and positive attitudes in preventing medication errors. Registered nurses should be able to follow the seven rights of medication administration safety (7Rs) to prevent medication errors. In the socio-demographic data, the study found a strong statistical relationship between the level of education and the level of knowledge regarding preventing medication errors. On the other hand, there was no relationship between age group and working experience with the level of knowledge regarding preventing medication errors.

Nurses' understanding regarding the prevention of medication errors is important in reducing the occurrence of medication errors. Nurses must follow seven rights of basic medication administration safety: right patient, medication, dosage, route, frequency, time, and documentation. The misapplication or violation of the seven rights (7Rs) will result in medication error. Continuous professional development activities are needed to ensure

compliance with medication safety among registered nurses.

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Knowledge, attitude regarding prevention of medication errors among registered nurses

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