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Medication Errors Among Nurses in Government Hospital

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Abstract *: **Background:** Nurses are the one who are close with patients. Medication administration is a part of the nurses' responsibility in order to make sure clients get the correct medication as supposed. Medication administration error is a universal health care concern.*
Objectives: *This study was amed to identify the level of knowledge among nurses which contribute to medication errors, to determine the most factors which contribute to medication error among nurses and to identify the relationship between levels of knowledge with all the contributing factors which contribute to medication error among nurses.*
Method: *A cross sectional study design by using a self-administered questionnaire. Data were analyzed using SPSS version 17.0 using descriptive statistic and the relationship was tested using Pearson's Chi square.*
Result: *A total of 48 respondents completed the questionnaire for respond rate 100%. The respondents' level of knowledge regarding medication was god. More than half of the nurses 54% (n= 26) had medium, 46% (n= 22) high, while none had low scores. The most factor which contribute to medication errors were* heavy workload and complicated orders 95.8% (n=46), then follow by percentage new staff 81.2 % (n=39) and personal neglected 66% (n=31).
Keywords: *Medication, Medication errors, nurses*

I. Introduction

Patient safety is a common goal for every healthcare provider. One of the major issues for safety is medication errors. It is important indicator of health care delivery system because potential injury to patients.[1] Over 2 million serious ADRs requiring hospitalization, causing permanently disability or death occurs each year.[2] In Malaysia, 2572 cases of medications were reported and it was identified as a main adverse event issue that impacted on patient outcome in 2009.[3] It has serious direct and indirect result and usually the consequences of breakdown in a system of care. Not only death or disability, it causes emotional impact to the patient. Medical errors harm an estimated 1.5 million people and kill several thousand each year in the United States of America.[4] Study conducted by the Institute of Medicine (1999), entitled "To Err Is Human: Building a Safer Health System", it is estimated that medication errors cause over 7,000 deaths annually. In Malaysia, the Malaysian government does emphasized on the medication safety whereby the government encourages researchers to conduct research on medication safety.[5] In view of the fact that the prevalance of medication administration error is increasing globally, the serious action should be taken to minize it from occur. According to Sik Hospital, Quality Control Unit, there were 3 incidence recorded in regard of medication error among nurses between January to June 2012.The statistic only show one hospital in Malaysia and no statistic available in Malaysia as whole and we believe that the number in Malaysia also great as we are advance developing country.

II. Methodology

This study used descriptive cross-sectional study using self-administered questionnaire to reveal the Medication Error among Nurses in Government Hospital. The Convenience sampling was used to select the respondents in this study. The target population is consisting of 48 Registered Nurses. The study setting conducted in Sik Hospital , one of the subspecialist hospitals in North, Malaysia. The unit chosen is Male ward, Female ward, Maternity ward, Pediatrics ward and Emergency Department. The development of questionnaires were be based on the literature review and other research instrument used in similar studies previously. The questionnaires compiled and then discuss by researcher and supervisor. Any changes or suggestions implemented as discussed. The questions based on a structured questionnaire that composed of three sections:

1.1 Section 1

Section 1 consisted of demographic data: year of working experience – 1 to 4 years, 5 to 10 years and 11 years above.

2.2 Section 2

Section 2 consisted of twelve questions that using closed –ended question (dichotomous question) directed towards the knowledge regarding the process for medication administration, drug calculation and regimen and injection site. This questionnaire were from study that had done by Raja et al., (2009). Respondents who answered correctly scored 1 point and wrong scored 0. The total points in knowledge of medication administration were 12 points and higher means scores represented higher knowledge. Mean score of 0 to3 indicates low, 4 to 8 indicates medium and 9 to 12 indicates high level of medication knowledge.[6]

2.3Section 3

Section 3 consisted factors contribution to medication error edited from the result of study done by Fu et al., (2007). It was categorized into five categories which using Likert scale. 25 questions were coded as 0=never; 1=rarely; 2=about half; 3=frequent; 4=always.[7] The respondents are asked to indicate how much the declarative statements given from each category will influence to contribute to medication error such as personal neglect, heavy workload, unfamiliarity with medication, new staff and complicated order. The answers from the respondents were coded in either positive or negative direction so that high points indicate the most factor lead to medication error. The total points in this section were 20 points and higher score represented the most factors that cause medication error. Score of less than 10 indicate low, 10 to14 indicate medium and 15 to 20 indicate high.

To identify the levels of knowledge and most contributing factors lead to medication error among nurses in government hospital, a significant value of 0.05 were used to test for significance for all statistical tests. The chi square analysis was performed to determine the relationship between contributing factors and the levels of knowledge.

III. Result

A total of forty eight (n=48) nurses participated in the study from medical, maternity, pediatric and emergency unit. All of them responded or completed the questionnaire representing 100% response rate.

3.1Section 1: Demographic Data

The questionnaires attempted to obtain the demographic data. The participating nurses have to respond in the appropriate boxes provided below to each questions and fill the appropriate answers. Distribution of values for years of experience was dividing into three; 1 to 4 years of experience, 5 to 10 years experience and 11 years and above. The respondent should have more than one year of experience.

The characteristic of the 48 respondents are present in Table 1. Six (6) 12.5% nurses were found to have an experience of less than 4 years experiences and majority (n=42) as having experience more than 5 years. There are thirteen (13) 68.8% among 5 to 10 years working experiences while 11 years and above are nine (9) 18.8%.

Table 1: Years of working experience of respondents

Working experience (year)	Frequency (n)	Percentage (%)
1-4 years	6	12.5
5-10 years	33	68.8
11 years and above	9	18.8

3.2Section 2: Knowledge of Medication

Table 2 shows the frequency and percentage of nursing in medication knowledge out of 48 respondents. Question related to pharmacological knowledge as shown in Table 2 was answered by all the nurses. A total of 12 questions were used to determined level of knowledge on serving medication among nurses in Sik Hospital. However, the finding showed that there are some of nurses unable to answer the questionnaire correctly that might be reflect nurses medication practice was unsafe. On question of medication sheet always bring every time serve medication, all knew they should bring the medication sheet each time served the medication to patient (100%). 100% stated never administer medication that other nurse has prepared. Right time knowledge were tested on questionnaire which IV antibiotic four times per day , 95.8% were right time and 4.2% served at wrong time .

On whether GTN is taken sublingually, 91.7% of the nurses gave the correct answer. 97.9% of nurses did not help their colleagues to sign the medication administration record in which the medication had been given earlier, 2.1% answered incorrectly.

Based on questions related to right dose, 89.6% answers drug order KCL amount should be given 60mls, 10.4 % answers wrong dose. On labeling syringes and bags with the medication names only 54.2% did the right procedures and 45.8% did not perform. 95.8% did not prepared and carry medication for more than two patients and 4.2% did it. Furthermore for Tablet Lanoxin 0.125mg dose should be given is 2 tablets 89.6% nurses calculated it right.

However, there were only 33.3% recommended for a heparin injection is at the abdomen and most handful nurses bring 66.7% did not recommended the best absorption route. 95.8% knew before giving medication, nurses should not sign the medication administration record and 4.2% will sign before giving the medication.

To ensure safe medication administration, nurses follow the nursing standard called six rights of medication administration consistently every time they administer medications. The six right of medication administration included Right patient, Right Drug, Right Dosage, Right Time, Right Route and Right Documentation.

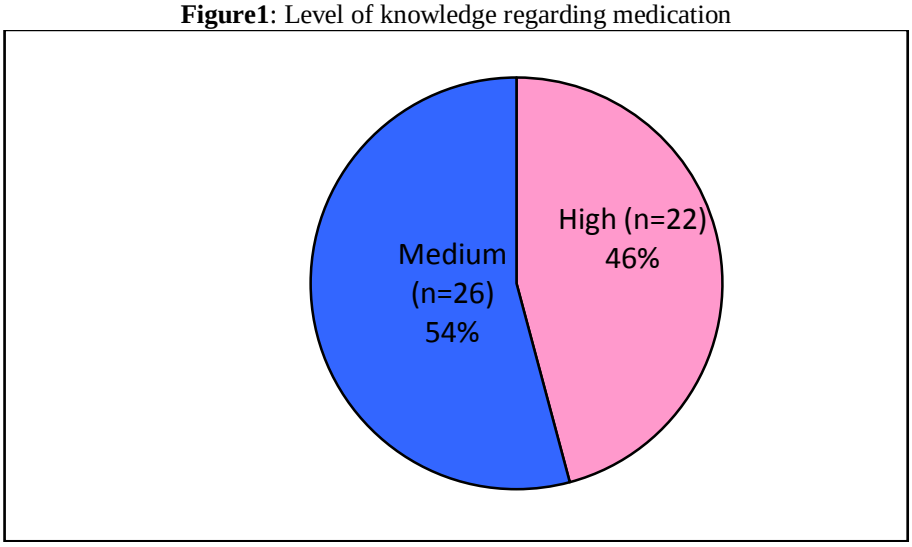
Table 2: Knowledge nurses on serving medication (n=48) in Sik Hospital.

Knowledge on serving medication	Yes n (%)	No n (%)
Do you always bring your medication sheet with you every time you serve medication to the patient?	48 (100)	0 (0)
Do you ever administer medication that another nurse has prepared?	0 (0)	48 (100)
Doctors order an IV antibiotic four times per day. Thus I should administer the medication at 8am-12pm-4pm-8pm	2 (4.2)	46 (95.8)
I ask the patient to put Nitroglycerin tablets sublingually	44 (91.7)	4 (8.3)
My colleague ask me to document the medication that had been given to a patient, thus I help her to sign the medication administration record	1 (2.1)	47 (97.9)
Drug Order: KCI 40 mg PO Drug Label: KCI 10 mg/1 5 ml, thus the amount given is 60ml.	43 (89.6)	5 (10.4)
Do you always check the patient's ID band prior to administering medication?	47 (97.8)	1 (2.1)
Do you label syringes and bags with the medication name?	26 (54.2)	22 (45.8)
Do you prepare and carry medications for more than two patients with you at a time?	2 (4.2)	46 (95.8)
Drug Order: Lanoxin 0.25 mg PO Drug Label: Lanoxin 0. 1 2 5 mg tablets, thus 2 tablets will be given to the patient?	43 (89.6)	5 (10.4)
The site frequently recommended for heparin injections is at the abdomen.	16 (33.3)	32 (66.7)
Before giving the medication, I need to sign the medication administration record.	2 (4.2)	46 (95.8)

3.2.1 Level of knowledge regarding medication

The level of medication knowledge among nurses was found good. Fig.1 show slightly more than half of the nurses 54% (n= 26) had medium, 46% (n= 22) high, while none had low scores in knowledge on medication among nurses in Sik, Hospital. This distribution score value previous journal used by Raja et al., (2009).

Figure1: Level of knowledge regarding medication



3.3 Section 3: Association Contributing Factors Which Potentially Lead To Medication Error: Factor 1: Personal Neglect; Factor 2: Heavy Workload; Factor 3: Unfamiliarity with Medication; 4: Newly Staff; 5: Complicated Orders.

Fig.2 showed the percentage of each category (n=48) selected as contributing to the medication error among nurses. Heavy workload and complicated orders 95.8% (n=46), A both category as higher causes then follow by percentage New staff 81.2 % (n=39) and personal neglected 66% (n=31). There are three common categories selected as contributing error. Others factor is unfamiliarity with medication 45.8% (n=22) which also need to solve problem causes the factor are.

Figure 2: The Percentage of Each Category Causes in Medication Error

3.3.1 Relationship between Medication Knowledge Level and Factor Contributing To Medication Error.

Pearson's chi square test was used for identify relationship between Medication Knowledge level and factor contributing to medication error**.** All each factors which contributing in Medication error was divided to Yes and No. The knowledge level also was divided by two categories Medium and high level.

The relationship between personal neglect and knowledge was founded that 68.2% Medium level agreed and 42.3% was disagreed. Then high level was 57.7% disagreed personal neglect the factors which contributing in Medication error and only 31.8% was agreed.

There was 92.3% nurses in medium knowledge level agreed that complicated orders was factor contributing to medication error and 7.7% disagreed. While 72.7% high level knowledge agreed but 27.3% was disagreed that complicated orders was factor contributing to medication error.

The variable of Personal neglect and complicated orders were found to be not significantly associated with factor contributing in Medication error among nurses, but the p value 0.073 for personal neglect and p value 0.070 for complicated orders was closed to be $\alpha = 0.05$. This was showed that the variable Personal neglect and complicated orders are important variable to medication error. The insignificant value was might be due to small size sample.

There was 96.2% Medium knowledge level was agreed heavy workload factors which contributing in Medication error and 3.8% disagreed that statement. 90.9% nurses with high knowledge level also were agreed the heavy workload factors which contributing in Medication error and 9.1% was agreed. The p value 0.559. There is no significant heavy workload factors was contributing in Medication error.

There was small group of nurses 38.5% in medium level was agreed factor unfamiliarity with medication which contributing in Medication error and 61.5% disagreed. Mostly nurses in high knowledge also disagreed 68.2% and only 31.8 was agreed. The p value 0.632. There is no significant unfamiliarity with medication factors was contributing in Medication error.

The new staff which a factor contributing in Medication error, 53.8% nurses with medium knowledge agreed and 46.2% disagreed. Then nurses in high knowledge level also majority (63.6%) agreed and only 36.4% disagreed. The p value 0.493. There is no significant new staff factor was contributing in Medication error.

Table 3: Relationship knowledge level and factors contributing medication error

		Knowledge Level				
		Medium		High		p value*
		Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	
Personal neglect						
	Yes	15	68.2	7	31.8	0.073
	No	11	42.3	15	57.7	
Heavy workload						
	Yes	25	96.2	20	90.9	0.559
	No	1	3.8	2	9.1	
Unfamiliarity with medication						
	Yes	10	38.5	7	31.8	0.632
	No	16	61.5	15	68.2	
New staff						
	Yes	14	53.8	14	63.6	0.493
	No	12	46.2	8	36.4	
Complicated orders						
	Yes	24	92.3	16	72.7	0.070
	No	2	7.7	6	27.3	

*Pearson's chi square test

IV. Discussion

This study was to identify the level of knowledge of serving medication which can contribute to medication errors. Identification of level of knowledge and the most contributing factor which lead to medication errors allows all the personels involved in prescribing, preparing, and serving medication to eliminate the situations that promote errors and to make changes. By eradicating medication error, all health personels will create a safe environment for patients.

The study found that the level of knowledge of nurses in Sik Hospital regarding administering medication were more than half of the nurses (54%) had medium, 46% high, while none had low scores. Asim and Nagy (2007) in their study showed that there were statistically significant differences in responses across the participant's years of experience and the current clinical working area about the medication error to occur.[8] In contrast, years of experience did not show any influence on the knowledge and practice of nurses except on attitude.[9]

Result showed that multiple factors were involved in medication errors. The top three causes were heavy workload, complicated orders and new staff. Previous research provides strong evidence that high nursing workloads at the unit level have a negative impact on patient outcomes.[10] Study by Seki, Y. and Yamazaki, Y. (2006) also agreed on the result in which stated that workload and lack of experience at the current ward (new

staff) are two conditions that can lead to medication errors.[11] In contrast, indicated that the main causes were due to personal neglect.[7]

The variable of Personal neglect and complicated orders were found to be not significantly associated with factor contributing in Medication error among nurses, but the p value 0.073 for personal neglect and p value 0.070 for complicated orders was closed to be $\alpha = 0.05$. This showed that the variable Personal neglect and complicated orders are important variable to medication error. The insignificant value was might be due to small size sample.

Eventhough medication error were rated as complicated and major issue in health care industry, it is still preventable if all personels involved; nurses, physician, pharmacist and others are well educated regarding steps required to reduced these errors. The management for example should provide courses and training to increase the staff knowledge and conpetency on medication. By doing this, they will promote patient's safety pertaining to medication. The management also should provide adequate staffing and proper relaxation area for nurses to reduce stress and to prevent fatigue among nurses. Adoption of computerized order entry will decrease the rate of medication error if being implimented correctly. New staff, as in newly qualified or new to the unit need to be fully and throughly prepared and supported by excellently constructed preceptorship to maximized their positive influence on transitioning to a new environment. Implimentation of medication nurses' special jacket/apron will help to reduce interruption while on medication round. Medication should came in familiar packaging and labeling to reduce the nurses' confusion, as too many varieties of medication packaging, form, dosing and preparation might lead to medication error.

A larger study aiming to provide more evidence of the factors that contribute to medication errors among nurses in government hospital would be a value. Finally, the connection between nurses' working area with medication errors is also important to be further investigated.

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