

PREVALENCE AND PERCEIVED CAUSES OF UNREPORTED MEDICATION ERRORS AMONG NURSES IN A PUBLIC HOSPITAL IN SELANGOR

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ABSTRACT

Medication errors could bring serious consequences to patients. Reporting medication error is a strategy to mitigate such incidence from happening. Unfortunately, some nurses do not report the errors due to certain factors. Determining the factors influencing unreported medication errors will ensure imperative actions that are to be taken to curb this issue. The aim of this study is to determine the prevalence and perceived causes of unreported medication errors among nurses in a public hospital in Selangor. A descriptive and cross-sectional study was carried out in 26 wards from various disciplines and the sample involved 234 nurses. The data were gathered through self-reported questionnaires consisting of three sections. The first section covered demographic characteristics, the second section aimed to obtain information on the frequency of medication error incidents and the last section aimed to obtain information on nurses' perceptions of barriers in reporting medication errors. The findings of this study indicated that there was a significant relationship between level of education and the nurses' perceptions of barriers in reporting medication errors. The study recommended that providing enough education, initiating a non-punitive culture may help increase voluntary reporting of medication errors among nurses to strengthen the reporting system and to avert medication errors in the future.

Keywords: Prevalence, Unreporting, Medication error, Prescription, Consequences

INTRODUCTION

'Patient safety' means the acts or methods done to avoid patients from getting injured or getting into adverse situations in the midst of health care procedures (Aspden, 2010). Quality is one of the most important components in ensuring good healthcare (World Alliance for Patient Safety Forward Programme, 2008). Every healthcare system tries to reduce resulted injuries as much as possible but medical errors and adverse events are two major factors endangering patient safety (Bodur & Filiz, 2010).

'Medication error' can be defined as 'a failure in the treatment process that leads to, or has the potential to lead to harm to the patient' (Ferner & Aronson, 2006; Aronson, 2009). The Institute of Medicine in Egypt reported that 44,000 to 98,000 deaths occur in hospitals

annually due to medication errors, which is as high as 1.9 patient per day (Fontan *et al.*, 2003). Statistics prove that 2.9% to 16.6% of hospital inpatients suffer from treatment-related adverse events (Zegers *et al.*, 2009). The number of patients who stay in hospitals associated with medication errors also increased to 4.6 days, resulting in a whopping \$4,685 of the cost per length for nursing shift (Mahmood *et al.*, 2009). 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 (Maziah *et al.*, 2012).

In a study done in Egypt showed that 4.9% nurses working at a hospital were reported to have committed more than three medication errors (Manal & Hanan, 2012). Giving medication without a physician's prescription happens in many cases of formally reported

medication errors (Mirzaee *et al.*, 2014). Factors of unreported medication errors include fearing the consequences of reporting, managerial factors and the factors related to the process of reporting (Bahadori *et al.*, 2014). It was estimated that 95% of medication errors were not reported due to fear of punishment (Bakr & Attala, 2012).

When a medication error is reported, safety can be maintained and valuable information can be added to a hospital's database so that in the future, such errors will be prevented (Chiang & Pepper, 2006).

Research Objectives

The objectives of this study are (1) to identify the prevalence of medication errors, (2) to determine the perceived causes of unreported medication errors among nurses' in a public Hospital, Selangor.

MATERIALS AND METHODS

Research Design:

A quantitative and cross-sectional study was conducted using a self-reported questionnaire for this study.

Settings:

The public hospital chosen for this study has 10 specialities (disciplines) and 29 types of wards. Services available at the hospital are inpatient, emergency services, rehabilitation services, and haemodialysis services. The departments include General Medicine, General Surgery, Paediatric, Obstetric, Anaesthesiology, Orthopaedics, Ophthalmology, Otorhinolaryngology, Psychiatry, Dental, Dermatology, Pathology, Radiology, Maxillofacial, Neuro Surgery, Spinal Surgery, Nephrology, Plastic Surgery, Trauma, and Infectious Diseases. The hospital had 620 beds, providing various secondary and tertiary medical services.

Population & Sample Size:

The population was the U29 nurses working in the ward from various disciplines (N=590). Sample size was taken from various disciplines and wards such as 4A, 4B, 4C, 4D, 5A, 5B, 5C, 5D, 6A, 6B, 6C, 6D, 7D, 9C, Dengue PKKN, 4C 1D, 1D PKKN, KUSTA, male and female. The researcher applied Raosoft software, with a confidence interval of 5% and confidence level of 95% (n=234). As for the sampling technique, convenience sampling was used in which the data collection were from

the nurses who are conveniently available to participate in study.

Inclusion and exclusion criteria

The inclusion criteria were nurses working in the ward and were involved in administering medication to patients. Exclusion criteria include nurses who were on leave (annual leave, study leave, confinement leave, etc), working in the clinic or administration site.

Research Instruments

The main approach to collect data information in this study is based on the use of questionnaires. The questionnaire of this study which consisted of 3 sections, was adapted from "The factors affecting the refusal on reporting of medication errors from the nurses" by Bahadori *et al.*, (2013).

Section 1 covered demographic characteristics consisting of 6 questions aimed to obtain information on nurse's demography: age, gender, marital status, ethnicity and assignation. Year of service would depend on their seniority.

Section 2 consisted of 19 questions aimed to obtain information on the Frequency of Medication Error Incidents among nurses in a public hospital in Selangor. For example, the question which touched on the action of not giving prescribed medication to the patient and giving medication to the patient without prescription of physician. The answer would be never to those who have never done such mistake, once to those who might have done the mistake for the first time, twice to those who have done the mistake twice and more than that. All the results were determined by the mean of frequency.

Section 3 had 19 questions aimed to obtain information on nurses' perception of barriers in reporting medication errors, divided into 3 items including fear of the consequences, managerial factors and reporting process.

"Fear of the consequences" consisted of 13 questions. For example, fear of the impacts of reporting errors on the personnel's annual evaluation, fear of the impact of reporting errors on their salary and benefits and false beliefs in nursing heads and managers.

"Managerial factors" consisted of 3 questions including the head focusing only in finding the culprits

and blaming them, regardless of other factors involved in the occurrence of error, disproportionate reactions of the heads to the error's seriousness and disproportionate reactions of the heads to the error importance.

Reporting process also consisted of 3 questions including disproportionate reactions of the heads to the error importance, lack of a clear definition of medication errors and forgetting to report the medication errors.

All questionnaires were based on a five-point likert scale from Strongly disagree to Strongly agree. 1= Strongly disagree, 2= Disagree, 3= Neutral, 4 = Agree, 5= Strongly agree. All the results were determined by the mean score. The Cronbach's alpha result for this study was 0.87, showing that the reliability test was good.

Ethical Considerations

The researcher had gained an approval from the Research Ethics Committee of Health Sciences followed by an approval from the UiTM Research Ethics Committee (Ref No: 600-RMI (5/1/6) and Malaysian Research Ethics committee (MREC)(05) KKM/NIHSEC/P16-1009 after registering under NMRR (National Medical Research Register) to proceed with the study (NMRR-16-1004-28889 (IIR).

All the requirements above need to be adhered to conduct a research in any facility of Ministry of Health Malaysia. Consent from the respondents must also be taken before starting data collection process.

Data Collection

The researchers invited respondents to voluntarily participate in the study. Once the respondents were willing to participate, date, time and venue were set for the respondents to answer the questionnaire. Upon their agreement, the respondents were given the study package, containing a copy of a cover letter explaining the aims of the study, participants' right, and instructions for completing and returning of the package along with the instrument of the study.

Before answering the questionnaire, the respondents were briefed regarding the way to answer the questions. Respondents were only allowed to participate before they started working as to reduce any contributing factor which might interfere the respondents' answers.

Respondents were given about ten to fifteen

minutes (10-15 minutes) to answer the questions. The location chosen was at the seminar room in each ward. Data collection process was done through self-administered questionnaires. The questionnaires were distributed to the nurses ($n=234$). The collection of data from the study sample, $n=234$, was completed within one month. The researchers came to the ward every week and passed questions to 7 wards per week.

Statistical Analysis

All the data were utilized to describe participants' characteristics using mean and standard deviation (continuous variables) and frequencies and percentages (categorical variables) by using the IBM Statistical Packages for Social Sciences (SPSS) for Windows, version 20.0. Descriptive statistics with frequency method had been used to identify the demographic factors, the frequency of unreported medication error incidents and the perceptions of barriers in reporting medication errors among general ward nurses in a public hospital. While inferential statistics, Chi Square were used to test the association between unreported medication errors and nurses' demographic characteristics.

RESULTS

Demographic characteristics

In this study, the mean age of the respondents was 29.18 years old (SD: 4.02). The youngest respondent was 23 years old and the oldest was 48 years old.

About 61% of the respondents were less than 30 years old (N=143) while only 1% of them were more than 40 years old (N=3). A total of 88 of them were 30 to 39 years old (38%).

Out of 234 of nurses working in this public hospital in Selangor, 208 (88.9 %) of them were female nurses while only 26 (11.1%) were males and they were mostly working at the medical male ward. A total of 174 (74.4%) nurses who participated in this study were married while 60 (25.6%) of them were single. The mean year of service among nurses who took part in this study was found to be as more than 5 years of service (Mean of year of service: 6.09 years; SD: 3.50). Almost half of the nurses in this study had their year of service of more than 5 years (45%, N=106) while about 36% (85) of them had below 5 years of service. There were about 18% (N=43) of the nurses with than 10 years of service as there was a nurse who had 22 years

of service who took part in this study (Table 1).

Table 1: Demographic Characteristics of the Respondents (n=234)

Variables	Frequency (%)
Age Mean: 29.18 (SD:4.02)	
Less than 30 years old	143 (61)
30 – 40 years old	88 (38)
More than 40 years old	3 (1)
Gender	
Female	208 (88.9)
Male	26 (11.1)
Marital Status	
Married	174 (74.4)
Single	60 (25.6)
Ethnicity	
Malay	224 (95.7)
Chinese	2 (2.1)

India	2 (0.9)
Others	3 (1.3)
Year of service. Mean: 6.09 (SD:3.50)	
Below 5 years	85 (36)
5- 9 years	106 (45)
More than 10 years	43 (18)

Prevalence of unreported medication errors among general ward nurses in a public hospital

Table 2 shows the prevalence of unreported medication errors for all the variables discussed in this session occurs at least once (Mean: 1.06, SD: 0.31). The highest mean was reported to be *Giving medication before or after due time* (Mean: 1.18, SD: 0.64); and *Not paying attention to proper time of giving a medication -before and after food* (Mean: 1.18, SD: 0.54).

Table 2: Prevalence of unreported medication errors among general ward nurses in a public hospital (n=234)

Variables	Frequency (%)				Mean (SD)
	Never	Once	Twice	More Than Twice	
Not giving prescribed medication to the patient	221 (94.4)	8 (3.4)	3 (1.3)	2 (0.9)	1.09 (0.40)
Giving medication to the patient without prescription of physician	224 (95.7)	4 (1.7)	5 (2.1)	1 (0.4)	1.07 (0.37)
Giving medication before or after due time	213 (91.0)	9 (3.8)	3 (1.3)	9 (3.8)	1.18 (0.64)
Not diluting a medication that has to be diluted	233 (99.6)	1 (0.4)	0	0	1.00 (0.07)
Not paying attention to proper time of giving a medication (before and after food).	205 (87.6)	22 (9.4)	2 (0.9)	5 (2.1)	1.18 (0.54)
Not taking necessary measure for medication that need special Attention (taking blood pressure and pulse, etc.)	225 (96.2)	2 (0.9)	6 (2.6)	1 (0.4)	1.07 (0.38)
Mixing medication (micro set medications) without paying attention to drug interaction	227 (97.0)	3 (1.7)	1 (0.4)	2 (0.9)	1.05 (0.33)
Error in injection method in terms of speed of injection	230 (98.3)	3 (1.3)	0	1 (0.4)	1.03 (0.23)
The intravenous injection of subcutaneous medication	229 (97.9)	5 (2.1)	0	0	1.02 (0.15)
The subcutaneous injection of an intravenous medication	231 (98.7)	3 (1.3)	0	0	1.01 (0.11)
The intramuscular injection of an intravenous medication	228 (97.4)	4 (1.7)	2 (0.9)	0	1.03 (0.22)
The intravenous injection of an intramuscular medication	229 (97.9)	4 (1.7)	1 (0.4)	0	1.03 (0.18)
Giving patients sublingual or chewable medications orally	224 (95.7)	6 (2.6)	1(0.4)	3 (1.3)	1.07 (0.39)
Variables	Frequency (%)				Mean (SD)
	Never	Once	Twice	More Than Twice	
Giving expired medication to patients	226 (96.6)	6 (2.6)	1 (0.4)	1 (0.4)	1.05 (0.28)
Giving postoperative analgesics without physician's prescription	226 (96.6)	3 (1.3)	3 (1.3)	2 (0.9)	1.06 (0.37)
Giving the wrong medication to a patient	215 (91.9)	18 (7.7)	1 (0.4)	0	1.09 (0.30)
Giving more or less than the prescribed dose	231 (98.7)	2 (0.9)	1 (0.4)	0	1.02 (0.16)
Not paying attention to proper position of patients regarding the kind of medication	223 (95.3)	3 (1.3)	6 (2.6)	2 (0.9)	1.09 (0.43)
Not paying attention to effects of drug interaction	224 (95.7)	6 (2.6)	2 (0.9)	2 (0.9)	1.07 (0.36)

Causes of Unreported Medication Errors among General Ward Nurses in a Public Hospital in Selangor

Three factors contributing to the causes of unreported medication errors among general ward nurses in this hospital were: *fear of consequences*, *fear of managerial factors* and *fear of reporting process*. Of

all the three factors, the nurses agreed that *fear of the consequences* was the cause of unreported medication errors among general ward nurses in this hospital (Mean: 4.44, SD=0.81). However, they were neutral with the result for the *fear of managerial factors* (Mean: 3.08, SD= 0.33) and *the reporting process* (Mean: 3.08, SD=0.42). The results are as shown in Table 3.

Table 3: Causes of Unreported Medication Errors among General Ward Nurses in a Public Hospital in Selangor (n=234)

Variables	Frequency (%)					Mean (SD)
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
3.1 Fear of the consequences (Mean: 4.44, SD: 0.812)						
Fear of the impact of reporting of errors on the personnel's annual evaluation	2 (0.9)	3 (1.3)	42 (17.9)	37 (15.8)	150 (64.1)	4.41 (0.89)
Fear of the impact of reporting of errors on their salary and benefits	0	2 (0.9)	39 (16.7)	44 (18.8)	149 (63.7)	4.45 (0.80)
Fear of being blamed by nursing heads	0	2 (0.9)	46 (19.7)	34 (14.5)	152 (65.0)	4.44 (0.83)
Fear of being blamed by doctors	0	9 (3.8)	27 (11.5)	46 (19.7)	152 (65.0)	4.46 (0.84)
Fear of being blamed by colleagues	0	3 (1.3)	44 (18.8)	36 (15.4)	151 (64.5)	4.43 (0.83)
Fear of producing side effects in patient	0	2 (0.9)	31 (13.2)	47 (20.1)	154 (65.8)	4.51 (0.75)
Fear of being labeled as incompetent nurses and inadequacy	0	3 (1.3)	35 (15.0)	43 (18.4)	153 (65.4)	4.48 (0.79)
Fear of colleagues' behavior	1 (0.4)	5 (2.1)	25 (10.7)	47 (20.1)	156 (66.7)	4.50 (0.80)
Fear of expressing a negative attitude towards the nurse(s) making errors by the patient and his/her family	0	4 (1.7)	33 (14.1)	44 (18.8)	153 (65.4)	4.48 (0.80)
Fear of judicial issues following reporting on medication error	2 (0.9)	4 (1.7)	38 (16.2)	36 (15.4)	154 (65.8)	4.44 (0.88)
Fear of informing colleagues working in other units and other facilities about one's medication error	3 (1.3)	4 (1.7)	40 (17.1)	38 (16.2)	149 (63.7)	4.39 (0.91)
3.2 Managerial factors (Mean: 3.08, SD: 0.33)						
Lack of receiving positive feedback from the nursing heads following to report on medication errors	0	4 (1.7)	39 (16.7)	40 (17.1)	151 (64.5)	4.44 (0.82)
False beliefs in nursing heads and manager	0	4 (1.7)	41 (17.5)	37 (15.8)	152 (65.0)	4.44 (0.83)
The head's focus only on finding the culprits and blaming them, regardless of other factors involved in the occurrence of error	0	2 (0.9)	203 (86.8)	27 (11.5)	2 (0.9)	3.12 (0.38)
Disproportionate reactions of the heads to the error seriousness	2 (0.9)	3 (1.3)	201 (85.9)	28 (12)	0	3.09 (0.40)
Disproportionate reactions of the heads to the error importance	2 (0.9)	4 (1.7)	205 (87.6)	23 (9.8)	0	3.06 (0.38)
3.3 Reporting process (Mean: 3.08, SD: 0.42)						
Not paying attention to the reporting on some medication errors	3 (1.3)	7 (3.0)	193 (82.5)	31 (13.2)	0	3.08 (0.46)
Lack of a clear definition of medication errors	1 (0.4)	8 (3.4)	188 (80.3)	35 (15)	2 (0.9)	3.12 (0.47)
To forget reporting on the medication errors	3 (1.3)	8 (3.4)	195 (83.3)	28 (12)	0	3.06 (0.45)

DISCUSSION

In view of the demographic characteristics, the mean age of the respondents in this current study was 29.18 years old (SD: 4.02). The study is almost the same by a previous study done by Badiyepymaie *et al.*, (2014) which reported that the mean age was 28.80 (SD: 6.48). However, this study is inconsistent with the study done by Mayo & Duncan (2004) where the mean age was 44.6 years (Range = 23–74 years; SD: 9.07).

As for educational level, the current study showed that 125 respondents had tertiary education (53.4%), followed by 71 whose level of education was not listed (30.3%), then 35 with secondary level (15%) and lastly 3 with primary level (1.3%). In other studies, by a few authors also found similar results to these. For example, Bahadori *et al.*, (2013) found that 72 (86.8%) of the respondents had a bachelor's degree (tertiary). Mayo & Duncan (2004) reported that the highest level of education among the respondents was tertiary level where 44% had Bachelor's Degree, 40% had Associate Degree, 11% had Diploma, 3% had Master's Degree and 3% had others.

In a study by Yun, Devi & Emily (2014) it was reported that the number of respondents who had Bachelor's degree was 663 (61.3%), 326 (30.1%) had Diploma, 58 (5.4%) had Advanced Diploma, Masters 16 (1.5%) and Doctorate 1 (0.1%).

In terms of the year of service, this study revealed that the mean year of service in this study was 6.09 (SD: 3.50). The majority of the nurses had a working experience between 1 to 11 years. Otherwise, the higher level of services was reported to be around 6 years, where the frequency was 33 (14.1%). There was only 1 nurse with an experience of more than 12 years. In a study reported by Bahadori *et al.*, (2013) 41 (49.4%) nurses were employed officially and 32 (38.6%) nurses had lower than 5 years of job experience. Another study by Mayo & Duncan (2004) showed that the mean average of practicing service was 18.7 (range 1–45 years; SD = 9.94), while 62.7% worked full time and 88.2% were in benefited positions. One study done in Singapore also stated that the working experience involved was 0–5 years with a number of 672 respondents (62.1%), 267 with 6–10 years of experience (24.7%), 82 with 11–15 years of experience (7.6%), 23 with 16–20 years of experience (2.1%) and 35 with more than 20 years of experience (3.2%) (Yun, Devi & Emily, 2014).

The prevalence of unreported medication errors for all the variables have occurred at least once (Mean: 1.06,

SD: 0.31). The frequency ranking was between 1.00 – 1.02 for smallest, 1.09 – 1.18 for highest. This study concluded that the smallest variables were not diluting a medication that has to be diluted, the intravenous injection of subcutaneous medication, the subcutaneous injection of an intravenous medication and giving more or less than the prescribed dose. The study done by Mirzaee *et al.*, (2014) indicated that the least frequent errors were not giving prescribed medication to patient, giving patients sublingual or chewable medications orally, not diluting a medication that has to be diluted, mixing medication in micro set without paying attention to drug interaction.

The most frequent unreported medication errors were giving postoperative analgesics without physician's prescription, giving expired medication to patients, and not paying attention to the proper time of giving a medication (before and after food).

For the causes of unreported medication errors among general ward nurses, the study domains included were fear of the consequences of reporting, managerial factors, and factors related to the process of reporting. The highest portions were fear of the consequences with the mean of 4.44 (SD 0.812), managerial factors with the mean of 3.08 (SD : 0.33), reporting process with the mean of 3.08 (SD 0.42). This result is supported by Tol & Pourreza (2010) where in his study it was found that fear of consequences of error was the main cause of unreported medication errors. But, two studies showed that the highest causes of unreported medication error were managerial factors, followed by factors related to the process of reporting and fear of the consequences of reporting (Geravandi *et al.*, 2016; Bahadori *et al.*, 2013).

CONCLUSION

As a conclusion, it was found that there was a significant relationship between the level of education and the three means of nurses' perceptions of barriers in reporting medication errors.

The current study results showed that the prevalence of unreported medication error occur at least once. The most cause in the refusal of reporting on medication errors was the fear of the consequences. Therefore, providing enough education to nurses, revising related processes as well as establishing a non-punitive culture and management support are some factors that may help increase voluntary reporting of medication errors

among nurses to improve the medication error reporting system and prevent medication errors to happen in the future.

LIMITATIONS

The samples of the study were nurses from the general ward in a public hospital in Selangor. This study had several limitations requiring consideration for future study. The respondents chosen as participants should be registered nurses who are involved in administering medication. Full and clear explanation should be given to the respondents to provide understanding as some respondents will not be giving full co-operation, causing misunderstanding in completing the questionnaires, time constraint and additional heavy workload for them

at the workplace.

RECOMMENDATIONS

It is suggested that similar studies should be carried out on other public and private hospitals using large samples and population studies, and then those results should be compared with the present study results.

ACKNOWLEDGMENT

We are grateful to respected personnel of Universiti Teknologi MARA (UiTM), Community Research Centre (CRC) Hospital Sungai Buloh, and all the nurses, who participate in this study. We would also like to thank the Director General of the Ministry of Health Malaysia for his permission to publish this article.

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