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**NURSES' PERCEPTION ON MEDICATION
ADMINISTRATION ERROR (MAE) AT
SURGICAL WARDS IN HUSM**

by

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
HUSM	Hospital Universiti Sains Malaysia
IOM	Institute of Medicine
SPSS	Statistical Package for Social Science

NURSES' PERCEPTION ON MEDICATION ADMINISTRATION ERROR (MAE) AT SURGICAL WARDS IN HUSM.

ABSTRACT

Mortality rate due to medication error incidence in United States was higher than incidence of motor vehicle accidents, breast cancer or AIDS. Although many preventative measures were implemented to reduce the incidence, the incidence is still alarming particularly related to violation of 5Rights during drug administration. As medication administration is one of the vital roles of nurses, it was crucial to determine nurses' perception towards medication administration error (MAE) at the busiest wards in a teaching hospital. This descriptive study aimed to determine the nurses' perception on medication administration error at various surgical wards in Hospital Universiti Sains Malaysia (HUSM). Seventy one nurses from various surgical wards were selected for this study by using stratified sampling method. Data was collected by using self administered questionnaire adapted from Demehin, Babalola and Erhun, (2008) and Wilkins and Shields, (2008). Using SPSS version 18, analysis of data was conducted using descriptive and One-Way ANOVA. All nurses (100%) had awareness on MAE. In addition, 26.80% of the nurses perceived the estimated frequency of MAE occurrence was at 1 per 10 drug administration. Most of the nurses perceived wrong time (22.54%), wrong drug (20.80%) and wrong doses (20.80%) as the most frequently occurring type of MAE. The nurses also perceived that distraction and interruption during medication administration process (17.32%), excess workload (14.70%), medication named was quite similar (14.17%), and wrong labeling (e.g. medicine, patient name) as the main factors contributing to MAE. Measures to reduce MAE

incidence were encouraging self reporting of medication administration error (14.75%), avoidances of all forms distractions (14.53%), importance of continuous professional education and re-training of all nurses in the right way of administering medication (13.67%) and involvement and cooperation in medication delivery by all health care delivery (e.g. nurses, pharmacists and physicians) (13.45%). A One-Way ANOVA showed that there was a significant difference in nurses' perception towards role overload between three surgical wards, $F(2, 68) = 4.109, p = 0.021$. All surgical nurses had awareness of MAE incidence with the main contributing factor related to the procedure during drug administration and nurses' perception towards role overload in different surgical ward. The information obtained from this study brings to light important to apply measures and guideline for nurses in reducing the incidence of MAE.

PERSEPSI JURURAWAT TERHADAP KESILAPAN PEMBERIAN UBAT DI WAD SURGERI HUSM

ABSTRAK

Kadar kematian pesakit disebabkan kesilapan pemberian ubat di Amerika Syarikat adalah lebih tinggi berbanding kematian disebabkan oleh kemalangan, kanser payudara dan AIDS. Walaupun banyak intervensi dilakukan untuk mengurangkan jumlah kesilapan pemberian ubat namun jumlahnya masih membimbangkan kerana penyimpangan daripada teknik '5Right' oleh jururawat semasa pemberian ubat. Kajian berbentuk keratan lintas dan deskriptif ini bertujuan untuk menentukan persepsi jururawat terhadap kesilapan pemberian ubat di wad surgery HUSM. Jururawat daripada lapan wad surgery telah terlibat. Jururawat dipilih berdasarkan prosedur persampelan stratifikasi kebarangkalian. Soal selidik yang digunakan dalam kajian ini ialah hasil gabungan daripada dua soal selidik iaitu, Demehin, Babalola and Erhun (2008) dan Wilkins dan Shields (2008) untuk menentukan persepsi jururawat terhadap kesilapan pemberian ubat. Data diproses menggunakan SPSS versi 18.0 dan data dianalisis menggunakan statistik deskriptif dan ujian *ANOVA*. Berdasarkan keputusan kajian ini, semua jururawat (100%) mempunyai kesedaran terhadap kesilapan pemberian ubat. Kebanyakan daripada jururawat mengenalpasti jenis kesalahan memberi ubat pada waktu yang salah (26.80%), memberi ubat yang salah (20.80%) dan memberi dose ubat yang salah (20.80%) sebagai jenis kesilapan pemberian ubat yang berlaku di wad surgery. Majoriti daripada jururawat mengenalpasti gangguan semasa proses pemberian ubat sebagai punca utama kesilapan pemberian ubat. Kebanyakan daripada jururawat menyatakan cadangan utama bagi mengurangkan kesilapan pemberian ubat ialah

dengan megalakan jururawat untuk melaporkan kesilapan pemberian ubat yang dilakukan (14.75%). Keputusan kajian menunjukan terdapat bebanan kerja berlebihan yang tinggi ($M = 4.17$, $SD = 1.94$) di wad operasi di HUSM. Keputusan kajian juga menunjukan terdapat perbezaan antara bebanan kerja berlebihan dalam kumpulan jururawat operasi di HUSM, $F(2, 68) = 4.109$, $p = 0.021$. Secara keseluruhannya, diharapkan hasil kajian ini dapat dijadikan panduan kepada jururawat dan pihak pengurusan hospital untuk mengelakkan kejadian kesilapan pemberian ubat daripada terjadi.

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Medication errors are a well-known problem in hospitals. Medication error is any preventable event that may cause or lead to inappropriate medications use or patient harm while the medication is in the control of the health care professional, patient or consumer (National Coordinating Council for Medication Error Reporting and Prevention, 2005). Medication error incidence is three times more in neonatal unit compared to adult ward (Kaushal, Bates, & Landrigan, 2001). Mortality due to medical error in the United States alone was estimated to be between 44,000 and 98,000 which accounting for more deaths than motor vehicle accidents, breast cancer or AIDS (Kohn, Corrigan & Donaldson, 1999).

The common errors are prescribing errors, dispensing errors and administration errors identified by Wakefields, Holemen, Borders, Blegen and Vaughn (2009). Prescribing error occur when the physician identify medication needs for patient and enters that order in the patient medication record. Patient's prescriptions may cause prescription errors because of omission of medication administration details for instance patient's weight (Bates, Cullen & Laird, 2005). While, dispensing errors occur when pharmacist dispensed the incorrect type of drug to patient or in several cases by staff nurses. Frequency occurrence of dispensing error is 50% and dispensing incorrect strength of the drug is the most error happen (Demehin, Babalola & Erhun, 2008). Administration errors occur at the time when patient is supposed to have been given the medication by staff nurse and it obviously

associated with nursing actions. Moreover, medication administration error is the second most frequent type of medication errors after prescribing errors and wrong time is the most common type of error in medication administration (Deans, 2005).

Medication administration errors (MAE) are divided into errors of commission and error of omission. Errors of commission are related to a medication that has been given to the patient. Examples of errors of commission are directly related to the practice of 5 Rights principle of administering medication which is right patient, right drug, right dose, right time, and right route. Dosage errors are the most common types of error occur (Lewis, Dornan, Taylor, Tully, Wass & Ashcroft, 2009). Errors of omission occur when patient did not receive the medication that was ordered and dispensed to the nursing unit.

Interestingly, the incidence of medication administration error keeps increasing. From all reported injuries in hospital, 10% to 18% is attributed to medication administration error (Hume, 1999). In California, over 700 patients die each year because of this issue (Speier, 2000). In an Iran study, mean of recalled committed medication administration error by nurses was 2.2 per nurse and the rate of such errors reported to nurse managers was 42.1% (Mrayyan, Shishani & Al-Faouri, 2007). However in Asian country, Taiwan reported 57.2% of their nurses had experienced of making medication administration errors and about half of them (52.4%) had reported the error (Chiang, 2010).

Many factors associate with medication administration error. According to Balas, Scott and Rogers (2006), factor such as heavy workloads, complexity of the patient's needs, interruptions and poor communication among health care providers had contributed to administration error. Furthermore, working environment also has an effect on medication administration error such as unfamiliarity with the nursing unit, interruptions during administering medication, medication looks alike and sounds alike are the environment

factor contributes to medication error administration (Ashton & Iyer, 2003 Cited in Demehin, Babalola & Erhun, 2008).

As medication administration errors are alarming, it creates many bad consequences and injury. The injury is ranging from minor discomfort to substantial morbidity (Bates, Cullen & Laird, 1995). In an American study, Phillips (2001) reviewed all cases of medication errors reported to the Food and Drug Administration for a six year period (1993-1998) and found that out of 5,366 medication reports, 68.2% resulted in serious patient outcomes and 9.8% were fatal. One in every five doses of medication is in error, 7% potentially harmful and 10.4% of administration errors were considered as potentially life threatening (Chua, Tea & Rahman 2009). Apart from that, medication errors may increase in monitoring and cost of care, and delayed hospital discharge (Raja Lope, Boo, Rohana & Cheah, 2009; Bates, Cullen & Laird, 1995). Besides, morbidity and mortality has been shown to increase inpatient health costs by an estimated 4,700 per hospital or 2.8 million annually (Kohn, Corrigan & Donaldson, 1999; Bates et al., 1995)

Many preventive measures can be implemented to decrease medication error incidence. Reduce the workload and increases the nursing staffing are the one that should be implemented (Demehin et al., 2008). While, Raja Lope et al. (2009) suggested, re-educating the nurses about the adherence of the '5 Rights', improving nurses' awareness of the correct steps in medication administration and continuing monitoring through quality assurance studies were measures taken that successfully reduced the problem of medication administration errors.

1.2 Problems Statements

Institute of Medicine (1999) claimed that, medication errors as a part of medical errors account for 1 out of 131 outpatient deaths and 1 out of 854 inpatient deaths. The rate of medication errors per patient per day is estimated to be 1.9 (Stetler, Morsi & Burns, 2000). Due to the increasing case of medication error, it is crucial to study on this issue in order to get a clear picture of what is happening in the hospital regarding medication administration error..

In addition, the working environments play a huge factor that might relate with medication administration error incidence. Surgical nursing has been considered the foundation of nursing and for health care as a whole (Grindel, 2004). It is one of the longest standing, distinct and recognizable areas of nursing practice. The varieties of setting make medication administration error are prone to be made. The working environment is unpredictable because of variation in types of patient, diagnosis, length of hospital stay, level of dependency, expected outcomes, variable resource availability for example varying number of nursing care providers, staff mix, supplies, equipment, information, education, technology and leadership support, the changing use of clinical and non clinical technology to care of patient and has the largest percentage of new nurses (Mangold, Martin, Michaels, Rapley, Seitz & Simpson (2008); CIHI, 2007).

There are several studies about error in medication have been done in Malaysia (Raja Lope, Boo & Rohana, 2009; Chua, Tea & Rahman, 2009). Based on the studies, the most types of error identified were wrong time, wrong administration techniques and wrong drug error. While, intravenous routes were more likely to be associated with an administration error than oral routed and the most common drugs error is cardiovascular drugs (Chua et al., 2009).

HUSM is one of the important teaching hospital in Malaysia. Based on a study, medication error in teaching hospital had substantially increases in medication error overtime, due to communication and coordination problems with nursing staff as compared to other hospital (Mark & Belyea, 2009). Nurses in a teaching hospital had claimed that error occur in each 1 per 100 drug administration and excess workload as the main factor contribute to the medication administration error (Demehin, Babalola & Erhun, 2008). Hence, frequency and factor associates with medication error which perceived by registered nurses have to be identified in order to prevent the incidence of medication administration error.

Medication administration is one of the vital practices in clinical nurses' roles. Yet, majority of medication errors are committed by registered nurses identified by Ross, (2000) (Cited in Raja Lope, Boo & Rohana, 2009) This is due to the nurses' violated the 5 Rights principles of administering medications (Raja Lope et al., 2009; Jones & Treiber, 2010). Nurses must comply with this standard to avoid from any error in administering medication. In Malaysian study, nurses were being observed whether they followed the 5 Right principles of administering medication without their awareness. As a result, nurses still did not adhere to the 5 Rights and 31% errors were identified from the observation (Raja Lope et al., 2009).

Although many preventive measures have been done, incidence of medication error is still increasing. The violation of the 5 Rights principle by nurses still occurs. Hence, it was important for this study to be done in order to determine nurses' perception about medication administration error in surgical wards at HUSM.

Theory of goal attainment by Imogene King was utilized in order to explain the conceptual framework about nurses' perception on medication administration error

presented in this study. The conceptual frameworks were adapted from Demehin, Babalola & Erhun, 2008 and Wilkins and Shield (2008).

1.3 Objectives of the Study

The general objective of this study was to determine nurses' perception of medication administration error (MAE) at surgical wards in HUSM.

1.3.1 Specific Objectives

- i. To determine nurses' perception of medication administration error (MAE) at surgical wards in HUSM.
- ii. To determine the differences in nurses' perception towards role overload between surgical wards in HUSM.

1.4 Research Questions

- i. What is nurses' perception on medication administration error (MAE) at surgical wards in HUSM?
- ii. Is there any significant difference in nurses' perception towards role overload between surgical wards in HUSM?

1.5 Hypothesis

Ho: There is no significant difference in nurses' perception towards role overload between surgical wards in HUSM.

Ha: There is a significant difference in nurses' perception towards role overload between surgical wards in HUSM.

1.6 Definition of Terms (Conceptual/ Operational)

Medication administration error

Based on the American Society of Hospital Pharmacists (1993), medication administration errors were defined to be present whenever there was an omission error, an extra dose given, wrong preparation of a medication, incorrect dose given, incorrect drug given, deteriorated drug given or if a drug was given via the wrong route, wrong rate or at the wrong time.

Nurses' perceptions

King (1981) defined perception as a process of organizing, interpreting and transforming information from sense data and memory. A perception is an awareness of people, objects and events. Perceptions vary from person to person because different people perceived different things about the same situation. Perception is an important variable to influence ones behavior. Individual needs, values, beliefs and self concept are important in determining how individuals view their life space or surrounding. In the concept of nursing perception, there are many factors that may influence perception. Factors that are proposed by King are biological aspect, past experiences, socioeconomic groups and level of education.

Nurses' perception of medication administration error

Nurses' perceptions of medication administration error in this study referred to the perception of nurses towards medication administration error problems. The perceptions comprised of six dimensions including (1) nurses' awareness, (2) types of medication administration error, (3) estimation frequency, (4) factor occurrence, (5) strategies to reduce and (6) role overload.

Questions on nurses' awareness about medication administration error were measured by using dichotomous question and nurses choose either "yes" or "no". Question on types of error, estimation frequency of error, factor occurrence and strategies to reduce medication administration error were measured by using close ended question. The questionnaire was adapted from Demehin, Babalola and Erhun (2008).

Nurses' perception of role overload was measured by using a 5-point Likert-scale questionnaire. The questionnaire was adapted from Wilkins and Shields (2008).

1.7 Significance of the Study

The proposed study can contribute to nursing practice and nursing administration. From the finding, it has created awareness among nurses on the importance of giving medication by adhering to the 5 Rights techniques. The information will be used as a guideline in providing correct technique in administering medication to patient. This study will provide valuable information about types, factor, frequency and strategies to reduce medication error. This will be important indicator for assessment in the quality of care provided. The result will be used as a baseline to develop friendly medicating environment in the ward. From the finding, role overload among nurses can be identified and hence the information will be used to achieve the effectiveness of the management in health care institution.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Medication administration is one of the vital practices in clinical nurses' role. Medication administration by the nurse is one part of a process that also involves doctors and pharmacists (Betz & Levy, 1985). Institute of Medicine (1999) estimated that more than 1.5 million people are harmed each year by medication errors and in hospitals "a typical patient would be subject to one administration medication error per day."

2.2 Medication

Medication is a product that contains a compound with proven biological effects, plus excipients, or excipients only. It may also contain contaminations, the active compound is usually a drug or pro drug, but maybe cellular elements (Aronso & Ferner, 2005). Berman, Synder, Kozier & Erb (2008) defined medication as a substance administered for the diagnosis, cure, treatment, or relief of a symptom or for prevention of disease. In United States, and Canada, medications are usually dispensed on the order of physician and dentist. Physician will write a prescription of medication and nurses will prepare and administer the drug. The administration of medications is a vital and valued aspect of nursing practice (Cheek, 1997).

Kozier and colleges (2008) had enlisted several process of administering medication. When administering any drug, regardless of the route of administration, the nurse must do

the following, identify client names, registered number, photograph or telephone number. Some hospitals use bar code technology scans for medication administration. Moreover, nurses should explain the purpose, explain the drug and any side effect that might occur after administering the medication.

Nurses must administer medication in the prescribed dosage, by the route ordered, at the correct time. These are the important aspects of medication administration for nurses to check each time a medication is administered. These are referred to as the 'Rights'. There are 5 Rights to medication administration. More rights have been added over the last few years with the latest is ten rights (Przybycien, 2005) Cited in Kozier and colleagues (2008). The ten rights include, give right medication to the patient and give right dose which mean appropriate dose for patient. Double check and know the usual dosage range of the medication. Then, administer the medication in the right frequency and at the time ordered. Medications given within 30 minutes before or after the scheduled time are considered to meet the right time standard. Give the medication by the ordered route and make certain that the route is safe and appropriate for the client. Give medication to the intended patient and check name along with registered number with each administration of a medication. Provide client with right education by explaining information about the medication to the client. After administer the medication, provide right documentation and also give right for patient to refuse any medication given. Nurses' role is to ensure that the patient is fully informed of the potential consequences of refusal. Furthermore, provide right assessment prior to administration (apical pulse, blood pressure). Lastly, conduct a right evaluation or follow up after administering the medication.

Nurses who administer the medication are responsible for their own action. It is a common and complex task that requires extensive knowledge and skill to perform correctly,

which is fundamental to most branches of nursing (Jones & Treiber, 2010). These are several guidelines in administering medication as proposed by Kozier and Erb (2008). Nurses need to be knowledgeable about medication and take special precaution when administering a medication. It is important to have another nurse check on dosages of drug before administering to patient. When a medication is omitted for any reason, record the fact together with reason. It is crucial for nurses to report immediately to the nurse in charge if medication error is made.

2.3 Medication Error

Kohn, Corrigan and Donaldson (1999) defined error as a failure to complete a planned action as intended, or the use of an incorrect plan of action to achieve a given aim. 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 (Aronso & Ferner, 2005). Medication errors result from the interaction of multiple factors that include regulatory environment, organizational leadership and commitment, management policies and procedures, complexity of tasks involved, work culture, and physical environment (Chaudhury, Mahmood, & Valente, 2009).

Table 2.1: Type of medication error (ASHP Guidelines, 1993)

Type	Definition
Prescribing error	Incorrect drug selection (based on indications, contraindications, known allergies, existing drug therapy, and other factors), dose, dosage form, quantity, route, concentration, rate of administration, or instructions for use of a drug product ordered or authorized by physician (or other legitimate prescriber); illegible prescriptions or medication orders that lead to errors that reach the patient.

Omission error	The failure to administer an ordered dose to a patient before the next scheduled dose, if any.
Wrong time error	Administration of medication outside a predefined time interval from its scheduled administration time (this interval should be established by each individual health care facility).
Unauthorized drug error	Administration to the patient of medication not authorized by a legitimate prescriber for the patient.
Improper dose error	Administration to the patient of a dose that is greater than or less than the amount ordered by the prescriber or administration of duplicate doses to the patient, i.e., one or more dosage units in addition to those that were ordered.
Wrong dosage-form error	Administration to the patient of a drug product in a different dosage form than ordered by the prescriber.
Wrong drug-preparation error	Drug product incorrectly formulated or manipulated before administration.
Wrong administration-technique error	Inappropriate procedure or improper technique in the administration of a drug.
Deteriorated drug error	Administration of a drug that has expired or for which the physical or chemical dosage-form integrity has been compromised.
Monitoring error	Failure to review a prescribed regimen for appropriateness and detection of problems, or failure to use appropriate clinical or laboratory data for adequate assessment of patient response to prescribed therapy.
Compliance error	Inappropriate patient behavior regarding adherence to a prescribed medication regimen.
Other medication error	Any medication error that does not fall into one of above predefined categories.

2.4 Nurses' Perception on Medication Administration Error

Medication administration errors are common problems in hospital. Many studies revealed that medication administration error did happen in every different setting in hospital. A study conducted on three surgical wards at a teaching hospital in Australia to determine their prevalence and variables that caused medication administration error (Han,

Coombes & Green, 2005). From the study, 687 observations of medications were made and observed by the experienced intensive care nurse. Researchers identified that error occurred 18% or in almost one fifth of continuous IV infusions administered to patients. Wrong administration rate was the most common type of error, and its occurrence could be significantly reduced by use of an IV infusion control device. While Taxis and Barber (2003) suggested that nurses were aware about the error but did not consider it to be clinically significant and concluded that use of infusion control devices and educational training would prevent rapid administration of bolus doses.

Hoddinott, Gowdey, Coulter and Parker (1967) did an observational study on medication administration error in a medical ward. Their medication chart were studied to detect errors in drug administration and after 59 days of observation, researchers found that there were 23 errors were detected in 20 patients that is 19% of all patients in this study. One of these errors was an overdose of digoxin. Hoddinott claimed that errors in drug administration may occurred when nurses were misreading the doctors order, misinterpret and faulty recording of the doctor's orders.

Lisby, Nielsen and Mainz (2005) did a cross-sectional study using three methods to detect errors in the medication process which were direct observations, unannounced control visits, and chart reviews. The study was conducted at randomly selected medical and surgical ward at one of the hospital in Denmark. The purpose of the study was to perform a systematic and detailed investigation of the frequency, type, and potential clinical consequences of medication errors in more stages of the medication process, including discharge summaries. In total 2467 opportunities for errors, 1067 (43%) errors were detected. None of the errors affected the patients' health but one-fifth was assessed as being potentially serious or fatal in a worst case scenario. The numbers of opportunities for

errors in the medical ward was 44 and in the surgical ward 29. There were no significant differences between the medical and surgical wards.

Calabrese, Erstad and Brand (2001) did an observational study in five ICU wards in United States which contained 851 patients over 3 months. Researcher identified that there were 3.3% of medication administration error occurred. Likewise, Sinopoli, Needham and Thompson (2007) in their study, reported that medication errors were more frequent in medical ICUs (13%) than in surgical ICUs (96%). However, in critical care unit, the frequency of medication prescription errors (54%) was higher than medication administration error (46%).

Pham, Story, Hicks, Shore, Morlock, Cheung, Kelen and Pronovost (2008) did a study to determine the frequency, types, causes, and consequences of voluntarily reported Emergency Department medication errors in the United States. The researcher then identified that there were 88 error reports per 100,000 visits. The highest percentage of errors (42%) occurred during the 3:00 p.m.–11:00 p.m. shift and on Mondays (16.5%). Physicians were accountable for 24% of errors while nurses for 54%. Errors most often originated in the administration phase of the medication use process (36%) and improper dose or quantity accounted for 18% of the errors. Nevertheless, errors that most commonly occurred in Emergency Department were administration phase which is 36% where prescribing error was the second highest which was 29% (Pham et al., 2008).

In NICU, nurses were monitored by third-year medical students on their adherence to the 6 Rights principles of medication administration (Raja Lope, Boo, Rohana and Cheah, 2009). Nurses did not aware that they were being observed at that time. Results shown that the most common steps omitted were having a witness during drug administration (94.7%), labeling of medication (88.3%), and checking prescription charts against patients'

identification immediately before medication administration (84.6%) and visually inspecting a patient's identification tag (70.7%). Whereas medication administration errors occurred in 31% (59/188) of the observed doses administered. Of these errors, 100% were due to medication given at the wrong time.

There are several factors that associated with medication administration error. Several studies revealed that calculation error in intravenous infusion is associated with many medication administration errors (Cowley, Williams and Cousins, 2001; Wirtz, Taxis & Barber, 2003). Yet, poor calculation skills of nurses, along with reports of medication errors in practice, appear to have fuelled the concern regarding calculation skills and led to an assumption that increased medication administration errors are the result of nurses' poor calculation skills (Wright, 2009).

Whereby, the top 10 causes of pediatric errors identified by US Pharmacopeia were performance deficit, procedure or protocol not followed miscommunication, inaccurate or omitted transcription, improper documentation, drug distribution, system error, knowledge deficit, calculation error, computer entry error and lack of system safeguards (Crowley, Williams & Cousins, 2001). Provide a suitable work environment for safe, effective drug preparation and provide an adequate number of nursing and pharmacy staff trained to prepare, dispense and administer medication to children (Crowley et al., 2001)

The most commonly cited causes of medication errors in Emergency Department were not following proper procedure/protocol (17%) and poor communication (11%). The most commonly cited contributing factors were distractions (7.5%), emergency situations (4.1%), workload increase (3.4%), and inexperienced staff (3.1%). Workload factors have been shown to affect the rate of medication errors (Leape, Bates & Cullen, 1995; Roseman & Booker, 1995).

Raju, Kecskes, Thornton, Perry & Feldman (1989) in their study revealed that more medication errors occurred during day shift than during the other two shifts. Researchers suggested that this may be due to the large number of written prescriptions and was administered during day shift. However, Markowitz, Pearson, Kay and Loewenstein (1981) claimed that nurses on the day shift had a better knowledge of drugs than the other two shifts. 36.8% of drug errors in day shift were associated with wrong drug, wrong dose and preparation technique while only 17% occur on evening and night shift and that were due to wrong time, rate and administration technique.

2.5 Nurses' Perception on Medication Administration Error and Related Factor

The literatures have found that nursing is the profession that is prone to detect a medication administration error, and not pharmacy (Kohn, Corrigan & Donaldson, 1999). There is 1 per 100 drug administration error made by nurses and such error was administration of incorrect drug (65%), administration of wrong dose (63%) and wrong time (57%) (Demehin, Babalola & Erhun, 2008).

Factors such as heavy workload, length time and shift length were the leading factor contributed to dispensing error and administration error (Demehin et al., 2008; Wilikins and Shields, 2008; Roseman & Booker (1995) and Leape, Bates & Cullen, 1995). Workloads do not only become a burden among nurses but also in other profession. Roseman & Booker (1995) examined the effect of nine workload factors and seasonal changes in on medication errors. Staffing levels, number of patient and medication error data was collected at 140 beds in hospital over 5 years period. Errors increased with the number of patients' days per months and the number of shifts worked by temporary staff. Errors decreased with the amount of overtime worked by permanent nursing staff. The researches

suggest that the positive effect of overtime on medication errors may be due to the degree in which experienced staff worked rather than temporary staff. This study indicates that workload and staffing levels do influence medication errors.

Although patients are the obvious victims of medication administration errors, nurses are also affected and they along with other members of the healthcare team are the second victims in this situation (Wu, 2000). Schelbred and Nord (2007) conducted in depth interviews with 10 nurses who had involved in a medication administration error incidence (e.g. 10 times the prescribed dose of morphine). The aim of this study was to describe the experience of nurses who had committed serious medication error and to investigate the support mechanism needed after committing such error. Schelbred and Nord (2007) stated, nurses who did error in drug administrations have fear of making new mistakes, decrease trust on themselves, a need to be checked up on and had sleeping problems and two participants had considered committing suicide. Apart from the 10 participants, none considered not reporting the error. The participants preferred talking about the error with health care professionals, feeling that friends and family who were not members of the health care team lacked of understanding of what they had gone through.

2.6 Conceptual Framework

According to King (King, 1981), perception is “a process of organizing, interpreting and transforming information from sense data and memory. Perception is an awareness of people, objects and events. It involves process of human transaction with the environment. Perception is each person’s representation of reality. King proposed that perception is an important variable in influencing individuals’ behavior. Individuals grow and develop

through the life span, experiences with changes in structure and function of their bodies over time influence their perceptions of self.

In the concept of nurses' perception, there are many factors that may influence these perceptions. The factors are biological aspect, past experiences, socioeconomic groups and level of education. In this study, nurses' perception might be different due to past experience, level of education and work environment. Hence, this study is centrally focused on the 6 dimensions of nurses' perceptions towards medication error administration.

In this study, researcher conducted a study in order to determine nurses' perceptions on medication administration error at surgical wards in HUSM. Nurses' perception in this study were divided into (1) awareness towards medication administration error, (2) types of error, (3) estimation frequency of medication administration error, (4) factor of occurrence, (5) strategies to reduce medication administration error (6) role overload.

The awareness on medication administration error at surgical wards was studied by using a dichotomous question. The question asked whether they were aware of the occurrence of error in medication administration. Respondent choose either 'yes' or 'no' for the answer. The nurses' awareness on medication error was identified.

Apart from awareness, nurses' perceptions on types of the error that usually occur in the institution were studied. The instrument was built with several types of error which were 'wrong drug', 'wrong dose', 'wrong time', 'wrong route' and 'drug administered to the wrong patient'. These types of error were developed from 5 Rights techniques of administering medication. Nurses' perception on estimation of medication administration error frequency was studied. The frequency of occurrence was determined by '1 per 10 drug administration', '1 per 100 drug administration', '1 per 1000 drug administration', '1

per 10000 drug administration', '1 per 100000 drug administration' and 'do not know the frequency of occurrence'.

The factor occurrences of error in medication administration were studied and the instrument contained nine possible causes of medication administration error. There were, excess workload, inexperienced staff, inadequately trained staff, sleep deprivation, unfamiliarity with a nursing unit (e.g. medication trolley), distractions and interruptions during medication administration process, similar medication names, lack of data concerning patient (e.g. patient name, age, weight, height) and wrong labeling (e.g. medicine, patient name). 75% nurses in a study done by Cohen, Robinson and Mandrack (2003) agreed that medication administration error occurred due to neglecting to follow the 5Right of medication administration. Whereas the top five reason of medication administration error stated by Cohen et al. (2003) were distractions and interruptions during medication administration, inadequate staffing and high nurse/patient ratios, illegible written medication orders, incorrect dosage calculations and similar drug names and packaging.

Next, was nurses' perception on strategies to reduce medication administration error. Items used were, 'more nurses should take part in administering medications', 'a superior or more experienced nurse should double check dispensed medicines before drugs are administered', 'there should be adequate orientation and familiarization with a new nursing unit (e.g. medication trolley, patient bed)'. 'nurses should concentrate when dispensing and avoid all forms of distractions', 'all professionals involved in medication delivery (e.g. nurses, pharmacists and physicians) should be more cooperative with one another', 'continuous professional education and re-training of all nurses in the right way of administering medication is vital as to ensure strict observance of the '5 Rights' of drug

administration', 'self-reporting of medication administration errors should be encouraged' and 'there should be adequate commendation and reward for nurses with no record of medication administration error'. Respondents choose any answers and there were no right or wrong answer in every question.

Perception of nurses towards role overload in surgical wards was determined in this study. Role overload was an index designed to measure the perceived appropriateness of the amount of work to be done in the time available (Wilkins & Shields, 2008). Respondent were asked to rate their level of agreement on a 5-point likert scale. The statements were, 'I often have to arrive early to get my work done', 'I often stay late to get my work done', 'I often have to work through my breaks to complete my assigned workload', 'it often seems like I have too much work for one person to do', 'I am not given enough time to do what is expected of me in my job' and 'I have too much to do, to do everything well'.

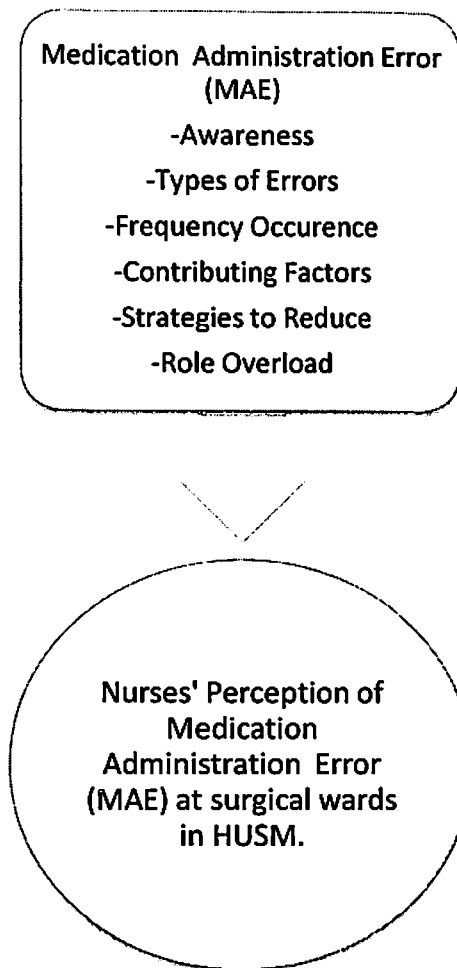


Figure 2.2: Conceptual Frameworks of Nurses' Perceptions on Medication Administration Error (MAE) at surgical wards in HUSM adapted from Demehin, Babalola and Erhun (2008) and Wilkins and Shields (2008).

CHAPTER 3

RESEARCH METHADODOLOGY

3.1 Research Design

Descriptive cross-sectional study was used in this study.

3.2 Population and Setting

The population of this study was nurses in surgical wards at Hospital Universiti Sains Malaysia (HUSM). The surgical wards included 1 Selatan, 2 Utara, 2 Intan, 2 Zamrud, 3 Utara, 4 Selatan, 4 Timur Depan and 4 Utara. From these eight wards, three groups of surgical wards were created for the purpose of analyses which were General surgical wards, Othopedic surgical wards and other surgical wards. Total number of population for this study was 147 as shown in Table 3.1.

3.3 Sample

3.3.1 Sample size

The sample size required for this study was calculated based on Krejcie and Morgan (1970. Cited in Chua 2006). Out of the total number of nurses in surgical wards, calculated sample size was 108. By adding 10% dropout rates to the calculation, the sample size increased to 119 samples. Therefore, total number of nurses in surgical wards achieved the sample size required for this study.

3.3.2 Sampling design

This study used stratified random sampling. Stratified sampling was used to ensure all respondents have an equal chance to be included in the study (Chua, 2006). The formula used to calculate sample size for each ward is as obtained in Table 3.1.

$$\text{Stratified sample size} = \frac{\text{Number of nurses in each ward} \times \text{total calculated sample size}}{\text{Total population}}$$

In random sampling, nurses named were placed in a box and drawn randomly to achieve the targeted sample size calculated in each ward. This procedure was done to ensure all the members in the population had an equal chances of been selected and biasness was avoided (Chua, 2006).

Table 3.1: Total population of nurses at surgical wards in HUSM.

No.	Groups	Wards	Number of staff	Number of subjects
1.	General	3 Utara	23	19
		2 Intan	23	19
		1 Selatan	17	14
2.	Orthopedic	4 Selatan	23	19
		4 Utara	16	13
		2 Zamrud	16	13
3.	Others	4 Timur Depan	14	10
		2 Utara	16	13
		Total	147	120

3.3.3 Inclusion Criterias

- i. Registered nurses
- ii. Work in surgical ward in HUSM
- iii. Both males and females
- iv. Consented to participate in the study

3.3.4 Exclusion Criterias

- i. Registered nurses from other institutional that undergo clinical attachment at HUSM
- ii. Registered nurses who attend courses
- iii. Registered nurses on maternity leave
- iv. Nurse managers including sisters and matrons
- v. Nursing students
- vi. Registered nurses work in other than surgical wards in HUSM
- vii. Refuse to participate in the study

3.4 Instrumentation

3.4.1 Instruments

This study was conducted using self- administered questionnaire comprised of three main parts. Part A was for demographic data, Part B was assessment of nurses' perception of medication administration error at surgical wards in HUSM and Part C was assessment of role overload.

Part A was for demographic data. The assessment of demographic data consisted of six items that identified subjects' age, gender, marital status, level of education and number of year practices. Part B was for assessment on nurses' perception of medication administration error in HUSM. This questionnaire was adapted from Demehin, Babalola