International Journal of Nursing and Health Services (IJNHS)
http://ijnhs.net/index.php/ijnhs/home
Volume 4 Issue 5 October 20th, 2021, pp 500-506
e-ISSN: 2654-6310

Determinant of Medication Administration Error Occurrence From Nurse Aspect At Haji Hospital Makassar

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Article info

***Article history*:**
Received: July 14th, 2021
Revised: August 05th, 2021
Accepted: September 05th, 2021

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DOI:
https://doi.org/10.35654/ijnhs.v4i5.482

Abstract. Introduction: The nurse organizes almost all the medication in the hospital. **Objective:** This study aimed to determine the influence of medication error (administration error) events from nurses at Haji Hospital Makassar in 2017. **Method:** This research was a quantitative research type. The design used was analytic observational with a cross-sectional approach. The purposive sampling technique determines a sample of 101 people. Data were analyzed quantitatively by using statistic analysis of cross-tabulation, chi-square, and then logistic regression analysis. **Result:** The results showed that the prevalence of medication error (administration error) was 166 incidents. Variables of a heavy workload, Personal Neglect, Unfamiliarity with medication, and New Staff influenced medication error (administration error). In contrast, the Complicated Doctor-initiated order, Complicated Order, and Insufficient training variables did not affect the medication error (administration error). And the most significant variable is heavy workload with p value=0.027<0.05 and OR value=0.106. **Recommendation:** It is expected to further research to explore more variables related to medication administration Error at the hospital

Keywords: Nurse-related factor, Medication error (administration error)

INTRODUCTION

The decline in the quality of healthcare is a global problem like medical error, specifically medication errors. The incidence of medication errors (administration error) indicates the achievement level of patient safety (1).

Institute of Medicine (IOM) notes that 44,000 – 98,000 people die in hospitals in America each year due to medical errors, even higher than deaths from motor vehicle accidents, breast cancer, and AIDS (2).

Golden stated that in 2007 at Aultman Ohio Hospital, America, there were 873 incidents in medication errors with medication errors by nurses reaching 462 incidents. The errors were categorized into the wrong patient (28), wrong dose (108), wrong drug (66), wrong time (50), wrong route (19), overdose (45), prescribing by the nurse (102). (3)

Medication errors usually occur during the prescribing and administration stages and may include between 65% and 87% of all medication errors(4).

Recent reports show that prescribing errors lead to 11% of medication errors, while administration errors are responsible for 40% of these errors. In the research, Dwiprahasto stated that 11% of hospital medication errors were related to errors when delivering drugs to patients in the form of the wrong dose of medication(5).

The nurse's responsibility is to prepare medication, administer it to the patient, monitor, evaluate and report the side effects of the drug caused by the medication(6). It is estimated that 40% of a nurse's time is spent on medication preparation and dispensing to patients, so drug administration is a core role of the nurse's career(7).

A patient can receive up to 18 doses per day, and a nurse can manage as many as 50 medications per shift. It puts nurses at the forefront regarding medication administration(8). Even the researchers and experts claim that medication errors should be viewed as a system failure rather than personal incompetence,(9) the reality of individual nurses who became the last bastion to prevent the incidence of medication errors. (10)

The prior research by Fithriyani stated that the incidence of medication errors in the Pharmacy Installation of RSU Haji South Sulawesi Province occurred as many as 57 incidents. The percentage of the highest kind of events that administration errors (wrong drug administration) by 77% (44 incidences)(11).

From the research explanation above, we can conclude that the nurse is the last gate in the chain of drug administration errors so that by knowing the cause of the drug administration errors, we can take precautions to avoid error, with reference to the Ministry of Health regulations that reference percentage of drug administration errors is 0%.

The Medication error data at Haji Makassar Hospital shows that administration error occupies the highest incidence. We need to analyze the determinant of medication administration error occurrence from the nurse aspect at Haji Makassar Hospital.

OBJECTIVE

This study aimed to determine the factor of medication error (administration error) events from the aspect of nurses at Haji Hospital Makassar in 2017

METHOD

Design

This study is a quantitative study using an observational analytic design with a cross-sectional study approach. The population is all nurses at RSU Haji Makassar. The sample was 101 nurses selected by purposive sampling who had met the inclusion criteria. Those who worked in an inpatient unit that served drug administration to patients were willing to participate in this study. And the exclusion criteria in this research were the nurses who are not in place when the research is conducted, and those in are in study assignments/study permits.

Data collection method

Primary data were taken from the results of distributing questionnaires to obtain information about the number of medication errors made by nurses, the effect of a heavy workload, and complicated doctor-initiated orders. Personal neglect, unfamiliarity with medication, insufficient training, complicated orders, and new staff against medication errors (administration errors) in 2017.

Data Analysis

Data analysis used SPSS 16 for the windows program. To examine the effect of the variable heavy workload, complicated doctor-initiated order, personal neglect, unfamiliarity with medication, insufficient training, complex orders, and new staff on the dependent variable medication error (administration error) at RSU Haji Makassar, cross-tabulation and statistical analysis were carried out using Chi-Square by using the degree of confidence $\alpha = 0.05$. Then a logistic regression test was carried out to determine the most influential variables.

RESULTS

Sample characteristics

The analysis results describe the distribution of subjects based on respondent's characteristics (age, gender, and years of service). The age characteristics are dominated by the age group of 25-34 years, as many as 52 people with 51.5%. The lowest one is the age group of > 45 years, as many as six people with a percentage of 5.9%. For gender characteristics, the percentage of the male is 14.9% and 85.1%, female. For the educational characteristics, the education level of Diploma 3 is 52 people with 51.5%. At the same time, the lowest level of education is vocational school category, as many as one people (1%). For the length of work, most respondents have more than 3 years of service, as many as 96 people with 95%. While under the three years are 5 people with a percentage of 5%.

Descriptive Analysis

Based on Table 1, the number of incidents of *medication errors (administration errors)* is 166. The highest types of occurrences are wrong time drug administration as many as 76 events (45.8%), not giving medication 57 events *(* 34.3% *)*, improper dose errors 16 events (9.6 %), Error rate/speed of drug administration 7 *(* 4.2% *)*. Errors in documentation and evaluation of drugs 5 (4.5%), Errors in drug administration routes (3%), and the lowest was medication errors according to instructions, namely 0 percent.

Table 1. Distribution of Types of Medication Errors (Administration Errors)

No	Type of administration error	Total	%
1	Don't give medicine	57	34.3
2	Wrong time administration error	76	45.8
3	Rate/speed of drug administration Error	7	4.2
4	Improper dose error	16	9.6
5	Administration Error according to instructions	0	0
6	Medication route error	3	3.0
7	Wrong Patient	2	1.2
8	Medication documentation and evaluation errors	5	4.5
	Total	**166**	**100**

Bivariate Analysis

The study results in table 2 show a significant effect on a heavy workload, personal neglect, unfamiliarity with medication, and new staff on medication errors (administration errors) at RSU Haji Makassar with each significance value ($p = 0.000$). Then there was no significant effect on complicated doctor-initiated orders on medication errors (administration errors) at RSU Haji Makassar ($p = 0.991$). And there is no significant effect on insufficient training on medication errors (administration error) at RSU Haji Makassar ($p = 0.499$). And there is no significant effect on complicated orders on medication errors (administration errors) at RSU Haji Makassar ($p = 0.355$)

Table 2. Testing the determinant of medication administration errors occurrence from the nurse aspect at Haji Hospital Makassar in 2017

No	Hypothesis	*p*-value	α-value	Information
1	Heavy workload affect the incidence of medication error (administration error) at Haji Hospital Makassar	.000	.05	Hypothesis accepted
2	There is no effect if complicated doctor-initiated order for medication errors (administration error) occurrence at Makassar Hajj Hospital	. 991	.05	Hypothesis rejected
3	Personal neglect affect the incidence of medication error (administration error) occurrence at Haji Hospital Makassar	.000	.05	Hypothesis accepted
4	Unfamiliarity affect medication for medication errors (administration error) occurrence at Haji Hospital Makassar	.000	.05	Hypothesis accepted
5	There is no effect of insufficient Training on medication errors (administration error) occurrence at Makassar Hajj Hospital	.499	.05	Hypothesis rejected
6	There is no effect of Complicated order on medication errors (administration error) occurrence at Makassar Hajj Hospital	.355	.05	Hypothesis rejected
7	Unfamiliarity affect medication errors (administration error) occurrence at Makassar Hajj Hospital	.000	.05	Hypothesis accepted

Note : Chi Square test significance $\alpha = 0.05$

Table 3. Hypothesis Testing for the Most Influential Variables on the Incidence of Medication Error (administration error) at Haji Hospital Makassar in 2017

No	Variable	Sig.	Exp(B)	Information
1	Heavy workload	0.027	0.106	The most take effect
2	Personal Neglect	0.022	0.075	
3	Unfamiliarity with medication	0.013	0.067	
4	New Staff	0.01	0.072	

Note: Logistic Regression

Multivariate Analysis

The results in Table 3 show that the most dominant and significant independent variable affecting the *medication error (administration error)* variable at RSU Haji Makassar is the Heavy variable workload (Exp(B) = 0.106).

DISCUSSION

This study showed that heavy workload, personal neglect, unfamiliarity with medication, and new staff affect the incidence of medication errors (administration errors) at Haji Hospital Makassar, and the most influential variable was heavy workload.

Al-Sarwan stated that the leading cause of medication errors (administration errors) is a heavy workload(12). Workload also affects the performance of nurses. According to Ball, one factor that influences the risk of error is the workload that is not in accordance with the available staff/nurses(13). Meanwhile, according to Armstrong, the nurse's workload is an indicator that results in medication errors(14).

Ilyas said that the high workload of nurses leads to fatigue and exhaustion. Furthermore, fatigue occurs when nurses work more than 80% of their working time. Then, it can contribute to personal negligence due to a lack of concentration in carrying out duties as a nurse (15).

Personal neglect occurs because work fatigue due to a high workload is the first cause of medication errors(16). However, NikPeyma's research found that mental and physical exhaustion was reported as the third leading cause of medication errors(17).

The results showed that some medication errors, such as rapid injection of drugs that had to be injected slowly and not paying attention to medications that required more attention than others, were more common among nurses(16). As in Haw et al. on a number of the most common medication errors, fatigue due to high workloads was the most important cause of medication errors(18). Fatigue appears as a particularly chronic sense of pressure from high-workload(19).

Lack of knowledge of the drugs is another contributing factor to current and previous studies(20). In a systematic analysis of a prospective cohort study of 264 preventable AMEs, failure to disseminate drug knowledge was a significant problem(21).

Lack of knowledge seems to be a persistent problem. Leape et al. conducted a qualitative study to identify system failures that underlie medication errors. Nurses, doctors, and pharmacists involved in medication errors were interviewed. The results showed that the most common system failure was a lack of knowledge of the drug, accounting for 29% of the 334 errors in six months. In particular, the drug administration by nurses, lack of knowledge accounts for 15% of the problems(21).

Experience for new employees contributes to the occurrence of medication errors. Nurses considered their mistakes to be related to those who had just graduated(22). Recent graduates have limited work experience. They may not recognize high-risk situations or medications like potassium chloride (KCl) and chemotherapeutic agents(8). Chemotherapy nurses also reported that lack of experience was the main reason for their medication errors(23).

A 1992 study by Walters described the accuracy of nurses' ages, years of experience, and years of hospital work due to occurrence and reporting of medication errors. A questionnaire on medication errors was administered to 334 nurses attending an in-service education program for medication administration, and 284 nurses responded. Nurses above 35 years reported making fewer mistakes than those below 35 years(24).

In this study, the variables of complicated doctor initiated-order, insufficient training, and complicated orders did not affect the incidence of medication errors (administration errors) at RSU Haji Makassar.

Medication errors are caused by external (environmental) and internal (personal) factors from the nurse. External (environmental) factors here mean it can be

caused by demands from the hospital that require nurses/hospital staff to implement a patient safety program at all times consistently. According to procedures as a follow-up to safety for patients, families, nurses, and the hospital itself to maintain the quality of service(25). This can be seen from the patient safety education and training held by the Hajj Hospital to staff who become health workers at the Hajj Hospital.

And also, good communication between doctors and nurses, the instructions given can be understood both in writing and orally, as Hariyanti and Primawestri stated that good communication would affect a person's performance. In line with these studies, studies have shown that 70% of medical error incidences can be reduced through interactions between teams in hospital settings. Patient safety experts agree that communication and cooperation factors in other units, such as mutual support and assistance, can prevent and reduce medical errors(26). The Joint Commission International underlines the importance of promoting cooperative behavior within units and improving suitable communication between officers, which helps prevent mistakes (27).

CONCLUSION

We conclude that from seven nurse-related factor variables, four variables affect the incidence of medication errors at Haji Makassar Hospital: heavy workload, personal neglect, unfamiliarity with medication, and new staff. Three variables have no relationship, namely complicated doctor initiated-order, insufficient training, and complicated order due to individual factors of nurses themselves and environmental factors, as well as good communication between doctors and nurses. Efforts to improve the quality of human resources should have more attention and constantly periodically enhance the knowledge of nurses related to treatment so that the incidence of medication errors can be prevented.

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