Types and causes of medication errors from nurse’s viewpoint

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ABSTRACT

Background: The main professional goal of nurses is to provide and improve human health. Medication errors are among the most common health threatening mistakes that affect patient care. Such mistakes are considered as a global problem which increases mortality rates, length of hospital stay, and related costs. This study was conducted to evaluate the types and causes of nursing medication errors.

Materials and Methods: This cross-sectional study was conducted in 2009. A total number of 237 nurses were randomly selected from nurses working in Imam Khomeini Hospital (Tehran, Iran). They filled out a questionnaire including 10 items on demographic characteristics and 7 items about medication errors. Data were analyzed using descriptive and inferential statistics in SPSS for Windows 16.0.

Results: Medication errors had been made by 64.55% of the nurses. In addition, 31.37% of the participants reported medication errors on the verge of occurrence. The most common types of reported errors were wrong dosage and infusion rate. The most common causes were using abbreviations instead of full names of drugs and similar names of drugs. Therefore, the most important cause of medication errors was lack of pharmacological knowledge. There were no statistically significant relationships between medication errors and years of working experience, age, and working shifts. However, a significant relationship was found between errors in intravenous injections and gender. Likewise, errors in oral administration were significantly related with number of patients.

Conclusion: Medication errors are a major problem in nursing. Since most cases of medication errors are not reported by nurses, nursing managers must demonstrate positive responses to nurses who report medication errors in order to improve patient safety.

Key words: Medicinal errors, nursing profession, reporting, safety

INTRODUCTION

Errors are an integral part of human life. Many errors originate from the natural process of cognitive and behavioral adaptations which develop the correct behavioral skills.[1] Execution of medical orders is an important part of healing process and patient care. It is also the main component of nursing performance and has a prominent role in patient safety.[2‑5] Medication errors can significantly affect patient safety and treatment costs and result in hazards for patients and their families.[6]

Giving medicine is probably one of the most critical duties of nurses since the resulting errors may have unintended, serious consequences for the patient.[7,8] Medication errors can lead to adverse outcomes such as increased mortality, increased duration of hospitalization, and increased medical expenses.[9,10] Although medication errors can be caused by all members of health care team, nursing medication errors are the most common.[11,12] The reason is that nurses execute the majority of medical orders and spend about 40% of their time in the hospital to administer medicines.[13] The rates of nursing medication errors are high in both developed and developing countries.[9‑14] Studies have shown that almost one-third of medicinal complications are due to medication errors.[6] According to previous research, thousands of Americans die due to these errors every year. The financial costs associated with these medical complications have been estimated as $77 million annually.[3] Studies have suggested medication errors to prolong hospital stay by 2 days and to increase costs by $2000‑2500 per patient. Inappropriate use of drugs can impose additional hospitalization costs due to adverse medicinal effects and not receiving the required medication.[15] It is difficult to obtain accurate statistics of medication errors since previous studies have indicated that
Materials and Methods

This cross-sectional descriptive study was conducted in 2009. Participants were randomly selected from nurses with a bachelor’s degree in nursing who were working in Imam Khomeini Hospital Complex (affiliated to Tehran University of Medical Sciences, Iran). The inclusion criteria were appropriate physical and mental health status, having at least 6 months of working experience, and willingness to participate. The protocol of the study was approved by the research deputy of the mentioned hospital. On explaining the objectives of the study and reassuring the confidentiality of the collected information, 237 nurses consented to participate.

Data collection tool was a self-made questionnaire which had been prepared and adjusted based on literature review.[17-20] The questionnaire contained 10 questions about demographic characteristics and 7 specific items about medication errors (types, causes, the most common method, etc.). Nurses with more than one case of medication error had to select only one item. The content validity of the questionnaire had been established by literature review and opinions of experts. The reliability of the questionnaire had been approved by test–retest method (r = 0.9). The questionnaires were anonymous and often filled out by the participants. Data analyses were performed by descriptive statistics (tables, graphs, mean, and standard deviation) and inferential statistics. SPSS for Windows 16.0 (SPSS Inc., Chicago, IL, USA) was used in this study and P values less than 0.05 were considered significant.

Results

Most nurses were females (67.08%), under 30 years old (51.05%), and married (62.02%). More than half of the participants were contract nurses (54.85%) and worked in rotating shifts (71.3%). Moreover, 55.69% of the subjects were working in internal medicine wards and 63.35% of them overworked in one or more hospitals. More than one-third of the participants (43.45%) had attended courses on drug administration.

While a great number of nurses (64.55%) reported medication errors, 31.37% of them reported to be on the verge of a medication error. In addition, 39.86% of the errors had been committed only once. The mean incidence of medication errors for each nurse during the 3-month period of the study was 7.4.

The most common types of reported medication errors were inappropriate dosage and infusion rate [Figure 1]. The most common causes of medication errors were using abbreviations (instead of full names of drugs) in prescriptions and similarities in drug names. Therefore, the most important cause of medication errors was lack of adequate pharmacological information [Tables 1 and 2].

Most medication errors (60.78%) had been made in intravenous injections of drugs. There were no statistically significant relationships between medication errors and years of working experience, age, and working shifts. However, a significant relationship was observed between frequency of errors in intravenous injections and gender. A significant relation was also found between errors in oral drug administration and number of patients.

Discussion

We found 64.55% of the nurses to have experiences of medication errors. In addition, 39.86% were not repeated. The mean number of medication errors committed by each nurse during the 3-month period of the study was 7.4. In Jordan, Mrayyon et al. reported that at least 42.1% of nurses had committed one medication error and within 3 months. They calculated the mean number of errors of each nurse as 2.2.[11] Lisby et al. performed a study in the hospitals of Denmark and found the rate of nursing medication errors to be lower than what we found.[21] This considerable
of awareness and the route of administration to have a significant role in the incidence of medication errors.\textsuperscript{[27]} In contrast, Stratton \textit{et al.} reported that only 5\% of the nursing staff considered lack of knowledge as an effective factor on the incidence of medication errors.\textsuperscript{[5]} Numerous studies have indicated medication errors to be the result of lack of in-service training and inadequate knowledge of nursing graduates.\textsuperscript{[28,29]} Many researchers have recommended increasing pharmacological knowledge of nurses as a strategy to reduce serious medication errors. Therefore, nurses are required to update their knowledge about medicines, especially new drugs.\textsuperscript{[30]}

The results of this study showed that the most common errors were associated with infusion rate and dosage of medicines. In a study in Brazil, the most common types of medication errors were wrong dosage and forgetting to administer medicines.\textsuperscript{[31]} In a study on the incidence of medication errors among British and American nurses, Dean \textit{et al.} concluded that the most common medication errors were medicine elimination, wrong dosage of medicine, and giving medications without a doctor’s prescription.\textsuperscript{[32]} Port \textit{et al.} conducted an observational study on administration of medication to 336 patients. They detected 485 nursing medication errors including wrong time (36\%), wrong method (19\%), wrong dosage (15\%), and administration of drug without a doctor’s prescription (10\%).\textsuperscript{[33]}

Our participants stated inadequate number of nurses compared to the number of patients to be among the causes of medication errors. In Saudi Arabia, Dibbi \textit{et al.} showed that human factors were the most common causes (46.5\%) of the incidence of medication errors.\textsuperscript{[34]} Stratton \textit{et al.} introduced low nurse to patient ratio as the main cause of medication errors.\textsuperscript{[5]} Various studies on the viewpoints of nurses about medication errors have reported crowded and noisy environment, tiredness, lack of adequate support, carelessness, increased workload, and being novice as the most important factors in the incidence of medication errors, particularly in intensive care units.\textsuperscript{[35]}

Obviously, it is absolutely impossible to eliminate all medication errors. However, the role of nursing administrators in reducing and preventing these errors is vital. Although most medication errors can be minor and may not harm the patients, they need more supervision and planning. Reporting medication errors is an ethical duty to maximize the benefits of patient care. It can thus improve patient safety and health. Therefore, managers should have a positive attitude toward the reporting of medication errors by nurses. They should in fact consider error reporting as an opportunity to understand the causes of errors. They will consequently be able to analyze cause and effect relations to establish better policies to prevent errors.

\begin{table}[h]
\centering
\small
\begin{tabular}{|l|l|}
\hline
Factors affecting the incidence of medication errors & Number & Percentage \\
\hline
Large variety of drugs in the medicine cabinet & 19 & 12.41 \\
Using acronyms of names & 62 & 40.52 \\
Similar names with some other medications and drugs & 52 & 33.98 \\
Using some drugs in the rare cases & 7 & 4.57 \\
Different medicinal dosages & 13 & 8.49 \\
\hline
\end{tabular}
\caption{Frequency distribution of medical factors affecting the incidence of nursing medication errors}
\end{table}

\begin{table}[h]
\centering
\small
\begin{tabular}{|l|l|}
\hline
Types of managerial and human factors & Number & Percentage \\
\hline
Too busy and tired from excessive work & 20 & 13.07 \\
Few number of nurses compared to the number of patients & 38 & 24.83 \\
Inadequate training of the staff & 23 & 15.03 \\
Lack of pharmacological knowledge & 49 & 32.02 \\
Incorrect medicinal calculations & 9 & 5.88 \\
Illegible data card & 3 & 1.96 \\
Illegible prescriptions & 12 & 78.84 \\
\hline
\end{tabular}
\caption{Frequency distribution of managerial and human factors affecting the incidence of nursing medication errors}
\end{table}
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