



Iranian nurses' medication errors: A survey of the types, the causes, and the related factors



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ABSTRACT

Background and objectives: Medication errors in hospitals are a major cause of the errors that disrupt the healthcare system. The aim of this study is to assess nurses' medication errors and the related factors.

Material and methods: This is a cross-sectional descriptive analytical study on 225 nurses in various hospitals, selected through the multistage random sampling. Data were collected using a five-part researcher-made tool, and a demographics, medication error, and related factors questionnaires. Data were analyzed by descriptive statistics, Kruskal-Wallis, and One-way analysis of the variance.

Results: Based on the results obtained, giving drugs to patients later or earlier (55.6%), giving multiple oral medications together irrespective of their interactions (36%), and administering the postoperative analgesic without a prescription (34.2%) constituted nurses' medication errors. In addition, factors such as low nurse-to-patient ratio (57.3%), high load functions (51.1%), and fatigue caused by the extra work (40.4%) were the most important factors affecting the incidence of medication errors. Fear of legal consequences (40%) was the most important factor in nurses' reluctance to report medication errors.

Conclusions: Medication errors are caused by various, disparate factors. Strategies proposed in order to reduce medication errors include increasing the number of nursing staff and modifying their workload, effective management, increasing nurses' knowledge in terms of drug administration and encouraging nurses to report medication errors in order to prevent their occurrence and promote patient safety. A safe reporting environment that encourages staff engagement to identify contributory factors, as well as possible solutions, must also be fostered.

1. Introduction

Medication errors are one of the most common causes of unintended harm to patients. They contribute to adverse events that compromise patient safety and result in a large financial burden to the health service (Cloete, 2015; Cheragi, Manoocheri, Mohammadnejad, & Ehsani, 2013). A medication error is defined as any avoidable event that may lead to an inappropriate use of medicinal products or adverse effects in the patient. Medication error is a multifactorial phenomenon and complex in nature. Errors can occur at any stage of the process of preparing and distributing medication and may be related to the performance of healthcare workers, medicinal products, the system, and processes such as prescribing, order communication, labeling, packaging, nomenclature, compounding, dispensing, distribution,

administration, education, monitoring, and use (Lisby, Nielsen, Brock, & Mainz, 2010; Roughead, Semple, & Rosenfeld, 2013). Some medication errors can cause major problems and lead to increased mortality, increased duration of hospitalization as well as increased medical expenses (Cheragi et al., 2013). In addition, medication errors result in patients' distrust and dissatisfaction with healthcare provider systems, stress and moral conflicts for nurses, negative impact on organizations, and the decrease in the quality of care services (Anitha, Mamatha, Raghuram, & Maheen, 2016; Hajibabae, Joolae, Peyravi, & Haghani, 2011).

According to the report of National Reporting and Learning Service, 526,186 incidents involving medication errors occurred in England and Wales between 2005 and 2010, 16% of which caused actual patient harm, of which 0.95% in turn resulted in death or severe harm

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(Cousins, Gerrett, & Warner, 2012). Every year, 48-90000 Americans die due to medicinal complications, 7000 of which are related to medication errors (Huse, 2010). Also, studies conducted in different healthcare environments have reported the rate of medication errors between 19 and 70% (Cheraghi et al., 2012). In underdeveloped and developing countries, it is generally very difficult to obtain the accurate statistics on medication errors. This problem is due to a lack of proper archiving and reporting systems as well as the absence of a data registration system. However, given the increased number of complaints from medical staff to courts and increased judiciary evidence, experts estimate medication error rates to be high in underdeveloped and developing countries (Cheragi et al., 2013). Despite the fact that medication errors can occur by any member of a healthcare team, errors committed by nurses are the most common and the most frequent ones. It could be due to the fact that nurses execute an important part of physician orders and spend 40% of their time on administering medicine in hospitals (Cheraghi et al., 2012). Pham et al. reported that nurses were responsible for 54% of medication errors and the most common time of the incidence of medication error was the drug administration phase (Pham et al., 2011). In the study of Cheraghi et al., it was found that more than 60% of the participating nurses had committed medication errors and 31% of them had been on the brink of committing medical errors (Cheragi et al., 2013). In other studies, on the other hand, different reasons for medication errors committed by nurses were put forward. The use of abbreviated names instead of the full name, similarities in drug names, carelessness and distraction of nurses, emergency situations, increased workload (Cloete, 2015; Cheragi et al., 2013; Hayes, Jackson, Davidson, & Power, 2015; Pham et al., 2011), fatigue resulting from high workload, low nurse to patient ratio, nurses' psychological problems (Souzani, Bagheri, & Pourheydari, 2007), insufficient pharmacological knowledge (Baghcheghi & Kouhestani, 2010; Ehsani et al., 2013), nurses' little work experience, and incorrect implementation of the drug administration protocol (Westbrook, Rob, Woods, & Parry, 2011) are among these potential reasons. Palez et al. suggested that most of the medication errors were due to the existence of defects in the system, the quality of staff's education and training, and the work condition (Palese, Sartor, Costaperaria, & Bresadola, 2009).

'Foreign' studies have examined the prevalence, the types, and the factors that affect the incidence of medication errors in nurses. However, this issue has not been adequately discussed and addressed in Iran. There are a few studies, carried out almost exclusively in Tehran, and the statistics on medication errors from other Iranian cities is not available. Considering the fact that determining error types is the first step in preventing errors and since researchers have frequently confronted such issues in their clinical observations, this research was, therefore, conducted with the aim of (1) determining the frequency and the types of medication errors committed by nurses, (2) identifying their causes, and (3) recognizing factors affecting the incidence of these errors in the hospitals affiliated to Ahvaz University of Medical Sciences in Iran.

2. Materials and methods

2.1. Setting and sampling

In this cross-sectional descriptive-analytical study, 225 participants were selected using the multi-stage random sampling from nurses working in teaching hospitals affiliated to Ahvaz Jundishapur University of Medical Sciences, Iran. Ahvaz is the capital city of Khuzestan Province located in the southwest Iran. It has eight teaching hospitals with more than one and a half million active beds. These hospitals include, among others, surgical, orthopedics, pediatrics, CCU, emergency, neurology, lung, infection, gastroenterology, burn, plastic surgery, women, and ICU units. Accurate statistics on the number of nurses working in these centers is not available, unfortunately. The

sample size was therefore determined based on the results of similar studies and the sample size formula. Due to the large number of hospitals and wards, randomization was done in two steps (Multi-stage random sampling). Randomization was actually conducted only at the first stage for the selection of hospitals and in the second stage for selecting the wards. The researchers, then, referred to the selected wards in various work shifts to select nurses who had the required criteria for participation in the research and were also willing to participate. The selection process was done in both stages by a draw. In Iran, the majority of nurses work in rotating shifts. A rotating shift consists of morning, evening, and night (eight-hour) shifts altering and alternating during a month, while a fixed shift consists of fixed exclusive morning, evening, and night shifts during a month. The researchers later referred to the mentioned wards in different work shifts and selected nurses who had the required criteria for participation in the research and were also willing to participate. The inclusion criteria were (1) having at least a bachelor's degree in nursing, (2) appropriate physical and mental health conditions (based on the subjects' oral testimony), (3) having at least 6 months of work experience, and (4) willingness to participate. At the time of the referral to the hospital, the researchers asked the nurses who were physically and mentally capable to complete the questionnaires. Some of the nurses complained of headaches, fatigue, or stress and preferred to complete the questionnaire at another later time. Consequently, the researchers referred to the intended wards for the completion of the questionnaires in another day and time.

2.2. The tool

Data were collected through a researcher-made tool that had been prepared and adjusted based on the literature review (Cheragi et al., 2013, 2012; Hajibabaei et al., 2011). The tool contained 79 items, in five parts. The first part (9 items) included demographic characteristics such as age, sex, education level, work experience, the department, passing training courses in the field of medication administration, work shift (rotating or fixed), working in one or more hospitals over the hours required, and having a second job apart from nursing. The second part contained 20 items specifically on medication errors committed by nurses over the past three months, and their reports. Responses to this part were 'yes', 'no', 'reported', and 'unreported'. Part 3 was regarding the factors that affected the occurrence of medication errors in the field of nursing management, the working conditions, and the nurses themselves, which included a total of 35 items. In this part, nurses were required to determine to what extent these factors contributed to the occurrence of drug errors. Part 4 of the questionnaire (13 items) concerned the reasons for the failure and/or reluctance to report medication errors, in which the nurses indicated how much these factors contributed to the failure, or refusal, to report medication errors. Finally, Part 5 included factors that were conducive to the occurrence of drug-related medication errors, with 2 questions. The scores of parts 3, 4, and 5 were calculated based on the five-degree Likert scale, from very high (5) to very little (1). The face validity method was used to determine the scientific validity of the tool. Furthermore, corrective comments by a group of lecturers and experts were collected and, after revision, the final questionnaire was developed. The initial version of the questionnaire contained a total of 60 items, in the mentioned parts, to which 9 items were later added following experts' comments. In addition, grammatical errors were also corrected. The final version was referred to the experts for the final confirmation. The reliability of the questionnaire was approved by the test-retest method in a 10-day period. The Cronbach's α for parts 2, 3, 4, and 5 were 0.87, 0.77, 0.83, 0.86, 0.83 respectively, and was 0.8 in total.

2.3. Data collection

Data were collected between September 2015 and February 2016. The data collection method was based on a questionnaire completed by

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