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Medication administration errors and contributing factors: A cross sectional study in two public hospitals in Southern Ethiopia

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ABSTRACT

Introduction: Medication administration errors (MAEs) are among the top common causes of injuries to the hospitalized patients. Nurses play a pivotal role in the prevention as well as occurrence of MAEs.
Aims: This study aims to quantify the prevalence of MAEs, to assess the degree of reporting MAEs, and to identify the contributory factors to MAEs.
Methods: This study used an institution-based, cross-sectional study design. A pretested, structured, self-administered questionnaire was used to collect data from 130 nurses. The nurses were also observed while administering medications continuously for 48 h by using a semi-structured, pretested checklist. The data were processed descriptively and analytically; bivariate and multivariate logistic regressions were computed to identify the factors contributing to MAEs.
Results: Just over 71% of the respondents admitted to have made MAEs in the previous 12 months. Only one (0.7%) of the 139 observed doses was properly administered. Factors like looking-like drugs (AOR = 10.661, 95% CI: 1.808, 62.869), and distraction (AOR = 5.615, 95% CI: 1.713, 18.403) were significantly associated with the MAEs. Three-fourths of those nurses who perpetrated MAEs also admitted to have not reported the MAEs. The unavailability of a system (AOR = 5.083, 95% CI: 1.842, 14.027), and fear (AOR = 4.422, 95% CI: 1.584, 12.349) were the factors that contributed significantly to the underreporting of the MAEs.
Conclusion: MAEs were common in the hospitals. Factors like looking-like drugs and distraction contributed significantly to the MAEs. Majority of the MAEs were not reported.

1. Introduction

The administration of a medication to a patient is one of the most valued nursing practices. Performing it safely is among the most crucial professional responsibilities of nurses (Garrett & Craig, 2007; Hughes, 2008; Mansouri et al., 2013; World Health Organization, 2016). Nevertheless, it is becoming increasingly difficult to fully maintain patients' safety during the process of medication administration (Cohen & Shastay, 2009). Although nurses are involved in most of the incidents of medication administration errors (MAEs), they also are the on the front line of health professionals for the safe administration of medications, and also for MAEs from happening to patients (Berdot et al., 2012; Hughes, 2008).

Throughout the ages scientists and health professionals have developed decisive principles so as to make the administration of medications safe. Among the widely practiced principles, are the "six rights" of medication administration: identifying the right patient, selecting the right medication, calculating the right dose, identifying the right route, administering the medication at the right time, and using the right documentation (Delaune & Ladner, 2002; Ten rights of medication administration, 2010) If strictly followed, the six rights could play a fundamental role in the prevention of most MAEs (Mayo & Duncan, 2004; Ten rights of medication administration, 2010)

Medical errors, the commonest of which is the MAEs, are among the top ten leading causes of morbidity and mortality in hospitalized patients (FACT SHEET, 2009; Jao & Hier, 2010) Many studies around the world have reported the prevalence of MAEs to be considerably high (Björkstén, Bergqvist, Andersén-Karlsson, Benson, & Ulfvarson, 2016; Frank Austria, 2009a; Jones & Treiber, 2010; Kohn, Corrigan, & Donaldson, 2008; Mansouri et al., 2013): self-report studies have documented a high proportion of nurses admitting to have made an MAE (Alsulami, Conroy, & Choonara, 2013; Demehin, Babalola, & Erhun, 2008; Llewellyn et al., 2009; Oshikoye et al., 2013). and observational studies likewise have revealed that the majority of

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nurses fail to follow the 'protocols' for the safe administration of medications (Alsulami et al., 2013; Dedefo, Mitike, & Angamo, 2016; Feleke, Mulatu, & Yesmaw, 2015; Yemisirach & Biniyam, 2010).

The MAEs can happen for a number of reasons: an illegible handwriting, distraction, a high patient-to-nurse ratio, unclear verbal communications, insufficient staffing, inadequate training, nursing incompetence, work overload, etc (Dedefo et al., 2016; Frank Austria, 2009a; Jones & Treiber, 2010).

The MAEs have a wide-ranging health and non-health related impacts on different parties. They are one of the leading causes of injuries to the hospitalized patients: the patients could face an increased hospital stay, injuries, disabilities or even death (Payne, 2014; Ten rights of medication administration, 2010). They can also cause varying levels of damage to the families of patients, health professionals (especially nurses) and health institutions (Joshua, 2010; Mahajan, 2011). The nurse who commits an MAE may suffer from unbearable psychological trauma, especially if the MAE leads to serious injuries or death. Consequently, the nurse feels unqualified, angry, guilty, and develops an intention to leave the profession (Sensemeier, 2007).

The financial cost of MAEs has also been estimated to be significantly high: each preventable error is implicated for an additional health-care cost of around $4700 (Gladstone, 1995; Sensemeier, 2007).

The impact of MAEs is likely to be widely prevalent and very serious in the developing world, because of a serious shortage of adequately trained health professionals, ill-equipped health institutions, poor organization, inadequate medical supply, etc (Jaquet et al., 2011; Mehta et al., 2008; Tumwikirize et al., 2011). According to a WHO report, for example, medication errors only may cost around a third of the expenditure of the developing world (World health organization, 2011).

Reporting an MAE timely is an essential measure a nurse may take to ensure the safety of a patient. Nonetheless, research findings have point to contrary; the degree of reporting MAEs by nurses is considerably low (Aboshaiqah, 2013; Frank Austria, 2009b; Montesi & Lenchi, 2009; Tshiamo, Kgositau, Ntsayagae, & Sabone, 2015) The underreporting has been attributed to many factors: the lack of awareness on the consequences of MAEs, fear of the consequences of reporting, not knowing to whom to report, the unavailability of a system for reporting, etc (Fawzia El & Eman, 2015; Lin & Ma, 2009; Pfeiffer, Manser, & Wehner, 2010).

Despite their wide-ranging impact, there is a scarcity of information on MAEs, particularly in developing countries. Consequently, a few, if any, mechanisms have been put in place to prevent MAEs, and barely any system has likewise been established to detect and report MAEs (Dedefo et al., 2016; Feleke et al., 2015; Montesi & Lenchi, 2009; Yemisirach & Biniyam, 2010). Therefore, assessing the prevalence, the degree of reporting, and the factors contributing to MAEs will play an important role in making information available for planners, policy makers and other stakeholders in order to make appropriate decisions regarding MAEs.

2. Materials and methods

2.1. Study design and settings

The study employed an institution-based, cross-sectional study design. It used a quantitative self-reporting and observational approach to collect data. The study was conducted in hospital settings from March 1–30, 2014.

2.2. Participants

The participants of this study were 141 nurses working in two public hospitals in Southern X. The inclusion criteria were: a minimum of diploma qualifications in nursing, a minimum of one year working experience in the hospitals and involvement in a direct patient care. The study did not include those nurses who were serving in administrative positions only.

2.3. Study variables

The prevalence of MAEs and the degree of reporting them were the outcome variables, whereas the sociodemographic characteristics of the respondents, and the factors that contributed to MAEs were the independent variables.

2.4. Data collection tools, personnel, and procedures

The data were collected using a structured, pretested, self-administered questionnaire and a semi-structured, pretested, observational checklist. The tools were adapted from previous studies (Ghaleb, Barber, Franklin, & Wong, 2010; McBride-Henry & Foureur, 2006; Parihar & Passi, 2008; Tshiamo et al., 2015; Westbrook, Woods, Rob, Dunsmuir, & Day, 2010) and guidelines developed by the American Nurses Association (ANA) and European Federation of Nurses Association (EFN) (ECRI Institute., 2008; Willman, Burke, Smith, & Sveinsdóttir, 2008).

The questionnaire contained 60 questions arranged into six sections; the first section contained eight questions regarding the sociodemographic characteristics of the participants, the second section contained 30 questions regarding the prevalence and types of MAEs, the third section contained three questions regarding the perspectives of nurses on the six rights of medication administration, the fourth section contained 12 questions regarding the reasons why MAEs happen, the fifth section contained four questions regarding the degree of reporting MAEs, and the final section contained three questions regarding the factors contributing to the degree of reporting MAEs.

The checklist contained eight questions. The questions were designed to elicit a 'met' or 'unmet' response depending on the degree of nurses' adherence to the six rights during the process of a medication administration.

Four nurses, with the diploma qualifications in nursing, were recruited to collect the data. Two supervisors, with the Bachelor of Science Degree in Nursing, were selected and assigned to monitor the data collection process.

The data were collected using two different approaches. Deployment of the self-administered questionnaire was the first one. After explaining the purpose of the study and obtaining consent, the data collectors distributed the questionnaire among the participants and collected the completed questionnaire thereafter.

The second approach involved a direct observation of nurses while administering medications. It was conducted continuously for 48 h by using the checklist. The nurses were scrutinized incognito for their level of adherence to the six rights of medication administration. The observers put a tick mark under the 'met' or 'unmet' column after inspecting the nurses' level of adherence to the six rights while administering medications.

2.5. Data quality control

Many measures were taken to ensure the quality of the data. First off, the tools were adapted from some previous studies and guidelines. Then they were translated and re-translated between different languages (Amharic and English) to check for their consistency. Most importantly, they were pretested on five percent of the respondents and ten doses of medications. The resultant data were used to calculate the Cronbach's alpha coefficients: it was 0.84 for the questionnaire, and 0.80 for the checklist. Furthermore, the tools were reviewed by six experts (three clinical nurses and three nurse academics) to check for their validity. The content validity index (I-CVI) of the questionnaire was calculated to be 0.86. Moreover, the data collectors and supervisors were trained intensively on the tools and data collection procedures.

The observational study was conducted under disguise: the