

Original Research Article

Perceived contributory factors to medication administration errors (MAEs) and barriers to self-reporting among nurses working in paediatric units of selected referral hospitals in Rwanda

Aimable Nkurunziza^{1*}, Geldine Chironda², Madeleine Mukeshimana¹

¹School of Nursing and Midwifery, College of Medicine and Health Sciences (CMHS), University of Rwanda (UR), Kigali, Rwanda

²Rory Meyers College of Nursing, New York University, New York, USA

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*Correspondence:

Mr. Aimable Nkurunziza,

E-mail: aimabl2020@yahoo.fr

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ABSTRACT

Background: Medication administration errors (MAEs) occur in health care settings however, the types, contributing factors to MAEs and barriers to reporting are not well studied in Rwandan context.

Methods: Quantitative approach was adopted. Descriptive cross-sectional design was used. A convenience sampling was used to select 151 nurses working in the paediatric units of the selected teaching hospitals in Rwanda. Pre-tested questionnaire for validity and reliability was used to collect data. Data was coded and entered into SPSS version 21. Descriptive statistics and inferential statistics (Chi-square test) were used to analyze data.

Results: Approximately 33.6% of the participants were able to identify one type, 17.4 % two, 18.1% three, 17.4% four types, 10.7% six types and only 2.7% identified all the seven MAEs. Identified main contributory factor to MAEs was the heavy workload it like this-Identified main contributory factor to MAEs was the heavy workload [82 (55%)]. The main barrier to self-reporting was fear to be blamed if something happens to the patient as a result of the medication administration error (88 (59.1%)). All the socio demographic were associated with the types of MAEs committed by participants. In addition, the experience, marital status and job position of the participants were significantly associated with factors contributing to MAEs ($p = .001$, $p = .000$ and $p = .044$) respectively whereas all the socio demographic were significantly associated with barriers to self reporting.

Conclusions: Factors contributing to MAEs were found in both parties and barriers to self-reporting were identified to be the fear reasons and administrative reasons. Therefore, the heavy workload should be addressed to reduce MAEs and a non-punitive environment is imperative in encouraging self-reporting of MAEs.

Keywords: Medication, Medication administration, Medication error, Paediatric nurse, Self-reporting

INTRODUCTION

Medication error is “any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer. Such events may be related to professional practice, healthcare products, procedures, and systems, including prescribing; order communication; product labelling, packaging, and

nomenclature; compounding; dispensing; distribution; administration; education; monitoring; and use”.¹

Medication errors are the most important cause of the incidents in the patient safety worldwide.² In the United States, medication errors kill one patient a day and harms about 1.3millions each year and it comes on the third place among the causes of death.^{1,3} Globally, the total budget spent on medication errors equals to 42billion US\$ or 1% of the total global health expenditure.⁴

According to the literature review in Australia, errors excluding wrong time account 9% of drugs administrations or 1 error per 10 administrations and among 80% of discharges had at least two errors for each patient.⁵ In Europe around 4,372 cases were reported due to medication errors and accidental overdose ranked the top among others.⁶

Nurses are reported to commit many medication errors among other health care professionals like medicine and anaesthesia.⁷ The FDA analyzed the reports of medication errors and the most common errors were wrong dose 41%, wrong drug 16%, and wrong route 16% and the most common factors were low level of knowledge 44%, and poor communication 16%.⁸

In a study conducted, in Nigeria, the findings reported MAEs where by wrong drug came on the top 26.4%, 19.8% drug interaction or contraindication present and 16.6% was regarding duration and frequency.⁹ Furthermore, to strengthen patient safety there should be a reporting system that is facilitated by a punishment free environment and nurse managers should not punish nurses who reported errors only but also reward the ones with an initiative to do so. So far, nurses were reported that they fear negative consequences that may follow the reporting after medication errors, but nurse managers should enhance the reporting system and initiate support services to decrease fear and shame of nurses and provide incentives to strengthen reporting.¹⁰

Medication errors are among nursing care part that can threaten patient outcomes and paediatric population is vulnerable than others because of their physiology and developmental needs and also because of dosing based on weight, children are at high risk of facing MAEs.^{8,11-13} Moreover, paediatric population is highly exposed to Adverse drug reactions (ADRs) because drugs have not been studied deeply in the paediatric population, and there is a low absorption and metabolism because of different factors like immature organs.¹⁴ Consequently, medication errors are among the causes of a large number of ADRs for these clients and they are more prone to medication errors as also reported in Czech Republic.^{7,14}

In a prospective study that has been conducted in Ethiopia, found that 7.3 % of paediatric clients who were hospitalized in paediatrics unit have been exposed to ADRs among them 47% were avoidable, while 53% were not.¹⁵ Similarly, according to their study, conducted in Iran, they found that medication errors were 48.8% that are common in pediatric population compared to adults.¹⁶

In Uganda, 18% of health care professionals reported that they have committed medication errors while 41% revealed that they have identified the medication errors committed with other health care professional and all those medication errors were potentially harmful. They also suggested that the country should establish the medication errors reporting system.¹⁷ Thus, to prevent

medication administration errors there should be a way for reporting them within the hospital but still there are some barriers that hinder this activity like lack of precise definition, no effort in reporting, fear, and administrative responses.^{18,19}

Rwanda was among 16 countries where they found that it had not a clear reporting system of medication errors.²⁰ Later, the ministry of health has tasked the concerned people regarding drugs selection, storage, prescribing, dispensing, administration, and patient monitoring to be sure that they are implemented to minimize the risks as well monitoring of medication errors.²¹ Still MAEs occur in Rwandan healthcare systems.^{22,23} Although the Rwanda ministry of health has put in place different strategies to strengthen patient safety and guidelines for pharmacovigilance and medicine information some clients still experience adverse drugs reactions and medication errors are the leading cause.²⁴ This also was supported by the claim of institute of medicine which says that medication errors are common in hospitals.²⁵ Therefore, MAEs are not well studied in Rwanda. This study explored the contributing factors related to medication administration errors and barriers to reporting among nurses working in pediatric units of selected referral hospitals in Rwanda.

METHODS

This research was conducted at selected teaching hospitals in Rwanda from October 2016 up to April 2017. These are the hospitals with more nurses in paediatric and surgery departments and receive complex cases from district hospitals for high specialized care. The study population was the pediatric and surgery departments' nurses who were available at the time of the study. This study recruited all registered nurses with at least 3months working experience in pediatric and surgical units, who had the will to participate in the study and who were not in leaves. A convenience sampling strategy was used to get 151 nurses. The self-administered questionnaire adapted from the one used to evaluate medication administration errors in Ethiopia was used.¹⁸

The first section assessed the demographic information of the respondents, the second part looked the information on the MAEs experienced by the nurses, the third section on the contributing factors to MAEs and the fourth section on barriers to medication administration error reporting. Permission to use the instrument was granted to the researcher by the author of the survey instrument. The research assistants were recruited and trained. Validity of the tool was tested by using experts to examine if the questions look very well or invisible, comparing it to other studies that have been previously conducted and if the concepts in the title are the same in objectives, research questions, conceptual framework and tool for data collection. The pre test of the instrument was done and the reliability of the tool was calculated and Cronbach's alpha was 0.86. Data entry and analysis were

done by statistical package for the social sciences (SPSS) version 21, 2015. Both descriptive and inferential statistics were used. Frequencies and percentages were used to analyze the medication errors, and barriers to self-reporting whereby chi-square with 95% confidence interval was used to identify the associations between the variables under the study. Institutional Review Board (IRB) from the university of Rwanda and clinical settings approved the proposal and guaranteed the permission to start the data collection. Protecting human research participants was obtained from the national institutes of health. Participants were explained about their rights in research and the informed consent was signed. After data collection, data were recorded into the software and kept by the researcher in a locked container.

RESULTS

Participants’ sociodemographic characteristics

The findings revealed that the majority of the participants were females 113 (75.84%), the age ranged from 21years to above 45years. With regard to the level of education in the field of nursing, the majority was advanced diploma trained nurses 122 (81.9%) and 27(18.1%) had bachelor’s degree. The majority of the participants experience was above 5years (98 (65.8%)). With regard to their religion a half of the participants were catholic 75 (50.34%).

Regarding the marital status the majority of the participants were married (104 (69.8%)).

Types of MAEs

The results revealed that the common type of MAEs made by nurses is administration of a drug at wrong time 20 (20.1%) which is the highest for those who identified one type of MAE whereas administration of a drug which is not prescribed was 1(0.7%), those who identified at least two wrong dose and omitting a drug 6 (4.0) and the least identified was wrong route and administration of a drug which is not prescribed 2 (1.3%), for the category for those who identified three drugs the highest was wrong time, omitting a drug and administration of a drug which is not prescribed 10 (6.7%) and the least identified in this group was wrong time, frequency and omitting 3 (2.0%), the highest in a group that was identified four MAEs was wrong dose, wrong time, omitting a drug and administration of a drug which is not prescribed 9 (6.0%) and the lowest was wrong time, route, frequency and omitting a drug 4 (2.7%). The participants identified the six MAEs wrong dose, wrong time, wrong drug, wrong frequency, omitting a drug and administration of a drug which is not prescribed 16 (10.7%) and those who identified seven MAEs wrong dose, wrong time, wrong drug, wrong route, wrong frequency, omitting a drug and administration of a drug which is not prescribed 4 (2.7%).

Table 1: Chi-square analysis between socio demographic with types of MAES, contributing factors to MAES and barriers to self-reporting N (=149).

Variables	Pearson chi-square	P value	
Socio-demographic and types of MAES	Sex of the participants	33.684 ^a	0.039
	Age of the participants	229.571 ^a	0.000
	Experience of the participants	121.611 ^a	0.000
	Level of education	62.133 ^a	0.000
	Marital status	103.320 ^a	0.001
	Religion	316.334 ^a	0.000
	Job position	70.853 ^a	0.000
Socio-demographic and factors contributing to MAES	Sex of the participants	90.059 ^a	0.063
	Age of the participants	392.493 ^a	0.083
	Experience of the participants	286.713 ^a	0.001
	Level of education	63.853 ^a	0.714
	Marital status	328.660 ^a	0.000
	Religion	437.681 ^a	0.337
	Job position	92.489 ^a	0.044
Socio-demographic and barriers to self reporting	Sex of the participants	63.674 ^a	0.013
	Age of the participants	436.858 ^a	0.000
	Experience of the participants	281.301 ^a	0.000
	Level of education	98.906 ^a	0.000
	Marital status	217.728 ^a	0.000
	Religion	492.527 ^a	0.000
	Job position	89.141 ^a	0.000

Factors contributing to MAEs

The main factors to MAEs identified in the present study are the heavy workload 82 (55.0%), unit staff do not receive in service trainings about new medication 50 (33.6%), use of abbreviations instead of writing completely 47 (31.5%), interruptions during drugs administration 40 (26.8%), all medications for one team of patients cannot be passed within an accepted time frame 38 (25.5%) and errors are made in the medication sheet 30 (20.1%).

Barriers to self-reporting

The main barriers to self-reporting in the present study were: nurses could be blamed if something happens to the patient as a result of the medication administration error 88 (59.1%), the patient or family might develop a negative attitude toward the nurse or may sue the nurse if a medication error is reported 79 (53.0%), nursing administration focuses on the individual rather than looking at the systems as a potential cause of error 77 (51.7%), nurses fear adverse consequences from reporting medication errors 77 (51.7%), the response by nursing administration does not match the severity of the error 61 (40.9%), too much emphasis is placed on medication administration errors as a measure of the quality of nursing care provided 55 (36.9%) and no positive feedback is given for passing medications correctly 52 (34.9%) as shown in Table 1.

DISCUSSION

Sociodemographic characteristics

The present study revealed that the majority of the participants were females 113 (75.84%), while 36 (24.16%) were males this is related to the culture that in Rwanda the nursing schools were designed to young girls only or nursing was a female dominated profession when it was started by the missionaries.²⁶ The age ranged from 21 years to the above 45 years above simply because the Advanced diploma is joined after secondary school. With regard to the level of education in the field of Nursing, the majority Advanced diploma trained nurses 122 (81.9%) this is because the bachelor's degree has started late in 2002 in Kigali Health Institute which was the only Higher learning Institution that was training this level at that time and also most of the nurses in Rwanda have the minimum level.²⁷ Similarly also to the special report called the human resources for health program in Rwanda - a new partnership which also showed the figures of Bachelor's degree trained nurses by 2018 at 1011 compared to Advanced diploma nurses 11384.²⁸ The majority of the participants experience was above 5 years 98 (65.8%) and according to Benner's stages of clinical competence they are considered as expert.²⁹ With regard to their religion a half of the participants were catholic 75 (50.34%) which is in relation to the religious population in Rwanda whereby the big number is from catholic

church at 44%.³⁰ Regarding the marital status the majority of the participants were married 104 (69.8%) similar to the marital status of Rwandan population which is on 46.1%.³⁰ The majority of participants in this study were bedside nurses 133 (89.3%) of course in nursing practice bedside nurses are more than the managers.

Types of MAEs

Among the participants who chose one type of MAE wrong time was the highest common MAE 20 (20.1%) this might be because of in the factors the participants mentioned on the top the heavy workload. Similar to the findings from the study done in hospitals affiliated with Mashhad university of medical sciences in, Mashhad, Iran with the purpose of evaluating the medication errors among 530 nurses.³¹ Another study with similar findings was conducted in Saudi Arabia and showed that 30.9% responded that the most common medication administration error is the wrong timing of medication administration.³² Moreover, using the documentation of Pediatric medication administration errors in Canadian pediatric center wrong time error accounted 168 cases (45.2%) among 272 cases.³³ Although these studies have identified wrong time error as the most common error in clinical settings, in contrast the retrospective study of 2,380 physician orders in King Abdul-Laziz Medical city, Saudi Arabia has identified 1,333 medication errors and the dosing error as the highest cause of medication error at the degree of 22.1% among others.³⁴

The least associated factor that was mentioned by the only one participant was administration of a drug which is not prescribed 1 (0.7%). This in contrast with the results from the study done in Gondar/Ethiopia which revealed that administration of a drug which is not prescribed at the rate of 20.1% for intravenous and 24.8% for non-intravenous drugs.¹⁸ The participants who identified at least the two MAEs chose wrong dose and omitting a drug 8 (4%) contrary to the several studies that have found wrong dose at the highest percentage compared the present study findings.^{35,36} However, the omission of a drug with the lowest percentage is similar to the study done at Benioff children's hospital.³⁷ Even if the wrong time comes on the top for the present study may be due to nurse patient ratio but dosing error is very crucial in pediatric clients as the simple error in dosing may lead to the greater risk to their health and requires weight related calculations compared to adults prescriptions.³⁸

The present results have suggested the significant association between the types on MAEs with the socio-demographic data except the sex of the participants ($p=0.039$). Similarly, to the study done in hospitals affiliated with Mashhad university of medical sciences, Mashhad, Iran which found that there was no significant association for MAEs with gender but in contrast it found also that there was no significant association between MAEs and experience.³¹

Factors associated to MAEs

The main factors that lead to MAEs are: workload or few nurses compared to the number of patients 82 (55.0%). Correspondingly to the study that has been conducted in Malaysia with the aim of identifying the level of knowledge and factors among nurses which contribute to MAEs whereby most of the participants 95.8% agreed that heavy contribute to MAEs.³⁹ Another contributing factor from the present study is that unit staff do not receive in service trainings about new medication 50 (33.6%) similarly to the study that has been conducted in Saudi Arabia which revealed that nurses in the two regional hospitals 215 (69.6%) agreed that they do not receive in service training regarding the new medication as the common MAE.³²

Alongside that factor the following was the use of abbreviations instead of writing completely 47 (31.5%) which is also another factor that can lead to MAEs as also reported to the United States of America.⁴⁰ Thus the Joint Commission has put out the precautions of using abbreviations that includes the list of abbreviations to not be used.⁴¹ Additionally in this study the interruptions during drugs administration play an important role in the cause of MAEs to the extent of 40 (26.8%). Likewise to the study done with the aim of evaluating the effectiveness of a “do not interrupt” bundled interruption to reduce non medication related interruptions to nurses during medication administration errors whereby in the observational study the interruptions accounted 57 per 100 administrations.⁴² The interruptions during medication administration impact the nurses’ work whereby they can make nurses to stop the work and handle the interruptions for at least 2.5min, procedural failures, clinical errors and compromised patient safety.⁴³ However, the results from the study that was conducted in three Canadian paediatric centres with the aim of assessing the risks factors associated to the increased severity of MAEs have found that the working shift is the most common factor whereby 64.5% of errors occur on the day shift followed by 22% that occur on the night shift.³³ The participants 83 (55.7%) from the present study also have strongly disagreed that the similarity of medications names is a contributing factor contrarily to the results of the retrospective study aimed at assessing the differences in recognition of similar medication names between pharmacists and nurses which revealed that drug names error is also high among others.⁴⁴

With regard to the socio-demographic data and factors contributing to MAEs there is a significant association of experience ($p= 0.001$) and marital status ($p= 0.000$). In contrast to the study done in Turkey with aim of assessing the medication errors basing on perspectives of newly graduated and experienced nurses which showed that there was no statistically significant difference for both groups in terms of experience.⁴⁵ The job position also showed a slight significance ($p= 0.044$). However, all these mentioned findings from the present study are

dissimilar to the study which was conducted in India and found that there was statistically significance for job position, marital status and experience.⁴⁶

Barriers to self-reporting

The present study has revealed that nurses fear to be blamed if something happens to the patient as a result of the medication administration error 88 (59.1%) which is analogous to the results from south Korea.³³ The second barrier was that the patient or family might develop a negative attitude toward the nurse, or may sue the nurse if a medication error is reported 79 (53.0%) alike to the qualitative study regarding the perceptions and attitudes towards medication error reporting in primary care clinics in Malaysia.³⁴ Another barrier in this study was that when medication errors occur, nursing administration focuses on the individual rather than looking at the systems as a potential cause of error 77 (51.7%) the same as the findings from the systematic review of different studies in Iran.³⁵ Another barrier from the present study is that nurses fear adverse consequences from reporting medication errors 77 (51.7%) similar to the descriptive cross sectional survey in Egypt that has argued the fear reasons on the level of 63.8%.³⁶ The current study also found that the response by nursing administration does not match the severity of the error 61 (40.9%) comparable to the recent findings from a study in Kirkuk city hospitals whereby 57.3% of nurses fear the administration reasons.³⁷

On the other hand, the lowest answer was disagreement of error definition with 8 (5.4%) contrarily to the findings from the study that found that disagreement over time and error definition is the third leading cause of not reporting the MAEs by the echelon of 36.6%.³⁶ Concerning the socio-demographic data and barriers to self-reporting after committing an error, the results revealed that there was statistical significance all variables in socio-demographic. In dissimilarity to the results of the study that was conducted in Turkey which revealed no statistical significance regarding experience and reporting.^{38,39}

CONCLUSION

Factors contributing to MAEs were found in both parties and barriers to self-reporting were identified to be the fear reasons and administrative reasons. Therefore, the heavy workload should be addressed, to reduce MAEs and a non-punitive environment is imperative in encouraging self-reporting of MAEs. It takes everyone efforts to improve patient safety and to ensure health and well-being of the patients.

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