

Medication Administration Errors among Nurses and Midwives in Ghana

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Abstract

Errors in the administration of medications are a prevalent issue among patients worldwide. The study looked at medication administration errors made by midwives and nurses in Ghana. A cross-sectional design was employed in conjunction with the quantitative method to conduct the investigation. A census sample was used to choose 231 nurses and midwives for the study. Descriptive statistics were used for the analysis. A combination of factors led to medication errors, and the majority of nurses and midwives reported experiencing medication errors twice in their professional practice. The study also found that the majority of respondents were female, between the ages of 25 and 29; they held a diploma; and they had worked for five years or less on the unit or department where the nurses and midwives were engaged. Regarding nurse-related factors, the majority of respondents concurred that psychological and mental health issues, drug unfamiliarity, and a general sense of hopelessness and disinterest in the nursing profession are all potential causes of medication errors. The study suggests that nurses and midwives receive more intensive education on medication errors.

Keywords

Ghana, Medication Errors, Midwives, Nurses

1. Introduction

Medication errors are a common patient problem in many countries, and they are frequently caused by a lack of collaborative communication among health professionals such as doctors, chemists, and nurses [1]. Patient safety is rapidly being introduced into nursing courses based on real-world health care [1]. According to [2], nurses play a critical role in minimising medication errors and dispensing safe medications. Similarly, [3] recommend that nurses acquire ade-

quate medication safety competencies before giving care because they are still at risk of making pharmaceutical errors, particularly in clinical practice. Medication delivery errors can result in patient mortality, lengthy hospital stays, and unfavourable consequences on nurses [4]. According to [4], research on medication errors by nurses and views of their reasons is crucial as a foundation for developing improved nursing education policies, particularly those related to drug safety.

Nurses and midwives are the professionals closest to patients and are the final link in the medication administration chain [5]. As the product of nurses and midwives shared values and beliefs, medication safety can be taught, developed and internalized in undergraduate nursing programs to transform safety culture [6]. There is limited evidence that healthcare educators explicitly incorporate medication safety into professional education programs [7].

Thus, nurses and midwives may receive relatively little education in error management techniques [8].

The evidence provided by literature shows that nurses and midwives are major culprits when it comes to medication errors due to the vital role, they play in patient care [9] [10]. There is the need to conduct a study to find data on medications administration errors (MAEs) in the Holy Family Hospital, Nkawkaw in the Eastern region and in Ghana as a whole especially among nurses and midwives. This will provide answers to questions regarding the kind of errors found among nurses and midwives within the hospital and what the related causes are.

2. Research Objectives

This study sought to:

- 1) Determine the prevalence of medication administration errors among nurses and midwives in Ghana.
- 2) Ascertain the causes of medication administration errors among nurses and midwives in their practice in Ghana.

3. Methods

3.1. Research Design

This study is quantitative in nature because data was collected from respondents in relation to the variables of the study or study objective. A descriptive cross-sectional study approach was used to collect data on study variables at a particular point in time. Since this design is economical and efficient, it provided descriptive, inferential and explanatory and standardized information in the study.

3.2. Study Area

Holy Family hospital Nkawkaw is a mission hospital serving as a district hospital within the Kwahu west municipality. It serves as a referral centre for the surrounding communities and districts for the treatment of medical and surgical

cases, obstetric and gynaecological cases, and paediatric cases. Nkawkaw Holy Family hospital has a staff strength of about 350 comprising of Specialists, General Practitioners, House officers, Physician Assistants, Nurses and Midwives, Allied health professionals and other paramedical staff. Holy family hospital Nkawkaw runs a 24 hr service comprising OPD services with about 10 consulting rooms. It has an emergency unit for detention within 24 hrs before discharging or admission into any of the medical or surgical ward (both male and female). It has an isolation unit for management of contagious diseases such as tuberculosis and epidemic-prone diseases such as Cholera and COVID-19. The population of nurses and midwives in the facility at the time of the study was 231.

3.3. Population

The study population consisted of all nurses and midwives who were working at the Holy family hospital. The population of nurses and midwives in the various departments of the hospital were 231 at the time of the study. These nurses and midwives had different demographic characteristics including age, years of experience and level of education. The expected number of midwives working at the Holy Family Hospital who participated in the study was 79. An expected number of 152 nurses (made up of general registered nurses, health assistants and community health nurses) at the Holy Family Hospital who work in different categories and perform duties specifically assigned to them participated in the study.

3.4. Sampling Procedure

A census sampling was employed in this study since the population was small and it, relied on data collected from all population members to provide the responses to the variables of the study. This method provided accurate and complete information since all population members were involved even though it was time consuming [11]. Since a census was used in this study, all nurses and midwives working in Holy Family Hospital were selected for data collection. Thus 231 nurses and midwives were used for the study.

3.5. Data Collection Instruments

An adapted questionnaire from a study with similar variables to this study was used for data collection from the respondents for the study. The questionnaire was adapted by the researcher and was made up of closed-ended, open-ended and Likert scale questions which were structured into 6 sections. Section A considered the demographic characteristics of respondents and had five sub-items. Section B was made up of two items and looked at the concepts or dimensions of medication errors respondents might have experienced in their practice. Section C comprised of fifteen sub-items and examined the possible causes of nursing medication errors.

3.6. Data Collection Procedures

A written introductory consent was sought from respondents on a template containing the questionnaire. Respondents in each ward being used for the study were provided with questionnaires to provide their responses to the questions. Researchers were available to provide help to respondents without influencing respondents' decisions. Data collection was done after approval and clearance had been received. Data collection was done before and after the beginning of nurses' and midwives' working shifts so as not to interfere with their work. Data was also collected between two weeks in order to be able to capture all nurses and midwives available. Receiving positive reception and corporation from nurses and midwives served as a challenge in the data collection process. Data collection was done in the COVID-19 period and as such all precautionary measures were adhered to. Data collection was face to face, where the researchers had direct contact with the respondents. Nevertheless, the researchers politely insisted on the adherence to these measures at all times in the data collection process. The researchers also made use of a sampling frame containing the names and contacts of all nurses and midwives at the Holy Family hospital to help identify respondents who were contacted at each point in time. This documentation served as a source of reference when a situation which may require contact tracing occurred. The researchers also made a personal risk assessment of situations and the environment at each point in time to make sure the right safety measures were being followed.

3.7. Data Processing and Analysis

The results from the respondents were computed and analyzed using the SPSS version 25 where data collected were coded into the software and commands given to provide results. Care was taken in entering data and data entered was cross-checked to prevent inputting wrong data. Data was analyzed to provide descriptive statistics. The results were displayed in tables in numerical form with accompanying explanations given. The study focused on analyzing each research question in order to meet the study objectives. The study employed the use of percentages and frequencies to analyse the data.

3.8. Ethical Consideration

This study involved sensitive issues and as such, clearance was sought from appropriate authorities. Ethical clearance from the University of Cape Coast was sought from the Institutional Review Board (IRB) to undertake the study. Approval and guidance were taken from the Department of Adult Health, School of Nursing and Midwifery and the research supervisor in carrying out the survey. The Medical Director and the Nurse Manager for Holy family hospital were written to for clearance before start of the study. Respondents were not required to provide personal data which could be used to trace them. Respondents were also given the needed privacy and time to provide their responses. Also, to ensure sound respondent-researcher relationship in this study, the researchers en-

deavored not to move from the role of the investigator to that of counsellor or therapist and tried to provide minimum assistance to respondents to maintain focus on the topic under investigation. Informed consent was obtained from every respondent by assuring them of anonymity and confidentiality and ensuring that identification features such as names were not recorded on the questionnaire.

4. Results

This section of the study presents the results from the study in tables and writing to aid in conducting further analysis. The data was obtained from the 231 nurses and midwives through census sampling on medication administration errors at Holy Family Hospital. Frequencies and percentages, as well as binary logistic regression, were used to analyse the data. The results from the collected data were presented in tables. **Table 1** shows results on the demographic characteristics of the 231 nurses and midwives used in the study. It was revealed that 21.2% (n = 49) of the respondents were between the ages of 25 and 29 years old, 73.2% (n = 169) were females, 51.9% (n = 120) were diploma holders, and 27.7% (n = 39) had worked for 5 years or less on the unit or department where the nurses and midwives were engaged, and 28.6% (n = 66) worked at maternity.

Prevalence of medication administration errors among nurses and midwives in Ghana

Table 2 shows the responses of the 231 nurses and midwives who participated in the study on the prevalence of medicine administration errors at Holy Family Hospital in Nkawkaw. According to **Table 2**, 54.5% (n = 126) of respondents had encountered drug errors in their nursing practice. Among the 126 nurses and midwives who had experienced medication errors, 41.3% (n = 52) had done so twice. According to the data obtained, a combination of circumstances contributed to medication errors (n = 38; 16.5%).

Causes of medication administration errors among nurses and midwives in their practice in Ghana

Table 3 shows the findings from a survey of 231 nurses and midwives at Holy Family Hospital in Nkawkaw regarding the causes of medication administration errors. The causes of MAEs were divided into three categories: nurse-related factors, department-related factors, and nurse management-related factors. Regarding nurse-related issues, 45% (n = 104) of respondents believe that being depressed and disinterested in the nursing profession is a cause of prescription mistake. The majority of respondents, 64.1% (n = 148), agreed that nurses and midwives' unfamiliarity with the pharmaceuticals is a cause of MAE, whereas 44.6% (n = 103) believed that psychological and mental disorders could lead to medication errors. Again, 47.6% (n = 110) of respondents believe that not enough time is a cause of drug mishaps. Also, 48.1% (n = 111) of respondents believe that fatigue caused by overworking is a cause of drug errors. **Table 3** demonstrates that 40.7% (n = 94) of respondents disagreed that department environmental noise was a source of prescription errors.

Table 1. Demographic characteristics of nurses and midwives (n = 231).

Demographic Variable	Frequency	Percentage (%)
Age		
24 years and below	22	9.5
25 - 29 years	49	21.2
30 - 34 years	47	20.3
35 - 39 years	37	16.0
40 - 44 years	27	11.7
45 - 49 years	21	9.1
50 - 54 years	15	6.5
55 - 60 years	13	5.6
Sex		
Female	169	73.2
Male	62	26.8
Qualification		
Enrolled	53	23
Diploma	120	51.9
Degree	46	19.9
Masters	12	5.2
Total	231	100
Years of service		
5 years and below	64	27.7
6 - 10 years	57	24.7
11 - 15 years	39	16.9
16 - 20 years	34	14.7
21 - 25 years	20	8.7
26 - 30 years	13	5.6
31 years and above	4	1.7
Total	231	100
Unit/department of work		
Maternity	66	28.6
Emergency	25	10.8
Theatre	22	9.5
Male ward	18	7.8
Female ward	19	8.2

Continued

Paediatric ward	25	10.8
Fever's unit	3	1.3
OPD	14	6.1
Other	39	16.9

Table 2. Prevalence of medication administration errors among nurses and midwives (n = 231).

Question	Frequency	Percentage (%)
Have you experienced medication error in your practice as a nurse or a midwife?		
Yes	126	54.5
No	105	45.5
If yes, how many times have you experienced medication error in your practice?		
Once	41	32.5
Twice	52	41.3
Thrice	22	17.5
Five times	2	1.6
Six or more times	9	7.1
Who was the principal cause of the medication error?		
Nurse/midwife	27	11.7
Doctor	19	8.2
Patient	15	6.5
Other health professional	10	4.3
A combination of factors	38	16.5
No idea	17	7.4

Table 3. Causes of medication administration errors among nurses and midwives (n = 231).

<i>Nurse related factors</i>		
Cause	Frequency	Percentage
Being despondent and disinterested in nursing profession		
Completely agree	21	9.1
Agree	104	45.0
No idea	4	1.7
Disagree	56	24.2
Completely disagree	46	19.9

Continued

Nurses/midwives being unfamiliar with the drugs		
Completely agree	7	3.0
Agree	148	64.1
No idea	17	7.4
Disagree	43	18.6
Completely disagree	16	6.9
Nurses'/midwives' psychological and mental problems		
Completely agree	2	9
Agree	103	44.6
No idea	35	15.2
Disagree	52	22.5
Completely disagree	39	16.9
Not having enough time		
Completely agree	17	7.4
Agree	110	47.6
No idea	4	1.7
Disagree	83	35.9
Completely disagree	17	7.4
Tiredness resulting from overworking		
Completely agree	54	23.4
Agree	111	48.1
No idea	6	2.6
Disagree	43	18.6
Completely disagree	17	7.4
<i>Department related factors</i>		
Department environment noise		
Completely agree	30	13
Agree	25	10.8
No idea	48	20.8
Disagree	94	40.7
Completely disagree	34	14.7
Drugs chamber office space (light, physical space)		
Completely agree	29	12.6
Agree	97	42

Continued

No idea	37	16
Disagree	40	17.3
Completely disagree	28	12.1
High volume of work		
Completely agree	58	25.1
Agree	75	32.5
No idea	63	27.3
Disagree	22	9.5
Completely disagree	13	5.6
The way drugs are arranged on the shelves		
Completely agree	45	20
Agree	101	43.7
No idea	30	13
Disagree	43	18.6
Completely disagree	13	5.6
Department medication and drug protocols		
Completely agree	15	6.5
Agree	102	44.2
No idea	23	10
Disagree	78	33.8
Completely disagree	13	5.6
<i>Nursing management related factors</i>		
The insufficient number of nurses and in relation to the patients		
Completely agree	72	31.2
Agree	100	43.3
No idea	3	1.3
Disagree	43	18.6
Completely disagree	13	5.6
Department style of supervision and control		
Completely agree	13	5.6
Agree	148	64.1
No idea	22	9.5
Disagree	26	11.3
Completely disagree	22	9.5

Continued

Physicians' illegible handwriting in patients' files		
Completely agree	40	17.3
Agree	94	40.7
No idea	37	16
Disagree	34	14.7
Completely disagree	26	11.3
Drug prescription method		
Completely agree	37	16
Agree	101	43.7
No idea	34	14.7
Disagree	46	19.9
Completely disagree	13	5.6
The errors occurring mostly during particular shifts		
Completely agree	3	1.3
Agree	118	51.1
No idea	25	10.8
Disagree	45	19.5
Completely disagree	40	17.3

Respondents agreed (42%; n = 97) that drugs chamber office space (light, physical space) could be a cause of medication error, 27.3% (n = 63) of respondents had no idea that high volume of work is a cause of medication error, and 43.7% (n = 101) of respondents agreed that the way drugs are arranged on the shelves is a cause. Concerning department medication and drug protocols, 44.2% (n = 102) of respondents agree that if they are not available, medication errors may occur. Regarding nurse management-related issues as causes of MAEs, the findings suggest that 43.3% (n = 100) agree that an insufficient number of nurses and midwives in relation to patients can cause MAEs. The majority of responders, 64.1% (n = 148), agree that departmental monitoring and control is a cause of pharmaceutical errors. About 41% (n = 94) of respondents believe that physicians' unclear handwriting in patient files is a cause of drug errors. Respondents also agreed (43.7%; n = 101) that the drug prescription procedure causes medication errors. Furthermore, 51.1% (n = 118) of respondents agreed that pharmaceutical errors occur primarily during specific shifts.

5. Discussion

Prevalence of medication administration errors among nurses and midwives in Ghana

According to the report, there is a significant rate of drug errors among nurses

and midwives. This is corroborated by [12], who claims that medicine administration errors occur in Ghanaian hospitals. [12] also reported that drug administration errors in Ghanaian hospitals are prevalent among nurses and midwives, although doctors and other health workers also contribute to MAEs. The study also discovered that in the majority of MAEs, the primary cause was a mix of factors. According to the respondents, patients contributed to MAEs (6.5%).

This finding is corroborated by [1] hypothesis that patients' attitudes towards drug administration contribute to MAEs. MAEs are frequently caused by a breakdown in collaborative communication among health professionals, such as doctors, chemists, and nurses/midwives [1] [13]. [5] discovered that nurses and midwives are the other medical personnel who have the most contact with patients and are the last line of defence in preventing drug errors. Similarly, they could be the primary cause of MAEs. The contribution of different health professionals to MAEs is possible, as a study conducted at the Hospital de Clínicas de Porto Alegre in 2003 revealed that, during a mean hospital stay of eight days in a general teaching hospital, on average, 75 different professionals deal with a patient's medical chart. Identification of the principal causes of MAEs may be possible through proper documentation as according to [14], during the course of hospitalization, data regarding the patient's daily evolution, with date and hour, description of all procedures to which the patient was submitted, and identification of all professionals that provided care are included in the medical record.

The study finds that the most important predictor for experience of medication error in nursing practice is years of service followed by qualification level of respondents. However, according to [7], there is limited evidence that healthcare educators explicitly incorporate medication safety into professional education programs. This will mean that nurses and midwives may receive relatively little education in error management techniques [8]. Also, [15] finds that the conditions that contribute to medication errors arise when nurses and midwives do not get sufficient supervision from their colleagues and senior nurses and midwives in the hospital and have not been equipped with proper medication safety education. While numerous studies have established that better nurse midwifery staffing and more supportive work environments lead to lower rates of adverse events including medication errors and mortality, comparatively there has been less attention given to the potential benefits associated with a more highly educated and experienced registered nurses and midwife workforce [16].

Causes of medication administration errors among nurses and midwives in Ghana

On nursing related factors causing MAEs among nurses, the study finds that most of the respondents agree that they believe being despondent and disinterested in the nursing or midwifery profession is a cause of MAE. Also, the respondents agree that nurses and midwives being unfamiliar with drugs may lead to MAE. Existing research has found that many new nurses and midwives are unsure of their competence with regard to the safe administration of drugs due to limited knowledge of pharmacology, side effects, and other aspects of medica-

tion safety [17] [18]. Also, [6] stated that pharmacological knowledge that is not associated with patient safety makes it difficult for nurses and midwives to apply drug safety principles, leaving them vulnerable to making medication errors.

The study also finds that tiredness resulting from overworking and having limited time to work too are primary causes of MAEs. This result is very evident in literature as research by [19] suggests that the number of hours nurses work, length of shifts, patient acuity and high workloads result in nurse fatigue. [20] have found that nurses are two and a half times more likely to suffer burnout and job dissatisfaction when regularly working shifts of ten hours or longer.

On departmental related factors leading to MAEs, results from the study show that the respondents agreed that a noisy working environment is a cause of MAE. However, noise has been seen as a possible cause of MAEs as [21] identified that distractions, such as noise, can be ignored or processed concurrently with the primary task, however, they may also contribute to errors and act as a precursor to an interruption. A poor lighting system and the lack of space in the drugs chamber office is seen as a cause of MAEs among most respondents. Environmental characteristics that can lead to problems during administration of medications include poor lighting, a restricted storage space which results in cluttered work surfaces, a poor layout of medication rooms, a lack of space for preparing and charting medications, and a lack of privacy in medication and drug chamber rooms [22] [23].

Nurses and midwives also indicated that a high volume of work and workload is a possible cause of MAEs [24]. [25] found that nurses' high workload can affect the quality and quantity of the supervision nurses provides. Nurses and midwives who engage frequently in competing activities as a result of high workloads and the acute nature of patients' conditions are more likely to experience distractions and interruptions, focus poorly on work-related activities and potentially make more errors [23] [26]. The respondents agree that the existing departmental medication and drug protocols could lead to medication administration errors. However, a high percentage of respondents also disagreed with the existing department medication and drug protocols serving as a cause of medication administration errors.

The study also came out with nursing management related factors that may lead to medication administration errors. On these factors, the study finds that department style of supervision and control contributes to medication administration errors. A number of studies have also identified the contribution of departmental supervision to MAEs. Conditions that contribute to medication errors arise when nurses and midwives do not get sufficient supervision from their colleagues and senior personnel in the hospital [15] [27]. A study by [28] also found that lack of proper supervision was a major cause of medication error. Furthermore, according to [25], nurses' high workload can affect the quality and quantity of the supervision nurses receive. Lack of supervision for nurses and midwives, particularly those who have just begun their practice, leaves them vulnerable to making medication errors [15] [29].

The study also finds that medication administration errors are more likely to occur during particular working shifts. Nurses are two and a half times more likely to suffer burnout and job dissatisfaction when regularly working shifts of ten hours or longer [20] [30]. This could lead to medication administration errors in such cases. The study also found that insufficient number of nurses and midwives in relation to the patients is a cause of medication errors in nursing practice. According to [31], staffing problems influence the availability of appropriate role models for nurses and midwives in their clinical practice. [32] estimated that the risk of patient harm as a result of medication error may be greater in Ghana, due to inadequate skilled human resources in hospitals.

6. Conclusion

The entire study process and results provides the necessary basis for a number of conclusions to be drawn in assessing medication administration errors among nurses and midwives. On the prevalence of medication administration errors among nurses and midwives, a greater proportion of nurses and midwives have experienced medication errors in their professional practice. Most of the nurses and midwives had experienced a medication error twice. In most cases, the occurrence of a medication was due to a combination of factors. On the causes of medication administration errors among nurses and midwives, nurses and midwives believe that showing less interest in the nursing or midwifery profession is a cause of medication errors. Unfamiliarity with drugs coupled with working with limited time and tiredness resulting from overworking also represent primary causes of medication errors.

Ethics Approval and Consent to Participate

Ethical clearance from the University of Cape Coast was sought from the Institutional Review Board (IRB). Approval and guidance were taken from the Department of Adult Health, School of Nursing and Midwifery. The Medical Director and the Nurse Manager for Holy family hospital were written to for clearance before start of the study. Informed consent was sought from the study participants.

Availability of Data and Material

The datasets generated during and/or analysed during the current study are not publicly available due to ethical reasons but are available from the corresponding author on reasonable request.

Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Authors' Contribution

ROD and VLO were responsible for the conceptualization of the topic of the

study. ROD made a substantial contribution to the design of the work, analysis and interpretation of data. VLO was actively involved in the data collection, analysis of the data, and draft of the manuscript.

CA contributed to the conceptualization of the study and was involved in the design, interpretation of the data, write-up and in the preparation of the final manuscript. ROD, VLO and CA read the final manuscript and approved the version to be published.

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