

## Research Article

# Medication Administration Safety Practices and Perceived Barriers Among Nurses: A Cross-Sectional Study in Northern Nigeria

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## ABSTRACT

**Introduction:** Safe medication administration is a vital process that ensures patients' safety and quality of life. However, reports of medication errors and their solutions are lacking. The aim of this study was to examine the correlation between medication administration safety practices and perceived barriers among nurses in northern Nigeria. **Methods:** A descriptive approach to research and cross-sectional design was applied to this study. The study population included nurse employees of the Zamfara State Government in northern Nigeria. Simple random sampling and systematic sampling were used in selecting the respondents of the study. Descriptive analysis and the Spearman rank-order correlation were used in data analysis. **Results:** Fewer than 50% of the respondents were found to agree or strongly agree that they identify allergic patients before administering medication. Most of the respondents had agreed or strongly agreed with the following as barriers to medication administration safety practices: lack of appropriate coordination between physicians and nurses, and lack of favorable policies and facilities. There was a very weak positive correlation between medication safety practices and barriers to medication safety practices, and the correlation was statistically significant ( $r_s = 0.180$ ,  $P = 0.009$ ). **Conclusion:** There was a high level of desirable medication administration safety practices that the respondents followed. Nonidentification of a patient's allergic status and inadequate information on the effects of medications were among the identified medication administration practice gaps. There should be policies guiding medication administration in all hospitals in Zamfara, Nigeria.

**Keywords:** medication administration, nurses, perceived barriers, safety practice, correlational study

## INTRODUCTION

The concept of safety is central to the principle of harm-free healthcare, and a focus of global healthcare professionals and healthcare institutions.<sup>[1]</sup> Safe medication administration is one of the vital processes that ensures patient safety and high quality of life.<sup>[2]</sup> Also, for many governments and international health organizations, safety is crucial as evidenced in policies governing healthcare.<sup>[3]</sup> With respect to these policies, the aim of the global patient safety challenge on medication safety is to deal with shortcomings in the healthcare system that lead to medication errors and their consequences.<sup>[4]</sup> This includes situations that lead to medication errors in medication prescription, distribution, and consumption, which, among other reasons, could be a health worker's

fatigue, shortages of staff, poor training, or the wrong information being given to patients.<sup>[4]</sup> Thus, reducing the harm of severe and avoidable medication errors by 50% in all countries is a priority of the World Health Organization (WHO).<sup>[4]</sup>

Medication administration errors (MAEs) are highly prevalent to the extent that each patient had at least one type of MAE in Felege Hiwot Referral Hospital, Ethiopia.<sup>[5]</sup> A systematic review revealed that 8.4% of inpatients in African hospitals experienced adverse drug events, and this contributed to 2.8% of admissions.<sup>[6]</sup> In another large-scale study with 2386 healthcare providers (HCPs) in Nigeria, the prevalence of self-reported medication errors among the participants was 47%.<sup>[7]</sup> Globally, there is an annual estimate of 42.7 million medical incidents in relation to diagnoses, prescribing

and dispensing medication, administering documentation, surgical procedures, and decision-making.<sup>[8,9]</sup> The medical incidents in low- and middle-income countries still remain unacceptably high.<sup>[8]</sup> In all of these, errors in the prescription and medication use constitute the most damaging errors.<sup>[10,11]</sup>

Medication safety refers to preventing and managing medication errors, which are unintended mistakes in the medicine-use process caused by omissions or commissions, as well as other errors.<sup>[12]</sup> Safety in the processes and practices are necessary for the management of the medication pathway. These include procuring, supplying, storing, compounding, manufacturing, prescribing, dispensing, administering, and monitoring the effects of medicines.<sup>[13]</sup> Giving appropriate medication to the patient is important in posing adherence and control of symptoms, overall care, and further management.<sup>[14]</sup> Barriers to medication administration safety are those factors interfering with appropriate medication administration processes. These factors can be related to the provider, patient, healthcare team, and work environment.<sup>[15]</sup>

Medication administration is a primary role of nurses; they perform the last check and are the last safeguard of inpatients from medication errors.<sup>[16,17]</sup> Nurses play a major role in ensuring the safety and quality of healthcare services.<sup>[18]</sup> Nurses can preclude possible medication errors by adhering to medication administration principles<sup>[19]</sup>; however, nurses are not the only ones who administer medications. Physicians, certified medication technicians, patients and their family members also administer medications.<sup>[20]</sup> Despite the importance of accurate medication administration, errors in medication are ubiquitous among nurses.<sup>[16]</sup> Approximately one of every three MAEs were attributable to nurses administering medications to patients.<sup>[20]</sup> Also, uncovering the consistent medical errors and finding solutions to those errors are challenging.<sup>[1]</sup> However, identifying factors contributing to those errors is among the best methods of improving the situation.<sup>[21]</sup> Thus, consistent reports of medication errors and unveiling their solutions are challenges facing the healthcare system; however, most of the studies concentrated on identifying barriers to medication error reporting. The barriers to safe medication administration practices were superficially studied and we have not found any study that correlates the safety practices in medication administration and their barriers. Therefore, this cross-sectional study examined the correlation between medication administration safety practices and perceived barriers among nurses in northern Nigeria.

## METHODS

The Zamfara State Health Research Ethical Committee gave the approval for the study, and permission to conduct the study was obtained from the management of each selected hospital. Informed consent was obtained

from each of the respondents. The study was descriptive and quantitative research used a cross-sectional design. The study population was nurses (including midwives) employed by the Zamfara State Government in northern Nigeria who are registered and licensed to practice by the Nursing and Midwifery Council of Nigeria. Included nurses were those offering in-patient services and working in secondary or tertiary hospitals of the state. All registered nurses, registered midwives, and other post-registration specialties, such as registered nurse-midwives, registered pediatric nurses, registered ophthalmic nurses, registered perioperative nurses, registered anesthetic nurses, and registered accident and emergency nurses, were included in the study. Nurses working in schools as educators or ministries and other health parastatals as administrators were excluded from the study. Inclusion and exclusion criteria were duly followed, allowing only eligible persons from different facilities and different areas of practice to participate.

The selected tertiary hospital was Ahmad Sani Yariman Bakura Specialist Hospital Gusau, the state's only tertiary hospital. Also, three general hospitals from each of the three senatorial zones were randomly selected. The primary health centers and private hospitals were excluded from the study. Data were obtained using two questionnaires: The Medication Administration Safety Assessment Tool comprising 27 items adopted from Araújo et al<sup>[22]</sup> was used to elicit information on medication administration safety practices, and the Medication Administration Safety Perceived Barriers Questionnaire comprising 12 self-constructed items was used to obtain data on the perceived barrier to medication safety. Responses of the two instruments were based on a 5-point Likert scale (strongly disagree, disagree, neutral, agree, and strongly agree). The questionnaires had a reliability of 0.85<sup>[22]</sup> and 0.82 using the Cronbach alpha, respectively.

The sample size was calculated using the Cochran sample size determination formula, and the sample size was 248. The questionnaires were distributed and collected manually by visiting the selected hospitals. However, 39 of the distributed questionnaires were not returned, making the total retrieved questionnaires 209, with a response rate of 84.3%. Simple random sampling was used in selecting three secondary hospitals from each of the three zones of the state. The one and only tertiary hospital of the state was purposively selected. Proportionate and systematic samplings were used in selecting the respondents of the study. The total population was 698 (both secondary and tertiary facilities). Secondary hospitals had 559 nurses, and the tertiary hospital had 139 nurses. Proportionately,  $[(n/698) \times 248]$  for the secondary facilities with 559 population, the sample size was 199, and for the tertiary facility with a population of 139, the sample size was 49. Likewise, respondents were allotted proportionately based on the number of nurses in each general hospital. A sampling frame was obtained from each hospital that served as a tool for systematic

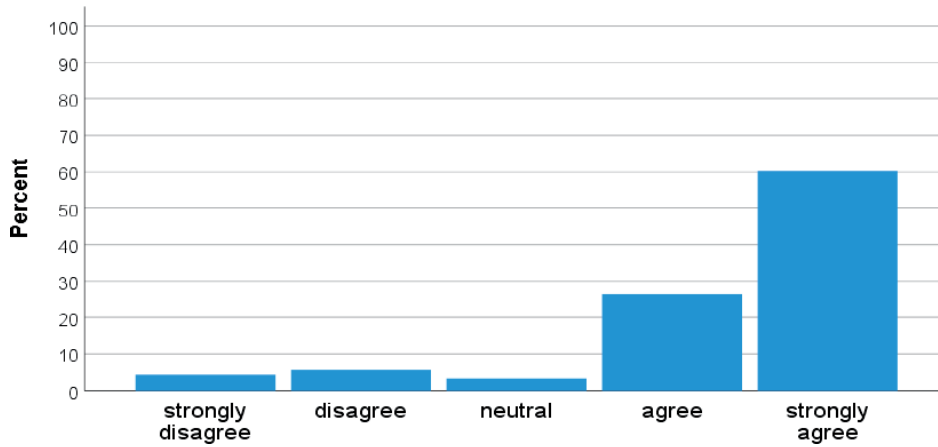


Figure 1. Levels of agreement with item 1, “I use at least two identifiers to confirm the patient before administering medication.”

sampling after calculating the sampling interval with every n<sup>th</sup> number selected.

The Statistical Package for the Social Sciences (SPSS) (version 26, IBM Corp.) was used for data analysis. Descriptive analysis results are presented in frequencies and percentages as well as means and standard deviations of the two questionnaires. For data that failed the normality test, the Spearman rank-order correlation was used to test the correlation between the medication administration safety practices and perceived barriers among nurses by using the mean scores of the two instruments.

## RESULTS

Registered nurses (RNs) formed 44.5% of respondents, registered midwives formed 30.6% of the respondents, and 24.9% of the respondents had post-registration qualification. It was found that 23.9% of the respondents had less than 1 year of working experience, 32.5% had 1 to 5 years of working experience, 19.6% had 6 to 10 years of working experience, and 23.9% had more than 10 years of working experience.

The majority of respondents had high percentages of agreement and strong agreement for most items related medication administration safety practices. Some of these items are critical to medication administration safety, including the following: Most of the respondents either agree or strongly agree (26.3% and 60.3%, respectively; mean ± SD 4.33 ± 1.07) that they used at least two identifiers to confirm the patient before administering medication (Fig. 1). With respect to this, only 4.3% and 5.7% strongly disagree and disagree, respectively; and 3.3% were neutral (Fig. 1). Most of the respondents agree and strongly agree (24.9% and 67.9%, respectively; 4.54 ± 0.86) that they identify the route of administration prescribed for the medication before administering it (Fig. 2). Moreover, respondents had the highest percentage of agreement and strong agreement (28.2% and 48.8%, respectively; 4.11 ± 1.12) of recording all medication-related events (Fig. 3).

Other items with high percentage of agreement and strong agreement and mean score greater than 4.0 include the following: verifying the name of the prescription medication before administering it (4.46 ± 0.89); only bringing to the bed medications prescribed to a single patient (4.11 ± 1.04); checking if a patient is

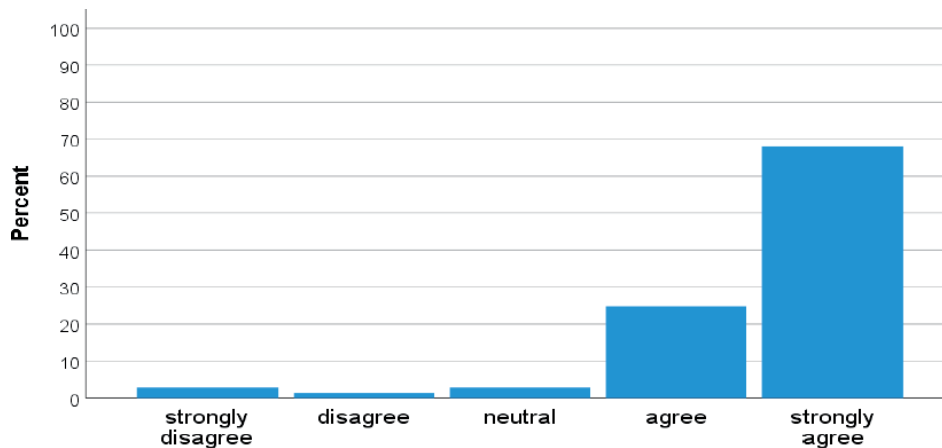
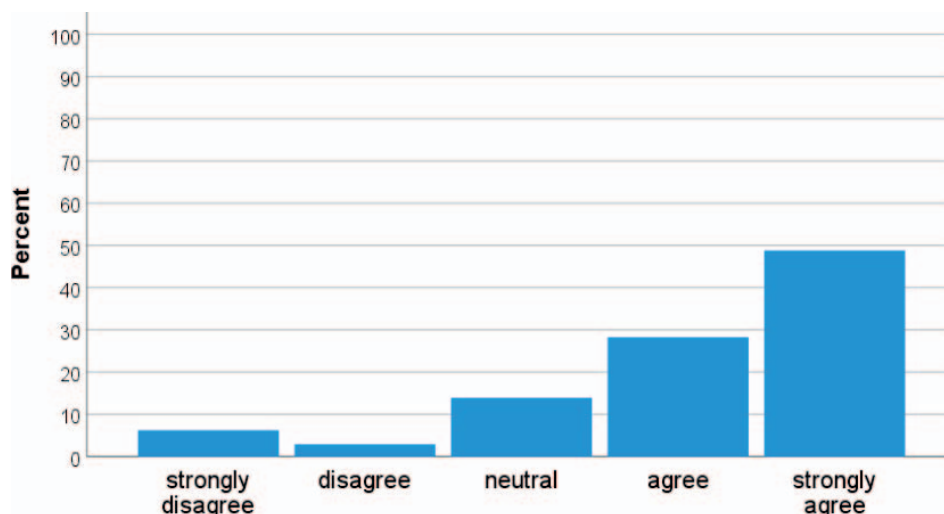


Figure 2. Levels of agreement with item 7, “I identify the route of administration prescribed for the medication before administering it.”



**Figure 3.** Levels of agreement with item 20, “I record all medication-related events.”

allergic to the prescribed medication ( $4.07 \pm 1.00$ ); checking if the prescribed route is technically recommended for administering the medication ( $4.28 \pm 0.85$ ); washing hands before preparation and administration of medications ( $4.27 \pm 0.97$ ); using aseptic materials and techniques to administer medications ( $4.25 \pm 0.94$ ); administering medication at the right time ( $4.44 \pm 0.86$ ); carefully checking the dosage prescribed for the medication ( $4.55 \pm 0.83$ ); double-checking calculations for preparation and for administration of potentially dangerous or high vigilance medications ( $4.15 \pm 0.94$ ); using standard measuring tools to prepare medications to measure dosages accurately ( $4.09 \pm 1.01$ ); recording the time of administration of the medication immediately after each dose ( $4.39 \pm 0.92$ ); checking if the medication to be administered is in a form compatible with the prescribed route of administration ( $4.23 \pm 0.84$ ).

Some items had a high percentage of agreement and disagreement with a mean score of less than 4.0. These included checking the drip speed, programming, and operation of continuous infusion pumps with the prescription ( $3.93 \pm 1.05$ ); notifying the risk management center and  $\pm$  or patient safety center of any incidents related to medication ( $3.69 \pm 1.12$ ); keeping adequate records of prepared medications to be stored ( $3.91 \pm 1.12$ ); clarifying doubts about prescribing before the prescriber ( $3.86 \pm 1.05$ ); guiding the patient and the companion about the name of the medication administered, justification, and expected effects ( $3.50 \pm 1.23$ ); and evaluating the patient to identify, if possible, whether the medication had the desired effect ( $3.67 \pm 1.12$ ).

Most of the respondents either strongly disagree or disagree (31.6% and 36.8%, respectively;  $2.28 \pm 1.25$ ) that they administer medication by verbal order only in case of emergency. Fewer than 50% of the respondents were found to agree or strongly agree (26.8% and 22.5%,

respectively;  $3.39 \pm 1.20$ ) that they identify the allergic patient in two or more ways, with a bracelet and a medical record. Most of the respondents either strongly disagree or disagree (14.8% and 36.4%, respectively;  $2.76 \pm 1.23$ ) that they adjust the administration times of the medications as part of the routine. However, other items having the highest percentages toward agreement nonetheless have mean practices of less than 3.5. The practice of returning leftover unadministered medications to the pharmacy had a mean of  $3.31 \pm 1.33$ . The respondents' practices of informing the prescriber of all effects other than expected for the medication had had a mean of  $3.41 \pm 1.19$ .

Table 1 shows that most of the respondents had agreed or strongly agreed to the following as barriers to medication administration safety practices: high workload or patient-nurse ratio (28.7% and 32.1% agreed and strongly agreed, respectively,  $3.49 \pm 1.43$ ); lack of supervision from superiors (31.1% and 19.1% agreed and strongly agreed, respectively,  $3.21 \pm 1.35$ ); lack of appropriate coordination between physicians and nurses (34.4% and 19.6% agreed and strongly agreed, respectively,  $3.28 \pm 1.34$ ); lack of favorable policies and facilities (28.7% and 21.1% agreed and strongly agreed, respectively,  $3.33 \pm 1.27$ ); distractions and interruptions during medication administration (38.3% and 18.2% agreed and strongly agreed, respectively,  $3.33 \pm 1.29$ ); and lack of patient monitoring after drug administration (30.1% and 21.1% agreed and strongly agreed, respectively,  $3.32 \pm 1.30$ ).

Most of the respondents either disagreed or strongly disagreed (17.2% and 32.5%, respectively,  $2.90 \pm 1.36$ ) with nurses' poor working experience as a barrier to medication administration safety practices. This is followed by lack of appropriate coordination between nurses themselves (20.1% and 25.4% disagreed and strongly disagreed, respectively,  $2.94 \pm 1.43$ ); nurses' unprofessional practices (21.5% and 23.9% disagreed



**Table 1.** Levels of perceived barriers to medication administration safety practices among nurses,  $N = 209$ 

Barrier	Responses, $n$ (%)					Mean (SD)
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
1. High workload or patient-nurse ratio	27 (12.9)	38 (18.2)	17 (8.1)	60 (28.7)	67 (32.1)	3.49 (1.43)
2. Insufficient nurses' knowledge of medication safety rules	25 (12.0)	30 (14.4)	67 (32.1)	57 (27.3)	30 (14.4)	3.18 (1.20)
3. Nurses' unprofessional practice	45 (21.5)	50 (23.9)	26 (12.4)	49 (23.4)	39 (18.7)	2.94 (1.45)
4. Nurses' poor working experience	36 (17.2)	68 (32.5)	15 (7.2)	61 (29.2)	29 (13.9)	2.90 (1.36)
5. Lack of supervision from superiors	30 (14.4)	42 (20.1)	32 (15.3)	65 (31.1)	40 (19.1)	3.21 (1.35)
6. Lack of appropriate coordination between physicians and nurses	29 (13.9)	38 (18.2)	29 (13.9)	72 (34.4)	41 (19.6)	3.28 (1.34)
7. Lack of appropriate coordination between pharmacists and nurses	39 (18.7)	54 (25.8)	29 (13.9)	59 (28.2)	28 (13.4)	2.94 (1.35)
8. Lack of appropriate coordination between nurses themselves	42 (20.1)	53 (25.4)	28 (13.4)	47 (22.5)	39 (18.7)	2.94 (1.43)
9. Issues with the physical work environment	22 (10.5)	35 (16.7)	51 (24.4)	62 (29.7)	39 (18.7)	3.29 (1.25)
10. Lack of favorable policies and facilities	20 (9.6)	40 (19.1)	45 (21.5)	60 (28.7)	44 (21.1)	3.33 (1.27)
11. Distractions and interruptions during medication administration	24 (11.5)	40 (19.1)	27 (12.9)	80 (38.3)	38 (18.2)	3.33 (1.29)
12. Lack of patient monitoring after drug administration	26 (12.4)	32 (15.3)	44 (21.1)	63 (30.1)	44 (21.1)	3.32 (1.30)

and strongly disagreed, respectively,  $2.94 \pm 1.45$ ); and lack of appropriate coordination between pharmacists and nurses (18.7% and 25.8% disagreed and strongly disagreed, respectively,  $2.94 \pm 1.35$ ).

Table 2 indicates a Spearman rank correlation statistical analysis with a very weak positive correlation between medication safety practices and barriers to medication safety practices, and the correlation was statistically significant ( $r_s = 0.180$ ,  $p = 0.009$ ).

## DISCUSSION

We studied medication administration safety practices and perceived barriers among nurses. The responsibility of medication administration primarily rested on nurses; therefore, they were the subjects of this study. According to the findings of the study, most respondents had desirable medication administration safety practices with respect to most of the questionnaire items. This shows the respondents' high level of good medication administration practices. However, in research conducted in Egypt, the total practice score of nurses in medication administration was 46.4% poor practices, 30% fair practices, and 23.6% good practices.<sup>[23]</sup> The gross difference might be because the study in Egypt was an observational study and was conducted in specialist

**Table 2.** Spearman correlation of medication administration safety practices and perceived barriers among nurses

Correlation	Mean medication safety practices	Mean barrier to medication safety practices
Mean medication safety practices		
Correlation coefficient	1.000	0.180*
Significance (2-tailed)		0.009
N	209	209
Mean barrier to medication safety		
Correlation coefficient	0.180*	1.000
Significance (2-tailed)	0.009	-
N	209	209

\*Correlation is significant at the 0.01 level (2-tailed).

hospitals, unlike this study, which used the self-reported method and was conducted in both specialist and general hospitals.

In this study, the highest percentage of the respondents either strongly disagreed or disagreed with administering medication by verbal order only in case of emergency. In support of using verbal orders in healthcare practice, Moghaddasi et al<sup>[24]</sup> asserted that from time immemorial the verbal order has been a common communication method used in the healthcare system, especially outside office hours. However, in opposition to verbal orders, a study about understanding the nature of medication errors found that of 19% drug administration errors, two-thirds were related to verbal orders<sup>[25]</sup>; and contrary to the finding of this study, the verbal order method should be used only in case of emergency conditions.<sup>[24]</sup>

Most of the respondents in this study did not identify the allergic patient in two or more ways, with a bracelet and a medical record for instance. This means that the respondents took a risk in administering drugs without knowing the allergic stance of the patient. The Nightingale pledge has vividly stated that nurses "will not administer any harmful drug."<sup>[26]</sup> This practice can expose allergic patients to inadvertent adverse consequences and negates the Nightingale pledge that nurses "will not administer any harmful drug."<sup>[26]</sup> It also reinforces the perception that the greatest threats to safety in healthcare are complacency and unconscious behaviors in nursing practice.<sup>[26]</sup> Powrie<sup>[27]</sup> made it clear that all medications should be administered only after observing medication administration "rights" and reviewing the allergic status of the patient. Also, verifying a patient's allergic status is a benchmark in healthcare practice; it prevents a potential MAE and enhances healthcare safety.<sup>[28]</sup>

The respondents' disagreement on adjusting the medication administration times to the routine had the highest score than agreement; however, adjusting the time of medication administration to the routine is allowed in certain conditions. Scheduled medications

may be administered early or late or may even be omitted under specific circumstances, including if administration of a time-critical scheduled medication will be or has been delayed or administered early beyond allowable expectations.<sup>[29]</sup> It is not surprising that returning leftover unadministered medications to the pharmacy had a low mean because the pharmacy units of many hospitals in Nigeria were not providing comprehensive pharmaceutical care service per best practices. This is asserted by Ma'aji et al<sup>[30]</sup> and Auta et al<sup>[31]</sup> that in many Nigerian hospitals, pharmaceutical services are limited to the traditional function of dispensing drugs to clients and inventory control.

The mean practices of respondents informing the prescriber of all effects other than expected was below the expectation. This is because coordinating patient care from different health disciplines is a major role of a nurse. Urquhart et al.<sup>[32]</sup> opined that nurses' roles as primary patient caregivers for 24 hours and as coordinators of care from other healthcare professionals require sharing information as an essential nursing activity. Thus, poor sharing of information regarding the unexpected effect of a drug could be detrimental to medication administration safety. This is in line with the lack of appropriate coordination between physicians and nurses in this study, in which most of the respondents either agree or strongly agree with lack of appropriate coordination between physicians and nurses as a barrier to medication administration safety practices.

Most of the respondents perceived a high workload or patient-nurse ratio as a barrier to medication administration safety practices. This is in accordance with a study on perceptions regarding medication administration errors among hospital staff nurses in South Korea, in which an inadequate number of staff nurses ( $4.88 \pm 1.05$ ) and heavy workload ( $4.23 \pm 1.22$ ) were perceived by nurses to cause MAEs.<sup>[18]</sup> Lack of supervision from superiors was also perceived to be a barrier by most of the respondents of this study. However, this finding is contrary to a study in the Udipi district, Karnataka, India, where it was found that lack of supervision was the least reported barrier (3.3%).<sup>[33]</sup> But the study in Karnataka, India, was on practices of intravenous (IV) medication management only, unlike this study, which was on general medication administration practices. This might account for the difference in findings of the two studies.

The highest percentages of the respondents in this research perceived lack of appropriate coordination between physicians and nurses as a barrier to medication administration safety practices. A study by Farzi et al.<sup>[34]</sup> had a similar finding in which respondents identified inadequate collaboration between healthcare professionals as a cause of medication errors. Another important factor identified by most respondents of this study as a barrier to medication administration safety is the lack of policies and facilities on medication administration. In line with this study, a study by Wondmieneh et al<sup>[21]</sup> found that the lack of using guidelines for medication

administration two times predisposes nurses to MAEs than when the guidelines were followed (adjusted odds ratio = 2.07; 95% confidence interval 1.06–4.06). Distractions and interruptions during medication administration were also identified by most of the respondents of this study as a barrier to medication administration safety practices. This is consistent with a finding by Farzi et al.<sup>[35]</sup>

Most respondents of this study agreed that lack of patient monitoring after drug administration is a barrier to medication administration safety practices. The WHO has also asserted patient monitoring as one of the factors that may influence medication errors.<sup>[36]</sup> Also, a study in the United Kingdom found that 12% of all primary care patients might be affected by a prescribing or monitoring error over the course of a year.<sup>[36]</sup> This might be in accordance with the perceived high workload found in this research.

In this study, most respondents either disagreed or strongly disagreed with nurses' poor working experience as a barrier to medication administration safety practices. Thus, lack of working experience was not a problem among the respondents. This is a commendable situation because experience among nurses is necessary for avoiding MAEs. Wondmieneh et al<sup>[21]</sup> found that lack of work experience was significantly associated with MAEs. Another important finding of this study is that most of the respondents did not perceive the lack of appropriate coordination between nurses themselves as a barrier to medication administration safety practices. This finding is in accordance with the nurses' roles, as the coordination of care, collaboration, communication, managing clinical risks, and promoting safety are among the key responsibilities of a nurse.<sup>[37]</sup>

Most of the respondents did not perceive nurses' unprofessional practices as a barrier to medication administration safety in their area of practice. Low unprofessional practices would help in reducing the MAEs. However, in conflict with this finding, a study on errors linked to medication management in nursing homes found an unprofessional approach below or contrary to the standards throughout the medication administration process as one of the human factors that cause MAEs.<sup>[38]</sup> The study was qualitative, with 21 participants, unlike this study, which was quantitative with a larger sample. This difference could be the source of the disparity between the two studies. Most of the respondents of this study perceived appropriate coordination between pharmacists and nurses in their practice area. This is in accordance with the expected nurses' roles of coordination of care among the healthcare professionals,<sup>[37]</sup> and it is of paramount importance in mitigating the menace of MAEs. However, this finding is contrary to information in the literature that pharmacist roles are limited to drug dispensing and inventory control in many Nigerian hospitals.<sup>[30,31]</sup> Thus, this called for an independent study on the matter.

This study demonstrated a very weak significant positive correlation between medication safety practices and perceived barriers to medication safety practices. This means that when medication administration safety practices increased, perceived barriers to medication safety practices also increased. It indicates that the nurse who followed medication safety practices would be more conscious of the barriers to the practices than the nurse who did not follow the medication administration safety practices. This finding is in line with another study finding that indicated a statistically significant positive relationship between errors made during drug administration and such errors that occurred as a result of environmental factors human factors, system factors, and failure to report previous errors.<sup>[39]</sup> Also, in accordance with this study, Mahran and Ibrahim<sup>[40]</sup> also found a very weak correlation between safety culture and application of medication safety rules among nurses, and the correlation was significant ( $r = 0.218, p = 0.001$ ); however, barriers to medication safety practices and safety culture, although related, are quite different.

### Strengths and Limitations

This study made a correlation between medication administration safety practices and barriers to safety practices; such studies are scarce in the literature. Items in the Medication Administration Safety Assessment Tool and Medication Administration Safety Perceived Barriers Questionnaire were analyzed individually. The results of these surveys revealed the exact safety practice that was lacking among the respondents, and the exact barrier to safety in the practice area. However, using the self-reported method, which is associated with reporter bias, is a limitation of this study. An attempt was made to minimize reporter bias by ensuring anonymity and assuring respondents that the information provided would be treated with the utmost confidentiality.

### CONCLUSION

We studied medication administration safety practices and perceived barriers among nurses. There was a high level of desirable medication administration safety practices among the respondents. Some of the practices with the highest level include carefully checking the dose prescribed for the medication, identifying the route of administration prescribed for the medication before administering it, and verifying the name of the prescription medication before administering it. However, respondents reported a low level of medication administration safety practices in some areas, such as nonidentification of patient allergic status, and not informing prescribers of all effects of medications other than expected. It could be said that the finding of this study related to allergy identification predisposes patients to MAE harm and is a threat to medication administration safety. The perceived barriers that most of the respondents agreed include high workload or patient-nurse ratio, lack

of supervision from superiors, lack of appropriate coordination between physicians and nurses, lack of policies and facilities, and lack of patient monitoring after drug administration. Existence of these kinds of barriers is highly detrimental to safety and quality of patient care.

Most of the respondents did not perceive nurses' poor working experience, lack of appropriate coordination between nurses themselves, nurses' unprofessional practices, and lack of appropriate coordination between pharmacists and nurses as barriers to medication administration safety in their areas of practice. There was a significant relationship between medication safety practices and perceived barriers to medication safety practices with a very weak correlation. There should be policies guiding medication administration in all hospitals in Zamfara, Nigeria.

Based on the findings of this study, more studies that would elucidate the medication administration practices and their barriers among nurses are recommended. Observational studies in the area of this study should be carried out. Moreover, qualitative studies that would provide in-depth investigation on the practices and perceived barriers of medication administration safety also could be beneficial in providing robust findings.

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