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Assessment of Medication Errors and Prevention Strategies in Selected Hospitals in Kwara State, Nigeria

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Abstract

Medication errors pose a significant challenge to patient safety worldwide, with Africa bearing the highest burden of preventable medication-related harm; however, limited data exist for Kwara State, Nigeria. This study assessed the knowledge, awareness, prevalence, causes, and prevention strategies of medication errors among 450 healthcare workers in selected hospitals across the three senatorial zones of Kwara State, using a sequential explanatory mixed-method design that included key informant interviews with five professionals. Findings showed that 91.8% of participants were aware of medication errors, but only 60.2% demonstrated good knowledge, which was significantly associated with age, tribe, religion, and professional role. The prevalence of self-reported medication errors was 73.6%, with poor handwriting (62.9%) and lack of communication among healthcare providers (54.9%) identified as the main causes; the most common self-reported error was failure to consider patient allergies (48.9%). Although 73.8% of facilities had training programs and 67.3% had medication error reporting systems, key informants highlighted staff shortages and work overload as primary contributing factors. Participants recommended more frequent training (74.9%), improved interprofessional communication (70%), and increased resource allocation (97.3%) to reduce errors. The study concludes that despite high awareness, knowledge gaps remain, and the high prevalence of medication errors calls for urgent implementation of comprehensive prevention strategies, including regular training, adequate staffing, standardized reporting systems, and enhanced communication among healthcare professionals. Future studies should attempt to assess the drivers of the major causes of medication errors reported in the present study as well as identify the medication error rates in under-studied populations.

Keywords: *Healthcare Workers, Kwara State, Medication Errors, Nigeria, Patient Safety, Prevention Strategies.*

Introduction

Medication is the most widely used therapeutic intervention in modern healthcare, yet errors in the medication process remain a persistent threat to patient safety worldwide [1]. Medication errors are defined as any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of healthcare professionals, patients, or consumers [2]. These errors can occur at any stage of the medication handling process, including ordering, prescription, preparation, dispensing, administration, and monitoring [3].

The global burden of medication errors is substantial. Worldwide, medication errors are responsible for 9% of avoidable healthcare costs, with healthcare systems losing approximately US$42 billion annually [4, 5].

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The World Health Organization (WHO) has declared ensuring safe medication practice as the third global challenge for patient safety [4]. Recent meta-analyses indicate that 5% of patients globally experience medication error-related harm, with this figure rising to 7% in low- and middle-income countries (LMICs) [5]. The African region contributes the highest proportion (9%) of preventable medication error-related harm globally [5].

In Nigeria, medication errors represent a significant public health concern. A national survey of 2,386 health professionals reported a prevalence of self-reported medication errors of 47% [6]. These errors are driven by multiple factors including high workload from staff shortages, communication problems, poor working environments, and inadequate training [9, 10]. Despite various international initiatives to reduce medication errors, success depends on establishing baseline knowledge, prevalence, and identifying contextually appropriate preventive strategies in areas where data scarcity persists.

Kwara State, like most Nigerian states, faces significant healthcare challenges including inadequate infrastructure, shortage of healthcare personnel, and poor community awareness [7]. These factors are known contributors to medication errors [12, 13]. While previous studies have assessed medication errors in various Nigerian states [8, 9, 14–16], there is limited comprehensive data on medication errors and prevention strategies in Kwara State healthcare facilities. The single previous study from Kwara State was limited to prescription errors among patients and did not assess healthcare workers' knowledge or existing prevention strategies [8].

This study aimed to comprehensively assess the knowledge, awareness, prevalence, causes, and prevention strategies of medication errors among healthcare workers in selected hospitals across the three senatorial zones of Kwara State, Nigeria. The findings will inform policy development and targeted interventions to enhance medication safety in the region.

Methods

Study Design

This study employed a sequential explanatory mixed-methods design over five months (June–October 2025). Quantitative data were collected and analyzed first using semi-structured questionnaire, followed by qualitative data collection through Key informant interviews to further explain and contextualize the quantitative findings.

Study Area

The study was conducted in nine healthcare facilities across the three senatorial zones of Kwara State, Nigeria (Figure 1). Kwara State, located in North Central Nigeria, comprises 16 Local Government Areas with an estimated population of 2.37 million . The state has 994 health facilities: 3 tertiary, 209 secondary, and 782 primary. The selected facilities included General Hospital Patigi, General Hospital Omu-Aran, General Hospital Lafiagi, Cottage Hospital Lade, Cottage Hospital Adewole, Primary Healthcare Centre Osin, Primary Healthcare Centre Alanamu, Medview Hospital, and Molab Hospital. These were purposively selected to ensure representation across geographical zones and service levels.

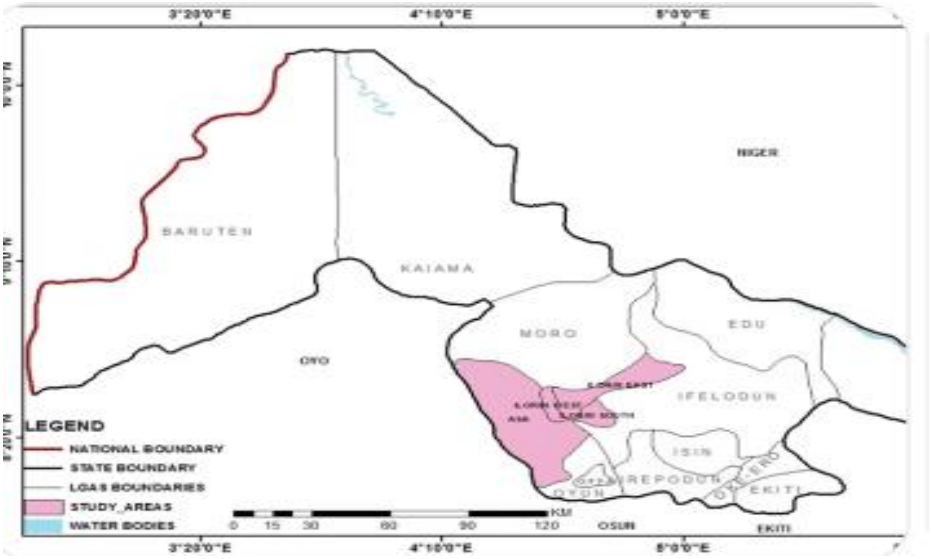

Figure 1. Location and Site of Study

Study Population and Sampling

Quantitative Component

The study population comprised healthcare workers (physicians, nurses, pharmacists, and pharmacy technicians) involved in prescribing, dispensing, administering, and monitoring medications. Sample size was calculated using Araoye's formula [9]:

$n = z^2pq/d^2$

Where: z = 1.96 (95% confidence level), p = 0.53 (prevalence of good knowledge from previous study), [21] q = 0.47, and d = 0.05 (degree of accuracy).

The calculated sample size was 382, adjusted to 424 to compensate for 10% non-response. However, 450 questionnaires were distributed to improve study power.

A multistage probability sampling technique was employed. In stage one, simple random sampling was used to select three health facilities from each senatorial zone (General Hospital Pategi, General Hospital Omu Aran, General Hospital Lafiagi, Cottage Hospital Lade, Cottage Hospital Adewole, Primary Healthcare Centre Osin, Primary Healthcare Centre Alanamu, Medview Hospital, and Molab Hospital). Proportionate allocation determined the number of questionnaires administered per facility based on total healthcare workers involved in medication processes. In stage two, random sampling was used to select respondents present at each facility during data collection.

Qualitative Component

Five key informants were purposively selected from three hospitals across the senatorial districts (General Hospital Pategi, General Hospital Omu Aran, and Cottage Hospital Adewole). Selection criteria included hospital rank, minimum of 8 years' experience, and demonstrated knowledge of medication errors based on staff recommendations. The key informants comprised three nurses (including two directors), one physician, and one pharmacist.

Reliability and Validity of the Instruments

Validity of the instrument was established through expert review to ensure clarity, relevance, and adequate coverage of the study objectives. The internal consistency of the questionnaire was evaluated using Cronbach's alpha coefficient. Dichotomous responses were coded as yes = 1 and no = 0 before the analysis. Reliability testing of the 34 items produced a Cronbach's alpha coefficient of

0.836 (standardized alpha = 0.833), demonstrating good internal consistency.

Data Collection

Quantitative Data

A pre-tested semi-structured questionnaire was administered online via Google Forms. The questionnaire assessed sociodemographic characteristics, knowledge and awareness of medication errors, causes and risk factors, existing safety protocols, and potential prevention strategies. Knowledge of participants was measured through a set of ten questions, each requiring a "Yes" or "No" answer. Each correct or positive response contributed one point to the total score. A total score greater than 5 (i.e., 6 to 10) was classified as "good knowledge," indicating a higher level of understanding or awareness. Scores from 0 to 5 indicated "poor knowledge," reflecting a lower level of understanding.

Qualitative Data

Key informant interviews were conducted using a semi-structured interview guide. Written invitations were sent beforehand, and informed consent was obtained before interviews. Sessions lasted 10-30 minutes and were audio-recorded with permission. Interviews took place in the informants' offices, with two research assistants facilitating each session.

Data Analysis

Quantitative Analysis

Data were extracted to Excel and imported into IBM SPSS version 22 for analysis. Descriptive statistics (frequencies, percentages, means, standard deviations) summarize sociodemographic characteristics and responses. Chi-square and Fisher's exact tests examined associations between sociodemographic factors and knowledge of medication errors. Statistical significance was set at $p<0.05$.

Qualitative Analysis

Audio recordings were transcribed verbatim using Turboscribe software and verified for accuracy. Narrative analysis was conducted with NVivo software for data organization. Transcripts were read repeatedly to identify patterns. Four main categories emerged: definition of medication errors, causes, existing prevention strategies, and potential prevention strategies. Similar responses were coded inductively, and themes and sub-themes emerged from pattern analysis.

Ethical Considerations

Ethical approval was obtained from the Kwara State Ministry of Health Ethical Research Committee. Written informed consent was obtained from all participants. Confidentiality and anonymity were maintained throughout the study. Participation was voluntary, and participants could withdraw at any time without consequences.

Results

Sociodemographic Characteristics

A total of 450 healthcare workers participated in the quantitative component (100% response rate). The majority were aged 45-54 years (30.7%), female (63.6%), Yoruba (73.6%), and Muslim (62.2%). Most had higher diploma qualifications (59.6%), were nurses (60%), had 11-20 years of work experience (34.0%), and worked in public hospitals (82.4%) (Table 1).

Table 1. Sociodemographic Profile of Participants (N=450)

Characteristic	Frequency (n)	Percentage (%)
Age Group		
18-24 years	36	8.0
25-34 years	110	24.4
35-44 years	107	23.8
45-54 years	138	30.7
≥55 years	59	13.1
Gender		
Male	164	36.4
Female	286	63.6
Professional Role		
Physician	61	13.6
Nurse	270	60.0
Pharmacist	33	7.3
Pharmacy Technician	86	19.1
Work Experience		
≤1 year	20	4.4
2-5 years	114	25.3
6-10 years	111	24.7
11-20 years	153	34.0
21-34 years	52	11.6
Type of Hospital		
Public	371	82.4
Private	79	17.6

Knowledge and Awareness of Medication Errors

Overall, 413 (91.8%) participants were aware of medication errors, while 271 (60.2%) had good knowledge. Participants demonstrated highest awareness of dispensing errors (80.7%), prescribing errors (74.9%), and administration errors (70.2%). Adverse reactions (79.6%), prolonged hospitalization (51.3%), patient death (51.1%), and increased healthcare costs (48.9%) were recognized as consequences of medication errors.

Knowledge of medication errors was significantly associated with age ($p \leq 0.05$), tribe ($p \leq 0.05$), religion ($p \leq 0.05$), and professional role ($p \leq 0.05$). Participants aged 45-54 years demonstrated better knowledge (77.5%) compared to other age groups. Christians had higher knowledge (70%) than Muslims (54.3%). Physicians exhibited the best knowledge (83.6%), followed by pharmacy technicians (72.1%), nurses (52.2%), and pharmacists (51.5%). No significant associations were found with gender, education level, work experience, or hospital type ($p > 0.05$) (Table 2).

Table 2. Knowledge of Medication Errors by Sociodemographic Characteristics

Variable	Good Knowledge n (%)	Poor Knowledge n (%)	χ^2/Fisher	p-value
Age Group			43.89	<0.001*
18-24 years	21 (58.3)	15 (41.7)		
25-34 years	63 (57.3)	47 (42.7)		
35-44 years	47 (43.9)	60 (56.1)		
45-54 years	107 (77.5)	31 (22.5)		
≥55 years	33 (55.9)	26 (44.1)		
Religion			11.58	0.001*
Islam	152 (54.3)	128 (45.7)		
Christianity	119 (70.0)	51 (30.0)		
Professional Role			33.99	<0.001*
Physician	51 (83.6)	10 (16.4)		
Nurse	141 (52.2)	129 (47.8)		
Pharmacist	17 (51.5)	16 (48.5)		
Pharmacy Technician	62 (72.1)	24 (27.9)		

**Statistically significant at p<0.05*

Prevalence of Medication Errors

The prevalence of self-reported medication errors was 73.6% (n=331), with 119 (26.4%) reporting no involvement or witnessing of errors. Regarding frequency, 39.3% reported rarely encountering errors, 38.7% sometimes, 13.3% never, 8.2% frequently, and 0.4% very frequently.

Causes and Contributing Factors

The most identified causes of medication errors were poor handwriting (62.9%), lack of communication among healthcare providers (54.9%), work overload (52%), look-alike/sound-alike drugs (48%), and lack of proper training (45.1%). The most frequent self-reported errors were failure to consider patient allergies (48.9%), dispensing wrong drugs (45.1%), administering wrong doses (32.4%), and misinterpreting prescriptions (29.8%) (Table 3).

Table 3. Causes of Medication Errors

Cause	Frequency (n)	Percentage (%)
Poor handwriting	283	62.9
Lack of communication	247	54.9
Work overload	234	52.0
Look-alike/sound-alike drugs	216	48.0
Lack of proper training	203	45.1
Patient allergy not considered	220	48.9
Wrong drug dispensed	203	45.1
Wrong dose administered	146	32.4
Misinterpretation of prescription	134	29.8

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Lack of medication safety training was the factor most frequently (12.7%) rated as "very often" contributing to medication errors.

Qualitative Findings

Definition of Medication Errors

Key informants defined medication errors as mistakes occurring during prescription, dispensation, administration, or patient response to drugs, which could prevent patients from receiving optimum care. One participant stated: "Medication error is the error committed in either prescription of drugs, or administration of drugs, or even after the use of a particular drug.

Causes of Medication Errors

Two main themes emerged: patient-related and healthcare worker-related factors. Patient-related factors included communication difficulties due to illiteracy or language barriers, atient overconfidence leading to non-adherence, and undeclared allergic reactions. One informant noted: "There are some patients that no matter how you try to explain to them, their informality of a level of education still affects, or prone them to experience a medication error as well."

Healthcare worker-related factors centered primarily on staff shortage and work overload. Participants emphasized that understaffing increases mental stress and error likelihood. One stated: "The work is too much. We have shortage of staff, and this causes overloading of the staff. Thereby, they can be stressed up and miss out what they are supposed to carry out." Other factors included carelessness, impatience in explaining prescriptions, and inadequate medication knowledge. Understaffing also led to reliance on unqualified personnel, further increasing error risk.

Existing Prevention Strategies

Medication error reporting varied across facilities, including pharmacovigilance forms, direct reporting to pharmacists or head nurses, and discussion during hospital meetings. Confidentiality was identified as crucial for encouraging reporting. One participant stated: "They are very comfortable because we maintain confidentiality in this hospital. Whoever committed the error will not be accused."

Healthcare workers' roles in prevention included proper drug labeling, work concentration, confirming patient understanding of instructions, appropriate prescribing and dosing, patient name verification, and documenting previous adverse reactions.

Potential Prevention Strategies

Strategies were categorized into personal-level and organizational-level approaches.

Personal-level strategies included safer medication practices (correct prescribing, administration, and prescription review; proper labeling; documenting adverse reactions; checking patient charts) and proper patient communication (detailed explanations at patient's pace; verifying understanding).

Organizational-level strategies emphasized training, staffing improvements, and workload reduction. Participants stressed the need for continuous training: "We all need drug safety training. Training cannot be too much. We need training and retraining in order to increase our capacity." Increased staffing was viewed as essential to reduce mental stress and ensure qualified personnel handle medications: "Employing more staff. Let's have sufficient staff, then let's make use of the right personnels at the right department."

Existing Safety Protocols and Policies

Training programs for medication error prevention existed in 73.8% of facilities, and 67.3% had medication error reporting systems. However, only 58.7% of participants felt comfortable reporting errors. Common safety measures included pharmacist review of prescriptions before dispensing (79.8%), regular medication safety training (74%), and double-checking high-risk medications (68%). Electronic prescribing systems (15.6%) and barcode scanning (8.7%) were rarely implemented.

Recommended Prevention Strategies

Participants recommended more frequent staff training (74.9%), better interprofessional communication (70%), and increased resource allocation (97.3%). Regarding training frequency, 41.1% preferred quarterly training, followed by annual (31.1%) and monthly (27.8%) schedules.

Discussion

This study's findings on medication error awareness and knowledge align with several Nigerian studies, indicating regional similarities and variations. The high awareness level (91.8%) observed here corresponds closely with reports from Rivers and Kaduna [21, 23] States, where awareness reached 100%, while it surpasses the 82.9% reported in Lagos State [10]. Similarly, the 60.2% good knowledge level parallels the 73.6% adequate knowledge among nurses in Calabar [11] but contrasts sharply with the notably lower 14.5% reported in Kaduna State, highlighting geographic disparities likely influenced by differences in educational outreach and healthcare infrastructure. [20-32]

The significant association between age and knowledge, particularly the superior knowledge among healthcare workers aged 45-54 years (77.5%), reflects findings from some Nigerian contexts where greater experience enhances medication safety awareness , though it contrasts with studies such as Sufiyan et al. from Kaduna State, which found no age-related differences. The observed higher knowledge among Christians compared to Muslims aligns with documented health literacy disparities in Nigeria [12], suggesting cultural factors may influence educational outcomes.

Professional role as a determinant of knowledge, with physicians exhibiting the highest knowledge (83.6%), is consistent with prior Nigerian studies attributing this to their extensive clinical training [13]. This pattern underscores the need for inclusive educational programs that engage all healthcare cadres, given that knowledge does not always translate into practice [14]—a phenomenon reported in other Nigerian healthcare settings.

The prevalence of self-reported medication errors at 73.6% is higher than rates reported in Abia (42.8%) [15] and Lagos (45.7%) [16] States but lower than Enugu (86.5%) [14] and Ondo (75%) [17] States. These regional differences may stem from variations in reporting cultures, staffing levels, and safety protocols, emphasizing the widespread nature of medication errors and the necessity for context-specific interventions.

Poor handwriting as the leading cause of medication errors (62.9%) concurs with previous Nigerian studies documenting legibility issues as a persistent problem, often exacerbated by high patient loads [18]. Communication failures, work overload, and lack of training as major contributing factors are also consistent with findings from other low- and middle-income, reinforcing the universality of these challenges in resource-constrained settings.

The predominance of failure to consider patient allergies (48.9%) as a common error aligns with international concerns about adverse drug reactions linked to inadequate

patient history taking [19]. Qualitative insights regarding patient illiteracy and cultural factors affecting communication resonate with documented barriers in similar Nigerian contexts.

The identification of lack of medication safety training as a frequent contributor to errors parallels findings from Ethiopia and other African settings, underscoring training as a critical intervention point. Although 73.8% of facilities had training programs, the expressed need for continuous and varied training modalities echoes global recommendations advocating ongoing education to sustain medication safety.

The presence of medication error reporting systems in 67.3% of facilities is encouraging and comparable to findings in Kaduna State , though discomfort with reporting among 41.3% of participants reflects a well-known barrier noted in Nigerian and international studies, where fear of blame limits disclosure . The emphasis on confidentiality as a facilitator for reporting aligns with global best practices promoting a non-punitive culture .

Preventive measures such as pharmacist prescription review (79.8%) are consistent with international evidence supporting pharmacist involvement in reducing errors . However, low adoption of electronic prescribing (15.6%) and barcode scanning (8.7%) mirrors challenges reported in other Nigerian and LMIC healthcare settings, indicating technological gaps that limit error reduction.

Participants' recommendations for frequent training (74.9%), improved interprofessional communication (70%), and increased resource allocation (97.3%) reflect priorities identified in similar studies across Nigeria and sub-Saharan Africa, highlighting a convergence of healthcare workers' perspectives on necessary systemic improvements.

The qualitative emphasis on staffing and workload reduction as organizational-level interventions is particularly noteworthy. While immediate staffing increases may be challenging in resource-constrained settings, evidence-based strategies including mindfulness training, stress management, small group discussions, and improved rostering can help healthcare workers cope with work-related stress.

Study Limitations

This study has few limitations, with a few major ones highlighted:

- The cross-sectional design precludes causal inferences.
- Self-reported data may be subject to recall and social desirability bias, potentially underestimating error prevalence.
- The study was limited to nine facilities in Kwara State, which may limit generalizability to other Nigerian states or healthcare settings.
- The qualitative component involved only five key informants, though data saturation was achieved.
- Patient perspectives were not included, which could provide valuable insights into medication error experiences and consequences.

Conclusion

This study reveals significant gaps in medication error knowledge and high error prevalence among healthcare workers in Kwara State, Nigeria. While awareness is high (91.8%), only 60.2% possess good knowledge, and 73.6% report involvement in or witnessing medication errors. Poor handwriting, communication failures, and work overload emerge as primary causes, with staff shortage identified as a critical underlying factor. Although most facilities have training programs and reporting systems, implementation gaps persist, particularly

regarding confidential reporting and advanced technologies.

The findings underscore the urgent need for comprehensive, multi-level interventions including regular training programs, adequate staffing, standardized confidential reporting systems, enhanced interprofessional communication, and increased resource allocation for error prevention. Addressing these challenges requires coordinated efforts from hospital management, regulatory bodies, and policymakers to create a culture of safety that prioritizes patient well-being and supports healthcare workers in delivering safe, effective medication care.

Recommendations

Based on the study findings, the following recommendations are proposed:

Training and Education: Hospital management should implement regular, mandatory medication safety training for all healthcare workers involved in the medication process, with quarterly refresher courses. Training should cover error identification, prevention strategies, proper documentation, and use of reporting systems. New staff orientation should include comprehensive medication safety protocols.

Staffing and Workload Management: Healthcare facilities must ensure adequate staffing levels to reduce work overload and mental stress. Job roles should be clearly defined, and only qualified personnel should handle medication processes. Where immediate staffing increases are not feasible, stress management programs and improved work scheduling should be implemented.

Reporting Systems: All healthcare facilities should establish standardized, confidential medication error reporting systems. Healthcare workers should receive training on reporting procedures, and a non-punitive culture should be fostered to encourage disclosure and organizational learning.

Technology Integration: Healthcare facilities should progressively adopt digital tools including electronic prescribing systems, barcode scanning for medication administration, and computerized physician order entry systems to reduce handwriting-related errors and improve accuracy.

Interprofessional Communication: Healthcare workers should be encouraged to embrace interprofessional communication and collaboration. Structured communication protocols should be established, and unclear handwritten prescriptions should be verified before dispensing and administration.

Patient Education: Healthcare workers should ensure detailed explanation of prescriptions to patients at an appropriate pace, verify patient understanding, and maintain patience with each patient. Patient education materials should be developed in local languages to address literacy barriers.

Policy Development: Regulatory bodies including the Federal Ministry of Health, Pharmacy Council of Nigeria, Nursing and Midwifery Council of Nigeria, and Medical and Dental Council of Nigeria should develop and enforce national medication safety standards and guidelines.

Resource Allocation: Hospital administrators and government agencies should prioritize resource allocation toward medication safety initiatives, recognizing that prevention is more cost-effective than managing error consequences.

Future Scope

Future research could explore medication errors and prevention strategies in Primary Healthcare Centers and Outpatient Drug Vendors to provide a more comprehensive understanding of medication safety across the healthcare continuum.

Patient Perspectives and Involvement: Incorporating patients' views, experiences, and compliance behaviors related to

medication errors could enrich understanding of patient-related factors and improve patient-centered interventions.

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Conflict Of Interest

The authors declare there is no conflict of interest in undertaking this study.

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Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request. Due to confidentiality agreements with participating healthcare facilities and ethical restrictions, the raw data cannot be publicly shared.

Author Contributions

Idowu Makinde Olapemi conceptualized and designed the study, coordinated data collection, performed data analysis, and drafted the manuscript. Elizabeth Adedire contributed to data collection, qualitative interviews, data interpretation, and manuscript revision. Amitabye Luximon-Ramma provided methodological guidance and critically reviewed the manuscript. All authors read and approved the final version of the manuscript.

References

[1]. Elliott, R. A., Camacho, E., Jankovic, D., Sculpher, M. J., & Faria, R., 2021, Economic analysis of the prevalence and clinical and economic burden of medication error in England. *BMJ Quality & Safety,* 30(2), 96–105. https://doi.org/10.1136/bmjqs-2019-010206

[2]. Svitlica, B. B., & Konstantinidis, G., 2024, Factors contributing to non-reporting of medication errors. *Global Pediatrics*, 8, 100144. https://doi.org/10.1016/j.gpeds.2024.100144

[3]. Alrabadi, N., Shawagfeh, S., Haddad, R., et al., 2021, Medication errors: a focus on nursing practice. *Journal of Pharmacy & Health Services Research*, 12(1), 78–86.

[4]. World Health Organization, 2017, WHO launches global effort to halve medication-related errors in 5 years. Geneva, Switzerland. https://www.who.int/news

[5]. World Health Organization, 2024, Global patient safety report. *Geneva, Switzerland.* https://www.who.int/publications

[6]. Ogunleye, O. O., Oreagba, I. A., Falade, C., et al., 2016, Medication errors among health professionals in Nigeria: A national survey. *International Journal of Risk & Safety in Medicine,* 28(2), 77–91.

[7]. David, F. A., & Oluwatosin, A. J., 2023, The problems and prospects of primary healthcare: A case study of Odo-Owa Oke Ero Local Government Kwara State, Nigeria. *Diversity and Equality in Health and Care,* 20, 31.

[8]. Agede, O. A., Odeigah, L. O., Ole, J. O., et al., 2024, Patterns and errors of medication prescription among patients with chronic medical diseases attending medical outpatient department of a tertiary hospital in Ilorin, Nigeria. *Tropical Journal of Health Sciences*, 31(2), 14–19.

[9]. Araoye, M. O., 2004, Research methodology with statistics for health and social sciences. *Ilorin: Nathadex Publishers.*

[10]. Awodele, O., Akinyede, A., Adeyemi, O. A., & Awodele, D. F., 2011, Pharmacovigilance amongst doctors in private hospitals in Lagos West Senatorial District, Nigeria. *International Journal of Risk & Safety in Medicine,* 23(4), 217–226.

[11]. Umoh, E. E., & Opue, O. F., 2021, Knowledge and practice of medication error prevention among nurses in University of Calabar Teaching Hospital. *IOSR Journal of Nursing and Health Science,* 10(1), 43–50.

[12]. Itasanmi, S. A., Ekpenyong, V. O., & Andong, H. A., 2022, Examining health literacy levels and its association with demographic dynamics among intra-city commercial drivers: Results from a survey in Nigeria. *Journal of Health Literacy,* 6(4), 9–21.

[13]. Alshehri, H. M., Alshehri, A. M. H., Alshehri, A. M. H., et al., 2024, Primary health care professionals' opinions regarding continuing medical education: *A cross sectional study. Medicine*, 103(50), e40865.

[14]. Omotola, N. J., Madu, O. T., Egbuonu, E. F., et al., 2025, Medication administration error and its associated factors among nurses in a tertiary hospital, southeast Nigeria. *Online Journal of Health and Allied Sciences,* 24(1), 1–6.

[15]. Onedo, T. A., Okafor, U. G., Somuvie, K. O., et al., 2025, Medication error reporting practices among hospital pharmacists in Lagos State, Nigeria. *West African Journal of Pharmacy*, 36(1), 14–25.

[16]. Babatunde, K. M., Akinbodewa, A. A., Akinboye, A. O., & Adejumo, A. O., 2016, Prevalence and pattern of prescription errors in a Nigerian kidney hospital. *Ghana Medical Journal,* 50(4), 233–237.

[17]. Abdullahi, A. K., Fatima, I., Abdurrahaman, U., et al., 2023, Assessment of legibility of handwritten prescriptions and adherence to WHO prescription writing guidelines in Ahmadu Bello University Teaching Hospital Zaria, Kaduna State, Nigeria. *Innovations in Pharmacy*, 14(1), 51–64.

[18]. Afework, A., Tamene, A., Tesfaye, A., Tafa, A., & Gemede, S., 2023, Status and factors affecting patient safety culture at Dilla University Teaching Hospital: A mixed-method cross-sectional study. *Risk Management and Healthcare Policy,* 16, 1157–1169.

[19]. Olufemi, O. O., & Aminat, A. A., 2022, Influence of adult literacy education on women political participation in Ilorin Metropolis, Kwara State, Nigeria. *University of Ilorin Journal of Lifelong Education,* 6(1), 102–114.

[20]. Wudu, M. A., Bayked, E. M., Bekalu, Y. E., & Birhanu, T. A., 2025, Prevalence of medication administration errors and its determinants among nurses in Ethiopia: a systematic review and meta-analysis. *BMC Nursing*, 24(1), 544.

[21]. Ayorinde, M. O., & Alabi, P. I., 2019, Perception and contributing factors to medication administration errors among nurses in Nigeria. *International Journal of Africa Nursing Sciences*, 11, 100153.

[22]. Sufiyan, M. A. B., Abdulkareem, S. B., Joshua, I. A., et al., 2023, Knowledge and perception of medication errors among healthcare workers in Ahmadu Bello University Teaching Hospital Zaria, Kaduna State, Nigeria. *Nigerian Postgraduate Medical Journal,* 30(2), 150–155.

[23]. Hariyati, R. T. S., Mediawati, A. S., & Eryando, T., 2021, Workload as the most important influencing factor of medication errors by nurses. *Open Nursing Journal*, 15(1), 204–210.

[24]. Alotaibi, J. S., 2024, Causes of medication administration errors and barriers to reporting as perceived by nurses in Saudi Arabia: A qualitative study. *Belitung Nursing Journal,* 10(2), 215–221.

[25]. Iloh, G. U. P., Chuku, A., & Amadi, A. N., 2017, Medical errors in Nigeria: A cross-sectional study of medical practitioners in Abia State. *Archives of Medicine and Health Sciences*, 5(1), 44–49.

[26]. Ikonne, P. I., & Nwozichi, C. U., 2024, Factors associated with medication error underreporting among healthcare professionals in Nigerian Air Force Hospital, Ikeja, Lagos, Nigeria. *International Journal of Public Health Pharmacy and Pharmacology*, 9(2), 37–55.

[27]. Ganiyu, K. A., Olotu, E. S., & Anthony, T. G., 2023, Drug prescribing, prescription errors and

prescription legibility at a primary healthcare center in a semi-urban community, South-South Nigeria. *Nigerian Journal of Pharmacy*, 57(2), 700–708.

[28]. Awoyale, O. D., Dairo, M. D., Fagbamigbe, A. F., et al., 2025, Yellow fever in plain sight: assessing disease surveillance officers' knowledge and self-efficacy in identification and reporting in Kwara State, Nigeria. *BMC Public Health,* 25(1), 2127.

[29]. Nwasor, E. O., Sule, S. T., & Mshelia, D. B., 2014, Audit of medication errors by anesthetists in North Western Nigeria. *Nigerian Journal of Clinical Practice*, 17(2), 226–231.

[30]. Nkurunziza, A., Chironda, G., & Mukeshimana, M., 2018, Perceived contributory factors to medication administration errors and barriers to self-reporting among nurses working in paediatric units of selected referral hospitals in Rwanda. *International Journal of Research in Medical Sciences*, 6(2), 401–407.

[31]. Villamañán, E., Larrubia, Y., Ruano, M., et al., 2011, Medication errors associated with notification of drug allergies: effect of computerized order entry on their prevention. *International Journal of Pharmacy and Pharmacology,* 1(8), 203–210.

[32]. Tuvor, D., Kumah, A., Abiti, R., et al., 2025, Medication administration error reporting among nurses: A descriptive qualitative study. *Global Journal of Quality and Safety in Healthcare,* 8(2), 63–69.