Nurse Media Journal of Nursing
e-ISSN: 2406-8799, p-ISSN: 2087-7811
https://medianers.undip.ac.id
16(2):300–315, August 2026
https://doi.org/10.14710/nmjn.v16i2.72025

ORIGINAL RESEARCH

Healthcare Professionals' Knowledge and Experiences of Adverse Event Detection in Emergency Departments in Southwest Nigeria: A Mixed Methods Study

Olamide Olajumoke Afolalu[1,2], Oluwaseyi Abiodun Akpor[1], Sunday Adeniran Afolalu[3,4]

[1]*Faculty of Nursing Sciences, Afe Babalola University, Ado-Ekiti, Ekiti State, Nigeria*
[2]*Faculty of Nursing Sciences, Osun State University, Osogbo, Osun State, Nigeria*
[3]*Department of Mechanical and Mechatronics Engineering, Afe Babalola University, Ado-Ekiti, Ekiti State, Nigeria*
[4]*Department of Mechanical Engineering Science, University of Johannesburg, Johannesburg, South Africa*

Article Info

Article History:
Received: 23 March 2025
Revised: 26 June 2026
Accepted: 10 July 2026
Online: 31 August 2026

Keywords:
Adverse events; emergency care; health professionals; knowledge

Corresponding Author:
Olamide Olajumoke Afolalu
Faculty of Nursing Science, Afe Babalola University, Ado-Ekiti, Ekiti State, Nigeria
Email:
olamide.afolalu@uniosun.edu.ng

Abstract

Background: The nature, incidence, and severity of adverse events (AEs) in hospital emergency departments (EDs) pose significant obstacles to patient safety and the quality of care provided globally and within Nigerian healthcare systems. While reporting of AEs may capture some incidents, healthcare professionals' experiences regarding the types, the frequency of triggers, and detection measures remain understudied.
Purpose: This study aimed to evaluate the knowledge and experiences of nurses and doctors regarding AEs in the EDs of three selected teaching hospitals in Southwestern Nigeria.
Methods: An explanatory sequential mixed-methods design was used, involving 64 nurses and 57 doctors working in the emergency units of the selected hospitals. Data were collected using a 57-item structured, validated patient safety incident (PSI) questionnaire and six focus group discussions (FGDs) with 36 healthcare professionals purposively selected from the quantitative participants. Quantitative data were analyzed using descriptive statistics and the chi-square test, while qualitative data were thematically analyzed using ATLAS software.
Results: Quantitative findings revealed that 56.2% of healthcare professionals possessed good knowledge of commonly occurring AEs; however, 65.3% had limited knowledge of specific triggers that cause AEs. Reporting methods mainly included forms and patient record reviews. Qualitative findings provided deeper insights into these results and revealed four key themes: experiences of AEs in emergency care, patterns and types, reporting practices and barriers, and suggestions for improved reporting. Participants reported equipment malfunctions and adverse drug reactions (ADRs) as frequently experienced AEs, and cited severe workloads, time constraints, the absence of standardized reporting protocols, fear of punishment, and restricted access to digital reporting tools as challenges to reporting.
Conclusion: Despite good awareness demonstrated by healthcare professionals, significant organizational and system-level barriers hinder effective AE detection and reporting. Strengthening training on AE identification, introducing standardized digital reporting protocols, and promoting a non-punitive reporting culture may improve patient safety in EDs.

How to cite: Afolalu, O. O., Akpor, O. A., & Afolalu, S. A. (2026). Healthcare professionals' knowledge and experiences of adverse event detection in emergency departments in Southwest Nigeria: A mixed methods study. *Nurse Media Journal of Nursing, 16*(2), 300–315. https://doi.org/10.14710/nmjn.v16i2.72025

Copyright © 2026 by the Authors, Published by Department of Nursing, Faculty of Medicine, Universitas Diponegoro. This is an open-access article under the CC BY-SA License (http://creativecommons.org/licenses/by-sa/4.0/).

1. Introduction

Over the past decades, patient safety incidents (PSIs) have remained a major global public health concern, with adverse events (AEs) contributing substantially to extended hospital stays, disability, increased healthcare costs, and mortality across healthcare systems (Lima-Júnior et al., 2023). Evidence from global health reports reveals that millions of people experience preventable harm each year, particularly in low- and middle-income countries (LMICs) (World Health Organization, 2021). AEs are incidents that result in patient harm arising from healthcare

management rather than the patient's underlying condition. They include harm associated with medication errors, diagnostic delays, procedural complications, and communication errors (Afolalu et al., 2021). Approximately one in ten hospitalized patients worldwide experiences an AE, many of which could be avoided by enhancing patient safety reporting mechanisms and multidisciplinary surveillance strategies (World Health Organization, 2024). This concern is particularly relevant in emergency care settings.

Emergency departments (EDs) are high-risk areas for AEs, which are mostly influenced by unpredictable workloads, overcrowding, and the need for rapid decision-making (Adamuz et al., 2020; Kelen et al., 2021). Evidence shows that emergency care professionals often face intense pressure when managing critically ill patients, which can lead to missed diagnoses, medication errors, and communication failures (Howard et al., 2022; Khalili et al., 2025). In addition, AEs in EDs have been attributed to complex care processes and inadequate resources (Alassaf et al., 2025; Samadbeik et al., 2024). Nevertheless, despite improvements in patient safety globally, the detection and reporting of AEs in EDs remain low, especially in resource-limited environments where formal surveillance systems and electronic reporting infrastructures are lacking. Consequently, the ability to raise awareness of AEs in EDs is largely reliant on the alertness, clinical acumen, and reporting practices of frontline healthcare professionals in clinical settings, especially nurses who have face-to-face contact with patients.

Nurses play a crucial role in patient safety in EDs by maintaining close patient contact, coordinating multidisciplinary care, monitoring clinical deterioration, administering medications, and often being the first to identify potential AEs (Alhadi et al., 2024). Their ability to monitor clinical deterioration and identify AEs is vital to patient safety systems and organizational learning (Dresser et al., 2023). However, several contextual factors, such as heavy workloads, inadequate staffing, fear of blame, and poor communication, can hinder their capacity to detect and report AEs, especially in LMICs where resources are limited (Afolalu et al., 2025; Dosunmu et al., 2026).

The unique challenges of AEs in EDs across sub-Saharan Africa are further complicated by limited human and material resources, inadequate equipment and supplies, insufficient training of health professionals in basic life support, shortage of manpower, and lack of confidence in health services (Dawkins et al., 2021; Usoro et al., 2021). As a result, EDs in Nigeria face serious structural and operational issues that may compromise patient safety. For instance, evidence from a previous study conducted in a paediatric emergency department emphasizes the need for effective identification and reporting of AEs as a strategy to enhance patient safety (Eze et al., 2023). However, despite the global emphasis on patient safety, AE detection and reporting remain insufficient in Nigerian institutions. Furthermore, existing studies in Nigeria have largely focused on medication errors, occupational hazards, and general safety culture, while relatively limited attention has been given to how healthcare professionals in EDs recognize and detect AEs within routine clinical practice (Afolalu et al., 2021; Dosunmu et al., 2026).

Understanding AEs through emergency room reporting systems has been found useful in tracking global trends in healthcare errors and improving safety culture (Griffey et al., 2021). In addition, examining healthcare professionals' experiences of AEs in Southwest Nigeria may inform local healthcare efforts and contribute to global initiatives aimed at enhancing nurses' roles in patient safety. It may also foster the development of non-punitive reporting cultures and create effective detection strategies for resource-limited emergency systems. Even though these benefits are widely known and documented, previous studies have mainly focused on the epidemiology of AEs in high- and middle-income nations (Assunção-Costa et al., 2023; Jessurun et al., 2023). Limited evidence exists on how ED healthcare professionals, particularly nurses and physicians, understand and interpret AE detection processes in resource-constrained settings such as Nigeria. This gap is critical, as poor recognition and reporting can undermine patient safety initiatives and delay preventive actions. Furthermore, there is a scarcity of mixed-method studies exploring both the knowledge and experiences of these professionals in EDs.

Therefore, this study aimed to address this gap by investigating healthcare professionals' knowledge of the types and frequency of AE occurrence in EDs, the methods used for AE detection, and the experiences of doctors and nurses with these events. Overall, understanding healthcare professionals' experiences regarding AE detection and reporting is essential for strengthening patient safety systems in EDs.

Copyright © 2026, e-ISSN 2406-8799, p-ISSN 2087-7811

2. Methods

2.1 Research design

The study used an explanatory sequential mixed-method design, which involved collecting and analyzing quantitative data through a cross-sectional survey in the first phase, followed by qualitative data collection to further explain the quantitative findings. This design was chosen to provide a more comprehensive understanding of the research problem. While the quantitative survey assessed healthcare professionals' knowledge of AEs, triggers, and measures for detecting AEs in EDs, the qualitative phase subsequently explored healthcare professionals' experiences and contextual explanations for the patterns observed in the quantitative results, particularly the gap in knowledge regarding the ED triggers and the variations in AE detection mechanisms across healthcare professions. The Good Reporting of a Mixed Methods Study (GRAMMS) checklist guided the reporting of the study (O'Cathain et al., 2008).

2.2 Study setting

The study was conducted in the emergency units of three large teaching hospitals in Southwest Nigeria between February and April 2024. These hospitals are federal- and state-owned institutions providing multidisciplinary emergency care, including medical, surgical, gynaecological, paediatric, and neonatal services. The facilities operate 24-hour emergency services and serve as referral centers for acute and critical cases. The combined bed capacity of the three hospitals is 1,260.

2.3 Quantitative phase

2.3.1 Study participants and eligibility

The study participants comprised nurses and doctors working in the EDs of the selected hospitals. Eligible participants were healthcare professionals who had worked in the ED within the past two years and had a minimum of six months of clinical experience in the unit before data collection. Healthcare professionals occupying managerial positions who did not provide direct clinical care to emergency patients were excluded. Additionally, nurses and doctors in training, including students and interns, were not included because they were unlikely to have sufficient experience with patient safety reporting in the unit.

2.3.2 Sample size and sampling technique

The quantitative sample size was determined using Taro Yamane's formula for estimating sample size from a known population. From a total population of 157 professionals (80 nurses and 77 doctors) working in the three EDs, a 95% confidence level and 0.05 precision yielded a minimum sample size of 113. After adjusting for a 10% non-response rate, the final sample size for the quantitative phase was 126 nurses and doctors. A proportionate stratified sampling technique was used to ensure representation of both professional groups. The total sample was allocated proportionally based on the population distribution of nurses and doctors within the EDs. Participants were subsequently selected using simple random sampling within each stratum

2.3.3 Measurement and data collection

Data were collected using a structured questionnaire adapted from the publicly available KwaZulu-Natal Department of Health (KZN DoH) Patient Safety Incident (PSI) tool (Gqaleni & Bhengu, 2020; Murphy et al., 2019). The instrument measured the types and frequency of patient safety incidents and their associated triggers. Selected items were modified to ensure relevance to the Nigerian ED context and local adverse event reporting practices. The modified questionnaire comprised four sections, A-D, and 57 items. Section A, which assessed sociodemographic characteristics of the respondents, comprised seven questions; Section B, which assessed knowledge of commonly occurring types of AEs in hospital emergency departments, comprised 25 items adapted from Gqaleni and Bhengu (2020). Section C, which focused on the frequency of triggers commonly occurring in EDs, consisted of 18 items. A dichotomous Yes/ No response format was used to measure participants' knowledge of the types of AEs, and a five-point frequency scale (never, rarely, sometimes, often, always) was used to measure the reported frequency of AE triggers in EDs. Section D, which assessed measures employed in the detection of AEs, contained seven items developed by the research team. There were two possible responses for each dichotomous item: Yes (1) or No (0). A Yes response denoted a positive reaction, while a

Copyright © 2026, e-ISSN 2406-8799, p-ISSN 2087-7811

No response denoted a negative reaction. Respondents' knowledge of AEs was classified as good (≥ 75%), moderate (50–74%), or poor (< 50%) based on the overall score.

2.3.4 Instrument validity and reliability

The content validity of the adapted questionnaire was assessed using the content validity index (CVI) evaluated by three experts specializing in emergency medicine, nursing, and patient safety research. This procedure was intended to ensure that the modified items, after being adapted from the KwaZulu-Natal PSI guideline, accurately reflected the Nigerian ED context. Additionally, the self-developed items in Section D of the questionnaire evaluated measures used in detecting AEs. These items were further assessed statistically during data analysis using exploratory factor analysis (EFA) to examine their underlying construct structure, in addition to content validation. For the CVI, each item of the questionnaire was weighed against the stated objectives to determine questions that were relevant or irrelevant, using a 4-point ordinal rating scale that ranges from 1 (irrelevant) to 4 (very relevant). The overall CVI obtained was 0.78, which met the reported minimum acceptable value (0.78–1.00) for content validity assessment of a newly adapted instrument (Yusoff, 2019). The questionnaire was subsequently pilot-tested among healthcare professionals working in an ED outside of the study area to determine its clarity and feasibility. The instrument was slightly modified based on feedback from the pilot test. The internal consistency reliability of the modified knowledge, frequency, and measures (KFM) questionnaire was assessed using Cronbach's alpha. The overall Cronbach's alpha of 0.75 for the total item correlation in this study falls within the globally recognized range of 0.70 or higher (Taber, 2018). The following values were obtained for the questionnaire subsections: knowledge (0.79), frequency (0.72), and reporting measures (0.70).

2.4 Qualitative phase

2.4.1 Participant selection and eligibility

The qualitative component of the study included nurses and doctors purposively selected from a pool of 126 participants who completed the quantitative phase. Both professional groups were included to capture diverse professional perspectives. Selection criteria included willingness to participate and active clinical engagement in emergency care.

2.4.2 Sample size and saturation

A total of 36 participants were recruited for six focus group discussions (FGDs), with six participants per group. Sample size adequacy was guided by the principle of data saturation, defined as the point at which no new themes emerge from successive discussions (Hennink & Kaiser, 2022). This approach is consistent with qualitative research recommendations, indicating that thematic saturation is typically achieved within four to eight FGDs in studies with specific research objectives (Hennink et al., 2019). Accordingly, iterative data collection and concurrent analysis were conducted throughout the study, and by the sixth FGD, no new themes emerged, indicating that data saturation had been achieved.

2.4.3 Data collection

A semi-structured FGD guide was developed based on key findings from the quantitative phase. The guide comprised open-ended questions that focused on areas where disparities in healthcare professionals' reporting methods and knowledge gaps regarding AE triggers were observed. In addition, it explored healthcare professionals' experiences with AEs, current reporting procedures, challenges encountered in identifying and documenting AEs, and recommendations for strengthening ED reporting systems. Each FGD lasted 40–60 minutes and was conducted in a private setting within the hospital environment. All discussions were audio-recorded and transcribed verbatim.

2.5 Data analysis

2.5.1 Quantitative data

Quantitative variables were analyzed using descriptive statistics, including frequencies, percentages, means, and standard deviations. The chi-square test of independence was used to examine associations between categorical socio-demographic variables and respondents' knowledge and AE detection practices. A significance level of $p < 0.05$ was adopted, and data were

Copyright © 2026, e-ISSN 2406-8799, p-ISSN 2087-7811

analyzed using SPSS version 27. Exploratory factor loading analysis was used to order the categorical variables by the measures most commonly used to detect AEs. This was shown in the self-developed Section D items of the questionnaire. The analysis was performed on the combined dataset of nurses and doctors because the objective was to examine the general structure of AE detection methods across ED healthcare professionals rather than compare factor structures between professions. Before conducting EFA, the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were used to determine whether the dataset was suitable for factor analysis. Good sample adequacy for factor analysis was indicated by the KMO score of 0.79. The statistical significance of Bartlett's test of sphericity ($\chi^2 = 198.431$, $p = 0.01$) indicated that the correlation matrix was suitable for EFA. Principal Component Analysis (PCA) was used to extract factors, reduce data dimensionality, and identify latent constructs underlying correlated variables (Singh, 2024). Consistent with accepted guidelines for EFA, factor loadings greater than 0.40 were deemed practically significant and retained for interpretation (Hair et al., 2019).

2.5.2 Qualitative data

Data from the FGDs involving 36 participants were transcribed and analyzed using ATLAS.ti software. Thematic analysis, based on Braun and Clarke's six-phase approach, was employed (Braun & Clarke, 2021). The researchers first familiarized themselves with the data by reading the transcripts several times. In the second phase, preliminary codes reflecting participants' experiences of AEs and reporting procedures were generated. Related codes were examined and organized into potential themes in the third phase. These themes were reviewed and refined in the fourth phase and defined and named in the fifth phase. Finally, the findings were presented in a final thematic report.

2.6 Trustworthiness of the qualitative findings

To ensure the trustworthiness of this qualitative inquiry, the researchers applied the four criteria of credibility, transferability, dependability, and confirmability proposed by Lincoln and Guba (1985), as supported by recent qualitative research literature (Adler, 2022; Kakar et al., 2023). Credibility was supported through prolonged engagement with participants during the FGDs. Each session lasted an average of 40 minutes, allowing for an in-depth exploration of participants' experiences of AEs. To ensure transferability, sufficient data were gathered from a representative sample of doctors and nurses across the hospitals, and a detailed description of the study procedures was provided to enable replicability in similar settings. Similarly, dependability was supported through a comprehensive audit trail that included detailed documentation of participant recruitment, data collection, transcription, and coding. The researchers systematically recorded the data analysis process, thereby allowing the analytical methods to be traced and verified. Confirmability was established by keeping thorough field notes and documentation of codes generated during the analysis process. Additionally, the identified themes were illustrated and supported by direct participant quotations, thereby enabling readers to clearly understand the link between the data and the study's conclusions.

2.7 Ethical consideration

Ethical approval was obtained from the ethics and research committee of the participating teaching hospitals (Protocol Numbers: XXXHREC/12/02/2024/335, ERC/2024/03/03 and XXX/EC/2024/02/891), where the study was undertaken. The study was conducted in accordance with the principles of the Declaration of Helsinki, which provides ethical guidance for research involving human participants. Written informed consent was obtained from all participants before data collection.

3. Results

A total of 126 questionnaires were distributed to eligible respondents, and all were returned, yielding a 100% response rate. However, five questionnaires were excluded because of incomplete responses, leaving 121 completed questionnaires for the final analysis (completion rate: 96.0%).

Copyright © 2026, e-ISSN 2406-8799, p-ISSN 2087-7811

3.1 Sociodemographic characteristics of the respondents

The mean age of the respondents was 37.09 ± 9.79 years, with the largest proportion aged 30–39 years (37.2%). Most respondents were female (62.0%), with females predominating among nurses, while males were more common among doctors. Almost all participants (97.5%) had direct patient contact in their clinical roles. Most nurses had a Bachelor of Nursing Science degree (82.8%), while all doctors held an MBBS/MD or higher professional qualification. Respondents were distributed across the three study hospitals, with the highest proportion coming from UTH (41.3%). Overall, 65.3% of participants had 1–5 years of experience working in an emergency unit, as shown in Table 1.

Table 1. Socio-demographic characteristics of the respondents (N = 121)

Variables	Nurses (n = 64)	Doctors (n = 57)	Total (N = 121)
Age group (years)			
20–29	19 (29.7)	13 (22.8)	32 (26.4)
30–39	19 (29.7)	26 (45.6)	45 (37.2)
40–49	15 (23.4)	12 (21.1)	27 (22.3)
≥50	11 (17.2)	6 (10.5)	17 (14.0)
Mean age ± SD	37.42 ± 10.67	36.73 ± 8.77	37.09 ± 9.79
Gender			
Male	11 (17.2)	35 (61.4)	46 (38.0)
Female	53 (82.8)	22 (38.6)	75 (62.0)
Profession			
Nurse	64 (100.0)	0 (0.0)	64 (52.9)
Doctor	0 (0.0)	57 (100.0)	57 (47.1)
Direct patient contact			
Yes	61 (95.3)	57 (100.0)	118 (97.5)
No	3 (4.7)	0 (0.0)	3 (2.5)
Professional qualification			
Nursing Diploma	8 (12.5)	0 (0.0)	8 (6.6)
Bachelor of Nursing Science	53 (82.8)	0 (0.0)	53 (43.8)
MBBS/MD/MOD/Consultant	0 (0.0)	57 (100.0)	57 (47.1)
Master's degree	3 (4.7)	0 (0.0)	3 (2.5)
Hospital			
OAUTHC	18 (28.1)	18 (31.6)	36 (29.8)
Wesley Guild Hospital, Ilesa	18 (28.1)	17 (29.8)	35 (28.9)
UTH	28 (43.8)	22 (38.6)	50 (41.3)
Years of emergency unit experience			
1–5	44 (68.8)	35 (61.3)	79 (65.3)
6–10	13 (20.3)	18 (31.6)	31 (25.6)
11–15	3 (4.7)	1 (1.8)	4 (3.3)
≥16	4 (6.3)	3 (5.3)	7 (5.8)

Notes. Values are n (%) unless otherwise indicated. Percentages are calculated within each professional group or the total sample. SD = standard deviation.

3.2 Knowledge of commonly occurring types of AEs in hospital emergency department

Table 2 presents respondents' knowledge of common AEs in hospital emergency settings. More than half of the nurses (59.4%) and doctors (52.6%) had good knowledge, while 40.6% of nurses and 47.4% of doctors had moderate knowledge. Overall, 56.2% of respondents had good knowledge and 43.8% had moderate knowledge.

Table 2. Summary of overall knowledge of commonly occurring types of AEs

Knowledge level	Nurses (n = 64)	Doctors (n = 57)	Total (N = 121)
Good	38 (59.4)	30 (52.6)	68 (56.2)
Moderate	26 (40.6)	27 (47.4)	53 (43.8)
Total	64 (100.0)	57 (100.0)	121(100.0)

Note. Values are presented as n (%). Percentages are calculated within each professional group or the total sample. Knowledge levels were classified according to the predefined questionnaire scoring criteria: good (≥75%), moderate (50–74%), and poor (< 50%). No respondents were classified as having poor knowledge.

Copyright © 2026, e-ISSN 2406-8799, p-ISSN 2087-7811

3.3 Knowledge of the frequency of triggers commonly occurring in emergency units

Table 3 presents respondents' knowledge of the frequency of AE triggers commonly occurring in emergency units. Most nurses (71.9%) and doctors (57.9%) demonstrated poor knowledge of the frequency of AE triggers. Overall, 65.3% of respondents had poor knowledge, 30.6% had moderate knowledge, and only 4.1% had good knowledge.

Table 3. Knowledge of the frequency of AE triggers among nurses and doctors (N = 121)

Knowledge level	Nurses (n = 64)	Doctors (n = 57)	Total (N = 121)
Poor	46 (71.9)	33 (57.9)	79 (65.3)
Moderate	15 (23.4)	22 (38.6)	37 (30.6)
Good	3 (4.7)	2 (3.5)	5 (4.1)
Total	64 (100.0)	57 (100.0)	121(100.0)

Note. Values are presented as n (%). Percentages are calculated within each professional group or the total sample.

3.4 Measures employed in the detection of AEs

The PCA was conducted not only for formal construct validation but also primarily to reduce dimensionality and identify patterns. Through factor loading analysis, the PCA confirmed that two main dimensions underlie AE detection practice, comprising institutional and collaborative detection systems, which were extracted as Components 1 and 2, respectively. While Component 1 focuses on the use of trigger tools, error analysis, AE reporting forms, electronic methods, and wearable technologies, Component 2 addresses team-based reviews of patients' medical records and reliance on colleagues to report errors. The highest loading (0.78) on Component 1 was observed for the provision of AE reporting forms. This was followed by the utilization of an error analysis tool to get to the root cause of an event (0.75), trigger tools (0.73), and the utilization of wearable technologies or body sensors (0.72) to identify AEs. The lowest loading on Component 1 (0.04) was observed for reliance on colleagues or other relevant care teams to identify AEs. Table 4 presents the component loadings for measures employed in the detection of AEs.

Table 4. Principal component analysis of measures for detection of AEs

Questionnaire Items	Component 1: Institutional Detection Systems	Component 2: Collaborative Detection Systems
Does your hospital utilize trigger tools to identify AEs?	0.73	0.80
Do you utilize an error analysis tool to get to the root cause of the event?	0.75	0.18
Is there a provision for reporting errors by use of AE reporting forms?	0.78	0.09
Does the hospital embrace the use of computerized or electronic methods of identifying and reporting AEs?	0.69	0.56
Do you engage in retrospective analysis or review of a patient's medical records to identify AEs?	0.47	0.43
Does the hospital utilize wearable technologies or body sensors to identify AEs?	0.72	0.05
Do you rely on colleagues or other relevant care teams for the detection of AEs?	0.04	0.93

Note. Extraction Method: PCA, KMO = 0.79, Approx. Chi-Square = 198.431, sig = 0.01

3.4.1 Association between socio-demographic profiles and knowledge of common types of AEs

As shown in Table 5, there was a statistically significant association ($\chi 2 = 11.17$, df = 3, $p = 0.01$) between age and knowledge of commonly occurring types of AEs in hospital emergency departments. Professional qualification ($\chi 2 = 12.62$, df = 3, $p = 0.03$) and years of practice ($\chi 2 = 17.43$, df = 3, $p = 0.01$) were also significantly associated with knowledge of commonly occurring types of AEs in hospital emergency departments. These findings suggest that most respondents with good knowledge of AEs were in the 30–39 years age group. Similarly, respondents with 1–5 years of practice experience showed better knowledge of emergency AEs.

Copyright © 2026, e-ISSN 2406-8799, p-ISSN 2087-7811

Table 5. Association between sociodemographic variables and knowledge of AEs

Variables	Knowledge of Common AEs		χ^2	df	*p*-value
	Moderate (n = 53) n (%)	Good (n = 68) n (%)			
Age (years)			11.17	3	0.01*
20-29	13(24.5)	19(27.9)			
30-39	18(34.0)	27(39.8)			
40-49	14(26.5)	13(19.1)			
50 and above	8(15.1)	9(13.2)			
Gender			0.01	1	0.95
Male	20(37.7)	26(38.2)			
Female	33(62.3)	42(61.8)			
Profession			0.55	1	0.45
Nurse	26(49.1)	38(55.9)			
Doctor	27(50.9)	30(44.1)			
Direct patient contact			0.13	1	0.71
Yes	52(98.1)	66(97.1)			
No	1(1.9)	2(2.9)			
Professional qualification:			12.62	3	0.03*
Nursing Diploma	6(11.3)	2(2.9)			
Bachelor of Nursing Science	20(37.7)	33(48.6)			
MBBS/MD/MOD/Consultant	26(49.1)	31(45.6)			
Master	1(1.9)	2(2.9)			
Years of practice			17.43	3	0.01*
1-5	32(60.4)	47(69.1)			
6-10	16(30.2)	15(22.1)			
11-15	2(3.8)	2(2.9)			
16 and above	3(5.7)	4(5.9)			

Note. Values are presented as n (%), with percentages calculated within each knowledge category. χ^2 = chi-square statistic; df = degrees of freedom. $p < .05$ indicates statistical significance.

3.4.2 Association between socio-demographic profiles and measures in the detection of AEs

As shown in Table 6, respondents' profession ($\chi 2 = 12.16$, df = 1, $p = 0.01$) and professional qualification ($\chi 2 = 13.85$, df = 3, $p = 0.02$) were significantly associated with the measures used to detect AEs. More nurses than doctors demonstrated excellent AE detection skills, and most respondents with excellent detection skills held a bachelor's degree in nursing science.

3.5 Qualitative findings

The qualitative phase of the study was conducted to gain a deeper understanding of the quantitative results and to explore healthcare professionals' experiences with AEs, the obstacles to reporting, and suggestions for enhancing AE reporting systems in the ED. The analysis revealed four main themes: healthcare professionals' experiences with AEs, patterns and types of AEs, current reporting practices and barriers, and suggested design principles for an effective AE reporting system. To ensure consistency and representativeness of participant responses, themes were examined and refined.

3.5.1 Theme 1: Healthcare professionals' experiences with AEs

Participants described their experiences with AEs as commonly occurring in EDs and noted that such events occurred, but rarely, in their day-to-day service. Others explained the comparatively low rate of reported incidents by noting that the units already had safety practices and clinical vigilance in place. Participants stated the following:

> *Adverse events are not common in our hospital here, but we cannot say we have not experienced them. They occur, but not as frequently as maybe one or two people will think. I think we have had just one episode since I have been working here*. (P11, Doctor, male, Registrar)

Copyright © 2026, e-ISSN 2406-8799, p-ISSN 2087-7811

Table 6. Association between socio-demographic profiles and measures in the detection of AEs

Variables	Measures in the Detection of AEs		χ^2	df	*p*-value
	Excellent (n = 46) n (%)	Low (n = 75) n (%)			
Age (years)			3.78	3	0.28
20-29	14(30.4)	18(24.0)			
30-39	19(41.3)	26(34.7)			
40-49	10(21.7)	17(22.7)			
50 and above	3(6.5)	14(18.7)			
Gender			0.03	1	0.84
Male	18(39.1)	28(37.3)			
Female	28(60.9)	47(62.7)			
Profession			12.16	1	0.01*
Nurse	34(73.9)	30(40.0)			
Doctor	12(26.1)	45(60.0)			
Direct patient contact			0.02	1	0.86
Yes	45(97.8)	73(97.3)			
No	1(2.2)	2(2.7)			
Professional qualification:			13.85	3	0.02*
Nursing Diploma	5(10.9)	3(4.0)			
Bachelor of Nursing Science	28(60.8)	25(33.3)			
MBBS/MD/MOD/Consultant	12(26.1)	45(60.0)			
Master	1(2.2)	2(2.7)			
Years of practice			2.46	3	0.48
1-5	34(73.9)	45(60.0)			
6-10	9(19.6)	22(29.3)			
11-15	1(2.2)	3(4.0)			
16 and above	2(4.3)	5(6.7)			

Note. Values are presented as n (%), with percentages calculated within each AE detection category. χ^2 = chi-square statistic; df = degrees of freedom. $p < .05$ indicates statistical significance.

> *In this unit, such errors are infrequent. I have neither heard of nor witnessed any case where patients were mistakenly prescribed or given the wrong treatments."* (P1, Nurse, female, SNO)

> *Mistakes during patient management can occur from any healthcare practitioner, although they are relatively uncommon.* (P4, Doctor, female, Registrar)

These findings suggest that adverse events were perceived as relatively rare but potentially unavoidable in high-pressure emergency care settings.

3.5.2 Theme 2: Specific patterns and types of AEs

Participants' descriptions of AE patterns revealed that equipment malfunctions and adverse drug reactions (ADRs) were the most commonly experienced AEs. Other forms included procedural errors, emergency-setting infections, blood transfusion reactions, and delays in diagnosis or treatment.

> *Oxygen explosion has occurred before… it's in the neonatal emergency. Hmm…, yes, I think it happened here once too, that I had to rush to carry the oxygen out.* (P17, Nurse, female, DDNS)

> *In fact, I can remember a particular case of a patient that we eventually lost. The patient was having hypokalemia, but the baseline laboratory result initially read within the normal range, so the patient was being managed in that regard, not until the managing team suspected that there seemed to be an error somewhere. The same test was reordered elsewhere, and a low potassium level was found. Correction was started immediately, but at the end of the day, we lost that patient.* (P16, Doctor, female, Registrar)

Copyright © 2026, e-ISSN 2406-8799, p-ISSN 2087-7811

We sometimes had a case in which a patient took two doses of different analgesics over a short period. Soon after, he developed severe burns, covering most of his body, a reaction consistent with a life-threatening condition. (P23, Nurse, female, PNO)

We do not have cases of falls because most of our beds have side rails, but in very rare cases, we record mild lumbar puncture trauma when handled by someone in training. (P15, Doctor, male, Senior Registrar)

3.5.3 Theme 3: Methods of AE reporting and barriers

Participants reported that AEs in the EDs were mainly recorded using paper-based systems, such as situation reports, patient case notes, and special forms, including pharmacovigilance and blood transfusion reaction forms. These reporting methods were manual and decentralized, making it difficult to track the incidents systematically within the hospital.

Yes, we write situation reports *when events occur…. We write the patient's name, time of the event, how it occurred, what led to it, and the staff on duty*. (P1, Nurse, female, SNO)

Most times, when errors *occur, we only inform the manager through the HOD or the unit head, who will then write an incident report so that management will be aware.* (P20, Nurse, male, NO)

However, participants pointed out that institutional learning from past incidents was hindered by the lack of a centralized reporting system.

Events happen, but they are not really recorded, because there is no standard system for reporting adverse events… Honestly, no record that we can actually check to see past occurrences. (P4, Doctor, male, Registrar)

No standardized system of reporting; we use our normal traditional means of reporting…okay? Usually, for such an event, we fill the blood grouping and cross-matching form, note the event that happened, we take a sample from the patient and a sample from the blood bag, and resend them back to the laboratory for grouping and recross-matching. (P13, Doctor, male, Senior Registrar)

These findings suggest that although systems are in place for recording AEs, they are mainly fragmented and dependent on conventional documentation methods, which could affect the reporting behavior of healthcare professionals and compromise patient safety outcomes.

Participants identified some institutional barriers to successful reporting of AEs in Eds. One of the main issues was workload and time pressure, which could make comprehensive documentation challenging.

The pressure of managing patient care makes it challenging to prioritize thorough reporting, which could affect the accuracy and timeliness of our records. (P36, Nurse, female, NO)

Participants also indicated a lack of uniformity in the application of reporting policies, resulting in differences in how incidents were recorded and handled across different units.

Hmm…., over the years, there hasn't been a clear approach to handling reported adverse events. Reports have been made inconsistently, with each person using their methods. (P1, Nurse, female, SNO)

We often report any cases through paper and pen, which remains a cornerstone in many Nigerian institutions,…….. (P16, Doctor, female, Registrar)

Copyright © 2026, e-ISSN 2406-8799, p-ISSN 2087-7811

Many participants stated that cultural and behavioral factors were significant issues affecting error reporting in the hospital. One of the primary concerns was fear of facing punitive action or blame when reporting AEs.

> *Many times, if you want to report any incident that happens, you look at the consequences of the matter before going ahead*. (P36, Nurse, female, NO)

> *Fear of repercussions remains a significant barrier to error reporting in our health system. Whenever an adverse event occurs, it is difficult to decide whether the truth should be brought to light or if the consequences may outweigh the benefits. Cultivating a culture that prioritizes learning over punishment is key to addressing this issue*. (P11, Doctor, male, Registrar)

3.5.4 Theme 4: Recommended design of an AE reporting system

Participants proposed several measures to improve AE reporting in EDs, highlighting the introduction of electronic reporting systems that meet regulatory standards, as a key strategy for replacing paper-based systems. They believed that digital systems could enhance accessibility, data storage, and timely communication of incidents. Participants stated:

> *In this decade of* electronic *occurrence, I think the best way is to follow the trend, to use the electronically designed system. It will be better because many units are now being interconnected; paperwork is no longer ideal …* (P13, Doctor, male, Senior Registrar)

> *From my perspective, I think using paper these days is becoming cumbersome; using paper means you will need to get someone to go and present it or send it to the appropriate people*. (P18, Nurse, female, SNO)

> *The paper system is not ideal; paper can be tampered with, but anything electronically driven may not be easily altered, because many people have gotten the copies already*. (22, Doctor, female, Registrar)

> *Meeting regulatory standards and enabling accurate health data analysis require robust reporting tools, supported by specialized strategies and detailed documentation*. (P23, Nurse, female, PNO)

4. Discussion

This explanatory sequential mixed-methods study examined healthcare professionals' knowledge and experiences with AE detection in the EDs of selected teaching hospitals in Southwest Nigeria. Integrating quantitative and qualitative results provided deeper insight into the factors affecting AE recognition and reporting in resource-limited emergency care settings. Overall, the results indicate that while respondents had moderate knowledge of common AEs and relied primarily on reporting forms and patient record reviews to identify incidents, there were significant deficits in trigger recognition, structured detection systems, and reporting culture. This finding is consistent with a previous study in which over two-thirds of participants reported adequate knowledge of AEs associated with medical devices or equipment (Sojitra et al., 2024), and with another study that reported limited use of trigger tools due to staff unfamiliarity and poor knowledge of triggers, which led staff to rely on voluntary reporting with less detection of AEs (Gutiérrez-Mendoza et al., 2025).

Participants noted that AEs were relatively infrequent but were more likely to occur in fast-paced ED settings. Studies in southeastern Nigeria corroborate this, highlighting common medication-related events (Omoleke & de Kyiv, 2024; Omotola et al., 2025). Similar findings have been reported in emergency care settings globally, where time pressure, diagnostic uncertainty, and rapid clinical decision-making create conditions that increase the risk of PSIs (Howard et al., 2022; Khalili et al., 2025). The qualitative findings helped explain this quantitative gap by providing contextual insights into the patterns of AEs and organizational barriers that influenced knowledge and reporting practices. Participants reported reliance on paper-based reporting systems, unofficial communication channels, and incidental recognition during care rather than

Copyright © 2026, e-ISSN 2406-8799, p-ISSN 2087-7811

formal surveillance systems, which hindered systematic event tracking. Additionally, structural challenges such as heavy patient workloads, time constraints, inadequate staffing, inconsistent reporting guidelines, and poor digital infrastructure contributed to underreporting, regardless of knowledge about patient safety issues. This suggests that healthcare professionals may recognize obvious AEs but lack competence in trigger-based detection approaches essential for identifying subtle or evolving patient harm.

The contrast between respondents' good knowledge of common AEs and poor trigger recognition has important educational and systemic implications. Trigger tools are essential for detecting hidden or undocumented patient safety incidents, particularly in fast-paced emergency settings where overcrowding, interruptions, and rapid decision-making increase the risk of preventable harm (Griffey et al., 2021). Poor trigger knowledge may therefore compromise the early recognition and reporting of AEs. This gap may reflect inadequate integration of patient safety surveillance methods into undergraduate education, continuing professional training, and institutional safety programs.

An important finding emerging from the integration of quantitative and qualitative results was the apparent contradiction between participants' perception that AEs were "rare" and the quantitative evidence of poor trigger knowledge. Rather than indicating truly low AE occurrence, this paradox may reflect under-detection and under-recognition of patient safety incidents. Participants suggested that incidents were often identified only when clinically obvious or severe, while less visible events might remain undocumented. Therefore, the perceived rarity of AEs may reflect limited detection capacity rather than the actual absence of adverse events. This finding aligns with previous evidence showing that low reporting rates in resource-limited settings often result from weak surveillance systems and under-recognition of safety incidents rather than genuinely lower event frequencies (Fekadu et al., 2025).

Key findings from the qualitative phase also pointed to certain systemic obstacles to efficient AE reporting in EDs, including lack of electronic reporting systems, unclear reporting regulations, heavy workloads, and personnel shortages. These issues align with systems theory, which posits that patient safety incidents are influenced by the interconnectedness of institutional frameworks, human factors, and clinical environments (Fekadu et al., 2025; Fekadu et al., 2026). The qualitative findings also highlighted the influence of organizational hierarchy and professional power dynamics on reporting behaviors. Participants described concerns about blame, criticism, and disciplinary consequences associated with reporting AEs. These concerns may be particularly important within hierarchical teaching hospital environments where communication patterns are influenced by professional authority. Nurses, who often spend more time in direct patient care, may identify safety concerns earlier but feel reluctant to escalate incidents within physician-dominated structures. These hierarchical cultures and punitive responses can lead to a culture of silence, fostering informal error documentation and undermining a just culture aimed at learning from incidents (Mira et al., 2025; Mohamed-Badran et al., 2026). This inter-professional power dynamic is a wake-up call to embrace continuously improved open communication through hospital management support systems that embrace respect for patient safety (Lee & Lee, 2024)

In Nigeria's healthcare system, challenges such as insufficient infrastructure, limited digital reporting, and resource constraints complicate the tracking of AEs. Participants noted the heavy reliance on paper-based systems, which hampers effective analysis. A similar situation is echoed in the Northern region of the country, where operational challenges with reporting systems limit their effective use among healthcare professionals (Omoleke & de Kyiv, 2024), as well as in other low- and middle-income countries where patient safety reporting systems are still evolving (Fekadu et al., 2025). Strengthening digital reporting methods, standardizing documentation processes, and providing frequent staff training on system use could therefore enhance the detection and reporting of AEs in emergency care environments. Such strategies may contribute to improved patient safety monitoring and quality of care. Equipment malfunctions and ADRs, as identified by the majority of participants, have been reported in previous studies and were found to be among the most prevalent concerns in high-stress environments like the ED (Afolalu et al., 2021; Amaniyan et al., 2020; O'Connell et al., 2018). These findings align with those of previous studies showing that effectively managing infrastructural challenges, such as bed spaces and medical devices, can significantly enhance high-quality patient care and optimize health outcomes (Al-Ghabeesh et al., 2023).

Copyright © 2026, e-ISSN 2406-8799, p-ISSN 2087-7811

5. Implications and limitations

The study findings have important implications for health professionals, especially nurses who serve as frontline providers and are often the first point of contact with patients. This study was the first to examine experiences of AEs from the perspective of ED healthcare professionals in Southwest Nigeria. It offers unique insights into experiences of AEs in emergency care, where nurses make up the majority of healthcare professionals. The findings of this study emphasize the need for focused education and training of healthcare professionals, including nurses, on incident reporting systems and root-cause analysis techniques. The study advocates for the involvement of nursing leadership in patient safety programs to foster a positive safety culture in Nigerian healthcare settings.

Importantly, the following methodological limitations affect the interpretation of this study's findings. First, the study was conducted in three teaching hospitals in Southwestern Nigeria; the results may not be generalizable to regions with different organizational structures and patient safety practices. Second, the cross-sectional design limits causal inference. Furthermore, while qualitative insights are valuable, they were obtained from a purposefully selected group of participants, potentially excluding broader perspectives from other ED healthcare professionals. Another limitation is the broad classification of medical doctors' qualifications, which masked variations in postgraduate training levels and professional status. This limitation made it unable to investigate how these differences might influence AE detection techniques and knowledge. In order to facilitate subgroup analyses and improve understanding of the influence of professional training on patient safety practices, future research should strive for more comprehensive professional grouping and classifications. Despite these limitations, the mixed-methods approach enriched the findings, offering a detailed view of AEs in emergency contexts. Therefore, it is recommended that future multicenter studies involving diverse geographical regions be conducted to improve generalizability. In addition, observational methods and audit-based trigger tools are proposed to minimize self-report bias.

6. Conclusion

The findings indicate that while healthcare professionals demonstrate general awareness of common AEs, such as drug reactions and equipment-related events, their understanding of the frequency of triggers for these events is noticeably lacking. This could affect the integration of preventive and reporting initiatives into patient safety practices and health outcomes. Additional gaps exist in the detection and reporting of AEs due to organizational factors such as heavy workloads and limited infrastructure. These factors discourage consistent documentation and highlight the importance of a positive safety culture in reporting behaviors and patient safety. Future research should focus on the impact of combined reporting mechanisms, such as trigger tools and digital AE reporting systems, on reporting practices and patient safety across various healthcare settings in Nigeria.

Acknowledgments

The research team would like to express sincere gratitude to the management staff of the hospital and all the participants who took the time to be part of the study.

Author contribution

OOA and OAA conceptualized, designed, and developed the study proposal. OOA collected data and performed data entry; OOA and OAA performed data cleaning and analysis. OOA and SAA prepared the initial manuscript draft. OAA and SAA provided critical review and editing of the final manuscript. OAA supervised the project. All the authors reviewed and approved the final draft of the manuscript.

Conflict of interest

The authors declare no conflict of interest.

Funding

The research was self-funded by the research team and received no specific grant from external sources.

Copyright © 2026, e-ISSN 2406-8799, p-ISSN 2087-7811

Declaration of Generative Artificial Intelligence (AI)

The authors affirm that the concept, analysis, results, and conclusions of this study were developed without assistance from AI technologies. The authors used ChatGPT (OpenAI) only to improve language and grammatical clarity. The authors are responsible for all interpretations and content.

References

Adamuz, J., Juvé-Udina, M.-E., González-Samartino, M., Jiménez-Martínez, E., Tapia-Pérez, M., López-Jiménez, M.-M., Romero-Garcia, M., & Delgado-Hito, P. (2020). Care complexity individual factors associated with adverse events and in-hospital mortality. *PLoS ONE, 15*(7), e0236370. https://doi.org/10.1371/journal.pone.0236370

Adler, R. H. (2022). Trustworthiness in qualitative research. *Journal of Human Lactation, 38*(4), 598–602. https://doi.org/10.1177/08903344221116620

Afolalu, O. O., Akpor, O. A., & Afolalu, S. A. (2025). A systematic review of interventions for reducing and reporting adverse events in emergency departments: Multidisciplinary approaches and technological innovations. *Collegian, 32,* 34–45. https://doi.org/10.1016/j.colegn.2024.12.001

Afolalu, O. O., Jordan, S., & Kyriacos, U. (2021). Medical error reporting among doctors and nurses in a Nigerian hospital: A cross-sectional survey. *Journal of Nursing Management, 29*(5), 1007-1015. https://doi.org/10.1111/jonm.13238

Al-Ghabeesh, S. H., Thabet, A., Rayan, A., & Abu-Snieneh, H. M. (2023). Qualitative study of challenges facing emergency department nurses in Jordan. *Heliyon, 9*(3), e14141. https://doi.org/10.1016/j.heliyon.2023.e14141

Alassaf, W., Albrahim, R., Abukhaled, J. K., Aldhaif, M., Mohammed, M. A., Al Baiz, A., & Aljahany, M. (2025). Correlation between emergency department crowding and adverse occurrences in an academic hospital: A retrospective cohort study. *Risk Management and Healthcare Policy, 18*, 561–568. https://doi.org/10.2147/rmhp.S504578

Alhadi, A., Alanazi, H., S, A., F, A., Alanazi, T., Alruwaili, F., Alanazi, A., J, A., Alenezi, N., Alanazi, F., & A, A. (2024). The role of nurses in early recognition and prevention of patient deterioration in general wards. *International Journal of Computational and Experimental Science and Engineering, 10*(4), 3320–3327. https://doi.org/10.22399/ijcesen.4604

Amaniyan, S., Faldaas, B. O., Logan, P. A., & Vaismoradi, M. (2020). Learning from patient safety incidents in the emergency department: A systematic review. *The Journal of Emergency Medicine, 58*(2), 234–244. https://doi.org/10.1016/j.jemermed.2019.11.015

Assunção-Costa, L., Pinto, C. R., Machado, J. F. F., Valli, C. G., & De Souza, L. E. P. F. (2023). Assessing the severity of medication administration errors identified in an observational study using a valid and reliable method. *Journal of Pharmaceutical Policy and Practice, 16*(1), 143. https://doi.org/10.1186/s40545-023-00653-x

Braun, V., & Clarke, V. (2021). *Thematic analysis: A practical guide*. Sage.

Dawkins, B., Renwick, C., Ensor, T., Shinkins, B., Jayne, D., & Meads, D. (2021). What factors affect patients' ability to access healthcare? An overview of systematic reviews. *Tropical Medicine & International Health, 26*(10), 1177–1188. https://doi.org/10.1111/tmi.13651

Dosunmu, O., Dwinta, E., & Fatimah, F. S. (2026). Interventions on medication administration errors in Nigerian and Indonesian hospitals: A narrative review. *Christian Journal for Global Health, 13*(1), 168-179. https://doi.org/10.15566/kxb1x733

Dresser, S., Teel, C., & Peltzer, J. (2023). Frontline nurses' clinical judgment in recognizing, understanding, and responding to patient deterioration: A qualitative study. *International Journal of Nursing Studies, 139*, 104436. https://doi.org/10.1016/j.ijnurstu.2023.104436

Eze, J. N., Edelu, B. O., Ndu, I. K., & Oguonu, T. (2023). Paediatric emergency medicine practice in Nigeria: A narrative review. *BMC Emergency Medicine, 23*(1), 31. https://doi.org/10.1186/s12873-023-00790-1

Fekadu, G., Muir, R., Tobiano, G., Ireland, M. J., Engidaw, M. T., & Marshall, A. P. (2025). Patient safety incident reporting systems and reporting practices in African healthcare organisations: A systematic review and meta-analysis. *BMJ Open Quality, 14*(1), e003202. https://doi.org/10.1136/bmjoq-2024-003202

Fekadu, G., Muir, R., Tobiano, G., Tura, A. K., Ireland, M. J., & Marshall, A. P. (2026). "Unsafe and unspoken"- Exploring barriers to patient safety and incident reporting in resource-

Copyright © 2026, e-ISSN 2406-8799, p-ISSN 2087-7811

limited intensive care units: A qualitative study. *Intensive and Critical Care Nursing, 94*, 104325. https://doi.org/10.1016/j.iccn.2025.104325

Gqaleni, T. M., & Bhengu, B. R. (2020). Analysis of Patient Safety Incident reporting system as an indicator of quality nursing in critical care units in KwaZulu-Natal, South Africa. *Health SA Gesondheid, 25*(1), 1–8. https://doi.org/10.4102/hsag.v25i0.1263

Griffey, R. T., Schneider, R. M., & Sharp, B. (2021). Trigger tools for adverse event detection in the emergency department. *Journal of Patient Safety, 17*(1), 71–72. https://doi.org/10.1097/PTS.0000000000000614

Gutiérrez-Mendoza, L. M., Manias, E., & Nicholson, P. (2025). Predictive values of trigger tools for identifying adverse events in hospitalized patients using a medical record review: A systematic review. *Int J Qual Health Care, 37*(4). https://doi.org/10.1093/intqhc/mzaf119

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis (8th Ed.)*. Cengage Learning.

Hennink, M., & Kaiser, B. N. (2022). Sample sizes for saturation in qualitative research: A systematic review of empirical tests. *Social Science & Medicine, 292*, 114523. https://doi.org/10.1016/j.socscimed.2021.114523

Hennink, M. M., Kaiser, B. N., & Weber, M. B. (2019). What influences saturation? Estimating sample sizes in focus group research. *Qualitative Health Research, 29*(10), 1483–1496. https://doi.org/10.1177/1049732318821692

Howard, I., Howland, I., Castle, N., Al Shaikh, L., & Owen, R. (2022). Retrospective identification of medication-related adverse events in the emergency medical services through the analysis of a patient safety register. *Scientific Reports, 12*(1), 2622. https://doi.org/10.1038/s41598-022-06290-9

Jessurun, J. G., Hunfeld, N. G. M., de Roo, M., van Onzenoort, H. A. W., van Rosmalen, J., van Dijk, M., & van den Bemt, P. M. L. A. (2023). Prevalence and determinants of medication administration errors in clinical wards: A two-centre prospective observational study. *Journal of Clinical Nursing, 32*(1-2), 208–220. https://doi.org/10.1111/jocn.16215

Kakar, Z. U. H., Rasheed, R., Rashid, A., & Akhter, S. (2023). Criteria for assessing and ensuring the trustworthiness in qualitative research. *International Journal of Business Reflections, 4*(2), 150–173. https://academicworks.cuny.edu/yc_pubs/342

Kelen, G. D., Wolfe, R., D'Onofrio, G., Mills, A. M., Diercks, D., Stern, S. A., Wadman, M. C., & Sokolove, P. E. (2021). Emergency department crowding: The canary in the health care system. *NEJM Catalyst Innovations in Care Delivery, 2*(5). https://doi.org/10.1056/CAT.21.0217

Khalili, M., Enayati, M., Patel, S., Huschka, T., Cabrera, D., Parker, S. J., Pasupathy, K., Mahajan, P., & Bellolio, F. (2025). Identifying diagnostic errors in the emergency department using trigger-based strategies. *BMJ Open Quality, 14*(3), e003389. https://doi.org/10.1136/bmjoq-2025-003389

Lee, S. E., & Lee, J. W. (2024). Effects of hierarchical unit culture and power distance orientation on nurses' silence behavior: the roles of perceived futility and hospital management support for patient safety. *Journal of Nursing Management, 2024*(1), 6564570. https://doi.org/10.1155/jonm/6564570

Lima-Júnior, A. J., Zanetti, A. C. B., Dias, B. M., Bernardes, A., Gastaldi, F. M., & Gabriel, C. S. (2023). Occurrence and preventability of adverse events in hospitals: A retrospective study. *Revista Brasileira de Enfermagem, 76*(3), e20220025. https://doi.org/10.1590/0034-7167-2022-0025

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. SAGE Publications.

Mira, J. J., Lorenzo, S., Aranaz-Andrés, J. M., Macías-Maroto, M., Cobos-Vargas, Á., Moreno Campoy, E. E., Pérez-Pérez, P., Trillo-López, P., Corpas-Nogales, E., Gea Velázquez de Castro, M. T., Arencibia-Jiménez, M., Asencio, A., Díez Herrero, D., Molina-Ribera, J., Calderón, E., Lozano-Gago, P., Libano Beristain, A., Navarro Maciá, C., San Jose Saras, D., … Carrillo, I. (2025). Understanding and reframing clinical errors through just culture: protocol for the DECIDE mixed-methods study in Spanish healthcare and community contexts. *BMJ Open, 15*(10), e101421. https://doi.org/10.1136/bmjopen-2025-101421

Mohamed-Badran, F. M., Rahman Gaber Khalifa, M. A. E., Elghannam, H. M., & Mohamed Ali, E. H. (2026). From blame to learning: implementing a just culture program for head nurses

Copyright © 2026, e-ISSN 2406-8799, p-ISSN 2087-7811

and its impact on silent behavior and error reporting among staff nurses. *BMC Nursing, 25*(1), 96. https://doi.org/10.1186/s12912-025-04265-5

Murphy, D. R., Meyer, A. N., Sittig, D. F., Meeks, D. W., Thomas, E. J., & Singh, H. (2019). Application of electronic trigger tools to identify targets for improving diagnostic safety. *BMJ Quality & Safety, 28*(2), 151–159. https://doi.org/10.1136/bmjqs-2018-008086

O'cathain, A., Murphy, E., & Nicholl, J. (2008). The quality of mixed methods studies in health services research. *Journal of Health Services Research & Policy, 13*(2), 92–98. https://doi.org/10.1258/jhsrp.2007.007074

O'Connell, K. J., Shaw, K. N., Ruddy, R. M., Mahajan, P. V., Lichenstein, R., Olsen, C. S., Funai, T., Blumberg, S., Chamberlain, J. M., & Network, P. E. C. A. R. (2018). Incident reporting to improve patient safety: The effects of process variance on pediatric patient safety in the emergency department. *Pediatric Emergency Care, 34*(4), 237–242. https://doi.org/10.1097/PEC.0000000000001464

Omoleke, S. A., & de Kiev, L. C. (2024). An evaluation of the surveillance system for monitoring and reporting adverse events following immunization in Kebbi State, Northern Nigeria: A mixed methods approach. *BMC Public Health, 24*(1), 2906. https://doi.org/10.1186/s12889-024-20356-5

Omotola, N. J., Madu, O. T., Egbuonu, E. F., Isreal, C. E., Opara, H. C., & Ugwu, C. C. (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), 6. https://www.ojhas.org/issue93/2025-1-6.html

Rodziewicz, T. L., Houseman, B., Vaqar, S., & Hipskind, J. E. (2024). *Medical error reduction and prevention*. StatPearls Publishing.

Samadbeik, M., Staib, A., Boyle, J., Khanna, S., Bosley, E., Bodnar, D., Lind, J., Austin, J. A., Tanner, S., Meshkat, Y., de Courten, B., & Sullivan, C. (2024). Patient flow in emergency departments: A comprehensive umbrella review of solutions and challenges across the health system. *BMC Health Services Research, 24*(1), 274. https://doi.org/10.1186/s12913-024-10725-6

Singh, A. (2024). Principal factor analysis in scale construction. *International Journal of Indian Psychology, 5*(2), 199. https://doi.org/10.51737/2766-4813.2024.099

Sojitra, B., Patel, C., Pandya, S., Virani, P., Shah, P., Patel, J., Shah, A., & Virani, P. H. (2024). Knowledge, attitude, and practice of materiovigilance among healthcare professionals at a tertiary care teaching hospital. *Cureus, 16*(7), e64978. https://doi.org/10.7759/cureus.64978

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education, 48*(6), 1273–1296. https://doi.org/10.1007/s11165-016-9602-2

Usoro, A., Aiwonodagbon, B., Strong, J., Kivlehan, S., Akodu, B. A., & Olufadeji, A. (2021). Perspectives on the current state of Nigeria's emergency care system among participants of an emergency medicine symposium: A qualitative appraisal. *BMJ Open, 11*(8), e043869. https://doi.org/10.1136/bmjopen-2020-043869

World Health Organization. (2021). *Global patient safety action plan 2021-2030: Towards eliminating avoidable harm in health care*. World Health Organization. https://www.who.int/publications/i/item/9789240032705

World Health Organization. (2024). *Global patient safety report 2024: Executive summary*. https://iris.who.int/handle/10665/380067

Yusoff, M. S. B. (2019). ABC of content *validation* and content validity index calculation. *Education in Medicine Journal, 11*(2), 49–54. https://doi.org/10.21315/eimj2019.11.2.6

Copyright © 2026, e-ISSN 2406-8799, p-ISSN 2087-7811