Original Article

MEDICAL ERRORS: AN ASSESSMENT OF AWARENESS AND PERCEPTION AMONG HEALTHCARE WORKERS IN SUB-URBAN, SOUTHERN NIGERIA

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Abstract

Background: Medical errors remain a global public health concern, significantly compromising patient safety and healthcare quality. With healthcare-associated infections and diagnostic inaccuracies disproportionately higher in resource-limited settings, understanding the awareness and perception of medical errors among healthcare workers is vital to ensuring patient safety.

Objectives: This study aimed to evaluate the awareness and perception of medical errors among healthcare workers in Okada, Edo State, Nigeria, and to identify determinants influencing these outcomes.

Methods: A cross-sectional study design was adopted, involving 324 healthcare workers selected using a multi-stage sampling technique. Data were collected through structured, self-administered questionnaires adapted from the WHO's patient safety assessment tools. Descriptive and inferential statistics were conducted using SPSS version 25.0, with logistic regression employed to identify significant predictors. A p-value of less than 0.05 was considered statistically significant.

Results: All respondents were aware of medical errors, with 62% demonstrating good awareness. Factors significantly associated with awareness included age ($p = 0.034$), profession ($p < 0.001$), and income ($p = 0.050$). Doctors showed the highest awareness (77.3%), while pharmacists had the lowest (40.3%). Good perception was reported by 75.9% of participants, with variations across professional roles, although not statistically significant. Positive perception was most prominent among pharmacists (85.1%) and medical laboratory scientists (82.8%).

Conclusion: The study revealed that although awareness of medical errors among healthcare workers in Okada is high, significant gaps exist in specific domains of error recognition and perception across professional groups. Factors such as profession, age, and income influence these variations. The findings emphasize the need for targeted training programs, fostering non-punitive reporting environments, and promoting interdisciplinary collaboration to enhance error prevention and patient safety.

Key words: Awareness, Determinants, Healthcare workers, Medical errors, Nigeria, Patient safety Perception, Okada.

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BACKGROUND

Medical errors remain a significant challenge to patient safety and healthcare quality across the globe[1]. The World Health Organization (WHO) reports that healthcare-induced injuries result in thousands of premature deaths daily, with a 1 in 300 chance of such an event occurring[2]. In developed countries, approximately 1 in 10 patients are harmed during hospital care[2,3] while the risk is even greater in the African region, where healthcare-associated infections are more than double that

of developed countries[4], and are seen in up to 22.1% of neonatal patients[5]. A critical component in minimizing medical errors is the development of a strong patient safety culture within healthcare organizations, which is defined by shared values, attitudes, and behaviours that influence how healthcare workers perceive and manage safety-related issues[6]. In healthcare environments with a positive safety culture, staff are more likely to acknowledge mistakes, and adopt practices focused on continuous improvement in patient safety, and the way errors are perceived—whether as inevitable, trivial, or mainly due to negligence—affects workers' engagement in error prevention and their approach to managing safety concerns[7,8].

The awareness and perception of medical errors are closely influenced by various determinants, including organizational culture, training, previous experiences, and personal attitudes[9]. Some workers may perceive errors as inevitable or not particularly harmful to patients, which may reduce their motivation to engage in preventive actions, while others may believe that errors are primarily caused by individual negligence or lack of attention, rather than systemic issues, influencing their approach to responsibility and accountability[10]. Additionally, healthcare workers' perceptions about the consequences of reporting errors—such as fear of blame or repercussions—can significantly impact their willingness to acknowledge and address errors[11].

This study aims to assess the awareness and perception of medical errors among healthcare workers as well as determinants that influence them.

MATERIALS AND METHODS

Study Area

The study was conducted in Okada, a town in Edo State, Nigeria, situated in the Ovia North-East Local Government Area. Edo State, located in the South-South geopolitical zone of Nigeria, spans an area of 17,802 km² and is bordered by Ondo State to the west, Kogi State to the north, and Delta State to the south. Okada is the administrative headquarters of the Ovia North-East Local Government Area and is home to a population of approximately 155,344 people, predominantly the Bini ethnic group. The town has a mix of urban and semi-urban features and is known for its commercial activities, with many residents engaged in farming, trading, and civil service. Key healthcare institutions in the area include the Igbinedion University Teaching Hospital, Okada Primary Health Centre, and several other primary healthcare facilities across the two wards—Okada East and Okada West. Okada's climate alternates between a warm, wet season and a hot, dry period, with annual rainfall of around 150 cm and temperatures ranging from 27°C to 44°C[12].

Study Population

The study targeted healthcare workers employed in healthcare facilities within Okada, Edo State. These included doctors, nurses, pharmacists, and medical laboratory scientists who were actively involved in patient care. The inclusion criteria for the study required healthcare workers to be present during the data collection period and provide informed consent to participate. Healthcare workers who were unavailable during the study or those who did not complete the questionnaires adequately were excluded from the study. The research aimed to assess their awareness, perception, and experiences regarding medical errors, including the prevalence, patterns, and determinants of errors in their practice.

Sampling Technique

A multi-stage sampling technique was employed to select study participants. In the first stage, healthcare facilities in Okada were selected using simple random sampling. Igbinedion University Teaching Hospital was chosen as the tertiary healthcare facility, and Okada Primary Health Centre was selected as a primary healthcare facility. In the second stage, stratified sampling was used to categorize healthcare workers into professional groups: doctors, nurses, pharmacists, and medical laboratory scientists. Each group was represented proportionally based on workforce distribution in the selected facilities. To ensure random selection, healthcare workers within each group were chosen using systematic sampling. The sample size was calculated to be 324, with an additional 5% non-response rate factored in to account for incomplete or missing responses.

Data Collection

The data collection for this study focused on assessing the awareness and perception of medical errors among healthcare workers in Okada, Edo State. A structured, self-administered questionnaire was used to gather relevant information. The questionnaire was derived from a research tool developed by WHO to assess awareness of patient safety in the work place[13] and was divided into two sections: one for awareness and the other for perception of medical errors. The awareness section included questions to determine whether respondents had heard of the term "medical errors" and what types of errors they were familiar with. It also explored the sources of their knowledge about medical errors. Respondents were asked to identify different types of medical errors, such as medication, diagnostic, and surgical errors. Their responses were scored based on the number of correct types identified, providing an overall measure of their awareness.

The perception section included 20 statements designed to gauge respondents' attitudes toward medical errors. These were presented using a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree." The statements addressed various aspects of medical errors, such as the belief in their inevitability, the importance of reporting, and the impact of errors on patient safety. Responses were scored to categorize perceptions as either positive or negative, with the overall perception score determining whether participants had a good or poor understanding of the issue. Data collection was carried out over a two-month period with the assistance of trained research assistants, ensuring that respondents' privacy and confidentiality were maintained throughout the process.

Ethical Considerations

Ethical approval for the study was obtained from the Igbinedion University Ethical and Research Committee, and permission was sought from the management of the healthcare facilities where the study was conducted. Informed consent was obtained from all participants, ensuring they were fully aware of the study's purpose, potential risks, and their right to voluntarily participate or withdraw without penalty. To protect privacy, all responses were treated with strict confidentiality, and participants were assured that their data would only be used for research purposes. The study adhered to ethical guidelines concerning personal data, and participants were given the opportunity to complete the questionnaires in private to ensure that their responses remained confidential.

Data Analysis

Data analysis was performed using the Statistical Package for Social Sciences (SPSS) version 25.0. Descriptive statistics were used to summarize categorical data, including frequencies, percentages, and proportions. Continuous data were presented as means and standard deviations. The association between categorical variables was analysed using bivariate analysis, specifically chi-square tests and Fisher's exact test. Multiple regressions were then used to build models for determinants of awareness and perception. A p-value of less than 0.05 was considered statistically significant. The findings were presented using frequency tables, pie charts, and prose to describe the awareness, perception, and their determinants among healthcare workers in Okada.

RESULTS

Sociodemographic characteristics

A total of 324 respondents participated in the study, with the majority aged between 26 and 30 years (135, 41.7%). The sample was nearly evenly split between males (167, 51.5%) and females (157, 48.5%). Most respondents were single (232, 70.7%), with a significant portion identifying as Christian (272, 84.0%). In terms of professional roles, doctors comprised the largest group (130, 40.1%), followed by nurses (70, 21.6%) and pharmacists (63, 19.4%). Regarding experience, 110 (34.0%) had between 6-10 years of practice, and 134 (41.4%) earned between ₦200,000-299,000 monthly.

Awareness of medical errors

All 324 respondents (100%) were aware of medical errors. Among them, 222 (68.5%) knew about surgical errors and wrong diagnoses, 205 (63.3%) were aware of wrong laboratory results, and 215 (66.4%) knew about equipment/system failures. Awareness of wrong

communication with patients was reported by 161 (49.7%) respondents, while 144 (44.4%) were aware of hospital infections. Overall, 201 (62.0%) healthcare professionals had a good awareness of medical errors, while 123 (38.0%) had poor awareness.

Factors associated with awareness of medical errors

Respondents aged 21-25 years showed the highest proportion of poor awareness (41, 35.3%), with a significant difference ($p < 0.001$). Awareness was also influenced by sex, with females showing better awareness (114, 67.9%) compared to males (87, 55.8%), and this difference was statistically significant ($p = 0.030$). Marital status did not show a significant association ($p = 0.249$), nor did religion ($p = 0.58$). Regarding job positions, doctors exhibited the highest awareness (99, 77.3%), followed by nurses (45, 63.4%), while pharmacists had the lowest (27, 40.3%), with a significant difference found ($p < 0.001$). Years of experience also influenced awareness, with those having less than 1 year of practice showing the lowest awareness (39, 60.0%), and this was statistically significant ($p = 0.006$). Income was another factor, as respondents earning less than ₦100,000 showed the highest awareness (30, 81.1%), while those earning between ₦100,000 and ₦199,000 had the lowest (69, 53.9%), with a significant difference at ($p = 0.050$).

Determinants of good awareness

Age was positively associated with awareness, as each year increase in age led to 1.064 times higher odds of being aware ($p = 0.034$). Marital status also showed a strong association, with singles having significantly higher odds (6.432 times) of being aware compared to married respondents ($p < 0.001$). Job position was another significant factor: doctors and nurses had lower odds of awareness, with odds ratios of 0.13 ($p < 0.001$) and 0.306 ($p = 0.007$), respectively, compared to medical laboratory scientists. Income was significantly associated with awareness, with respondents earning less than ₦100,000 having significantly lower odds (0.12, $p = 0.004$) compared to those earning ₦300,000 and above. Other factors such as sex, religion, years of experience, and income brackets of ₦100,000-199,000 and ₦200,000-299,000 were not significant predictors of awareness.

Factors associated with good perception

Although not significant, age showed a trend where respondents aged 41 years and above had the highest proportion of good perception at 23 (88.5%), compared to 33 (67.3%) among those aged 31-40 years ($p = 0.222$). Sex did not show a significant association, with 130 (77.4%) of females and 116 (74.4%) of males having good perceptions ($p = 0.603$). Marital status was similarly not significant, as 70 (78.7%) of married respondents and 176 (74.9%) of single respondents had good perception ($p = 0.561$). Across professional roles, pharmacists and medical laboratory scientists had relatively higher proportions of good perception at 57 (85.1%) and 48 (82.8%), respectively, compared to doctors at 90 (70.3%) and nurses at 51 (71.8%), though the association was not significant ($p = 0.060$). Years of experience and income categories also lacked significant associations. Respondents earning ₦300,000 and above demonstrated the highest proportion of good perception at 22 (88.0%), while those earning ₦200,000-299,000 had the lowest at 94 (70.1%, $p = 0.150$).

Determinants of perception

Age was not a significant predictor, with an odds ratio (OR) of 0.983 (95% CI: 0.929–1.040; $p = 0.555$). Sex showed that males had higher odds of good perception than females (OR = 1.598, 95% CI: 0.880–2.900), but the result was not statistically significant ($p = 0.124$). Marital status similarly showed no significance, with single respondents having an OR of 0.836 (95% CI: 0.402–1.736; $p = 0.630$) compared to married respondents. Religion and professional roles were also not significant predictors. Doctors and nurses had slightly higher odds of good perception (OR = 1.473 and OR = 2.078, respectively), but the results were not significant ($p = 0.444$ and $p = 0.116$). Pharmacists had reduced odds compared to medical laboratory scientists (OR = 0.703, $p = 0.498$). Years of experience and income levels also did not show significance. Respondents with less than one year of experience had an OR of 1.157 (95% CI: 0.455–2.945; $p = 0.759$), while those earning ₦200,000–299,000 showed higher odds of good perception (OR = 2.618, 95% CI: 0.686–9.987), though not significant ($p = 0.159$).

Table 1: Socio-demographic characteristics of respondents

Variable	Frequency (n = 324)	Percent (%)
Age (years)		
21-25	112	34.6
26-30	135	41.7
31-40	51	15.7
41 and above	26	8.0
Mean (±S.D)	**29.0 ± 7.4**	
Sex		
Male	157	48.5
Female	167	51.5
Marital status		
Single	232	70.7
Married	86	27.5
Cohabiting	3	0.9
Separated/Divorced	3	0.9
Religion		
Christian	272	84.0
Muslim	42	13.0
Traditional Religion	10	3.1
Position/Job title		
Doctor (Physician/Surgeon)	130	40.1
Nurse	70	21.6
Pharmacist	63	19.4
Medical Laboratory Scientist	61	18.8
Years of practice		
< 1	63	19.4
1-5	69	21.3
6-10	110	34.0
>10	82	25.3
Average income (₦)		
<100,000	37	11.4
100,000-199,000	125	38.6
200,000-299,000	134	41.4
≥300,000	28	8.6

Table 2: Awareness of medical errors among respondents

Variable	Frequency (n = 324)	Percent (%)
Awareness of medical errors		
Yes	324	100
No	0	0.0
Surgical errors		
Yes	222	68.5
No	102	31.5
Wrong diagnoses		
Yes	222	68.5
No	102	31.5
Wrong laboratory results		
Yes	205	63.3
No	119	36.7
Equipment/system failures		
Yes	215	66.4
No	109	33.6
Wrong communication with patients		
Yes	161	49.7
No	163	50.3
Hospital infections		
Yes	144	44.4
No	180	55.6
Source of information		
Colleagues	247	76.2
Social media	172	53.1
Internet	155	47.8
Television	91	28.1
Radio	68	21.0

Table 3: Logistic regression model for predictors of good perception regarding medical errors

Factors	β (Regression co-efficient)	Odds Ratio	95% CI for OR		p-value
			Lower	Upper	
Age (years)	-0.017	0.983	0.929	1.040	0.555
Sex					
Male	0.469	1.598	0.882	2.900	0.124
Female		1			
Marital status					
Single	-0.180	0.836	0.402	1.736	0.630
Married		1			
Religion					
Christian	-0.016	0.984	0.415	2.333	0.971
Muslim		1			
Position/Job title					
Doctor (Physician/Surgeon)	0.387	1.473	0.546	3.973	0.444

Nurse	0.731	2.078	0.836	5.164	0.116
Pharmacist	-0.352	0.703	0.254	1.945	0.498
Medical Laboratory Scientist		1			
Years of practice					
Less than 1 year	0.146	1.157	0.455	2.945	0.759
1-5 years	0.122	1.130	0.480	2.663	0.779
6-10 years	0.007	1.007	0.470	2.158	0.985
Above 10 years		1			
Average income (₦)					
<100,000	0.474	1.606	0.313	8.248	0.570
100,000-199,000	0.356	1.428	0.346	5.885	0.622
200,000-299,000	0.962	2.618	0.686	9.987	0.159
>300,000		1			

DISCUSSION

In terms of awareness, all respondents (100%) reported awareness of medical errors, yet significant variations were noted in the level of awareness regarding specific types of errors. For instance, awareness of medication errors was highest at 72.8%, while awareness of hospital infections was lowest at 44.4%. This pattern is consistent with findings from a study in Jordan in 2021, where healthcare workers were more familiar with medication errors than iatrogenic infections, due to their frequent occurrence, immediate effects and clinical emphasis[14]. In contrast, hospital infections, though prevalent, may be under-recognized as medical errors due to their systemic and multifactorial nature. The public health significance of this finding lies in the fact that low awareness of errors such as hospital infections limits efforts to prevent these adverse events, which are common in resource-limited settings. It is recommended that healthcare training programs emphasize all forms of medical errors, including those related to infections and communication, through periodic workshops and standardized educational materials.

Income was significantly associated with awareness of medical errors, with respondents earning less than ₦100,000 demonstrating the highest level of awareness (81.1%), compared to 53.9% among those earning ₦100,000–199,000 (p = 0.050). This finding contrasts with studies conducted in Oman in 2009, where higher-income earners exhibited better awareness of medical errors among respondents[15]. A possible explanation for the current study's result is that lower-income workers may actively engage in training opportunities provided by their institutions as part of mandatory or subsidized programs, while higher-income workers, often in senior positions, may have competing responsibilities that limit their participation. This finding emphasizes the importance of making continuous training programs accessible and mandatory for all healthcare workers, regardless of income level, to ensure uniform awareness of medical errors.

Job position also showed significant associations with awareness, with doctors exhibiting the highest awareness (77.3%), followed by nurses (63.4%) and pharmacists (40.3%). Similar findings have been reported in studies conducted in Palestine in 2022, where doctors, due to their leadership roles and direct involvement in clinical decision-making, demonstrated higher awareness of medical errors, with over 71% having good awareness, as opposed to 27% of pharmacists and 59% of nurses[16]. This gap exposes the need for interdisciplinary collaboration and patient safety training programs tailored to the roles of all healthcare professionals. By fostering a holistic understanding of medical errors across professions, healthcare systems can reduce the likelihood of adverse events and improve patient outcomes.

For the perception of medical errors, 246 respondents (75.9%) demonstrated good perception, with notable variations across professional roles. Pharmacists and medical laboratory scientists had better perceptions at 85.1% and 82.8%, respectively, compared to doctors

(70.3%) and nurses (71.8%). This result agrees with findings from studies in Pakistan in 2023, where doctors had the lowest perception scores, although, in comparison to pharmacists and nurses, it was non-significant[17]. The current study's findings may reflect the nature of work environments for pharmacists and laboratory scientists, where stringent protocols and error reporting systems create heightened sensitivity to patient safety. The public health significance of this finding lies in recognizing that positive perceptions encourage proactive identification and mitigation of errors. Healthcare managers should prioritize open communication and non-punitive error reporting systems to reinforce positive perceptions of medical errors among all professional groups.

For the determinants of awareness, multiple logistic regression analysis revealed that age, marital status, profession, and income were significant predictors. Age was positively associated with awareness, whereas older respondents had higher odds of being aware ($p = 0.034$). This finding disagrees with a study conducted in Kaduna, Nigeria in 2023, which found was not significantly associated with awareness levels concerning medication errors[18]. This implies that all medical professionals require targeted mentorship and exposure to patient safety practices at every stage of their careers to strengthen their awareness levels.

Income was another significant determinant, with respondents earning less than ₦100,000 having significantly lower odds of awareness (OR = 0.12, $p = 0.004$) compared to those earning ₦300,000 and above. Economic barriers in resource-limited settings can exacerbate disparities in awareness and participation in safety training programs, and as such, healthcare institutions should provide subsidized or mandatory training programs to ensure all healthcare workers, regardless of income, are adequately equipped to identify and prevent medical errors[19,20].

CONCLUSION

This study shows the high level of awareness of medical errors among healthcare workers in Okada, Edo State, Nigeria, while revealing significant disparities in specific aspects of error recognition and perception across professional groups. Doctors demonstrated the highest awareness levels, whereas pharmacists were less informed, indicating the need for targeted interventions. Positive perceptions of medical errors were prevalent but varied across roles, with pharmacists and medical laboratory scientists exhibiting better perceptions compared to doctors and nurses.

The findings emphasize that determinants such as age, profession, and income significantly influence awareness, while the perception of medical errors was shaped by factors not fully explained in this study, warranting further exploration. The results display the need for tailored training programs to address gaps in knowledge and perception, with a focus on promoting a strong patient safety culture. This includes implementing non-punitive reporting systems, nurturing interdisciplinary collaboration, and providing equitable access to training for all healthcare workers, regardless of their professional role or income level.

Ultimately, improving awareness and perception of medical errors through structured interventions can enhance patient safety and healthcare quality in resource-limited settings like Okada.

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