Knowledge and attitude to disclosure of medical errors: a comparative analytical cross-sectional study of physicians from secondary and tertiary health facilities in Abuja Nigeria

Yalma R.M[1], Asuzu M.C [2]

[1]*Department of Community Medicine, College of Health Sciences, University of Abuja, Nigeria,*

[2] *Department of Community Medicine, College of Medicine, University of Ibadan, Nigeria.*

Qualifications of Authors:

Professor Michael Chukwunaemeli Asuzu,

MBBS (Ib); DOH & S; MSc (McMaster); FMCPH; FFPHM (UK)

Dr Ramsey Msheliza Yalma,

MBBS (Nig.); FMCPH (Nig.)

Correspondences to:

Dr Ramsey M. Yalma

Email: yrmsheliza@yahoo.com

Tel: +2348035869043

List of Abbreviations:

1. FMCPH: Fellow Medical College of Public Health
2. MBBS: Bachelor of Medicine and Bachelor of Surgery
3. DOH & S: Diploma in Occupational Health and Safety
4. MPH: Master's Degree in Public Health
5. MSc: Master of Science
6. SPSS: Statistical Package for Social Sciences
7. FCT: Federal Capital Territory

Abstract

Knowledge and attitudes to medical errors disclosure are very important for patients' safety and quality of health care. This study compares the perceptions of physicians on medical errors occurrences and their knowledge, and attitudes to disclosure practices in government secondary and tertiary health facilities in Abuja, Nigeria.

A comparative cross sectional analytical survey was conducted. A cluster sampling technique was used to study a total of 485 physicians, 255 (52.5%) from the tertiary level and 230 (47.4%) from the secondary level. A semi-structured, self-administered questionnaire was employed to collect data which was analysed using SPSS software. Chi-square test was used to assess associations between variables at a significance level of 5%.

The perception of the physicians suggests that occurrences of medical errors at tertiary level versus secondary level were near misses (85.4% vs. 85.7%), mistakes (73.3% vs. 77.5%), slips or lapses (51.9% vs. 65.5%), technical errors (70.6% vs. 68.0%) and wrong drug route errors (43.9% vs. 55.2%); ($p > 0.05$ for all groups). The estimated overall error rates were (62.2% vs. 66.2%; $p = > 0.05$. The knowledge on medical errors were (57.65% vs. 53.9%, $p = 0.408$) while positive attitude to disclosure were (46.6% vs. 61.3%, $p = 0.001$).

This study suggests a heavy burden of medical errors with the tertiary health facilities having better knowledge of errors than the secondary facilities; however, the secondary facilities showed a more positive attitude to errors disclosure. There is an urgent need to reduce the burden of medical errors, improve physicians' knowledge of medical errors as well as their attitudes to disclosure.

Key words: Medical errors, Physicians, Knowledge, Attitude, Perceptions, Disclosure

1.0 INTRODUCTION

A recognized classification of medical errors developed by the Canadian Safety Institute identifies the following broad categories of errors. [1]

"Near misses" are errors that do not cause harm to patients by chance or because the error was corrected before harm could occur. "Mistakes" are errors in the planning of an action.

"Slips or lapses" are errors in the execution of an action that often occur as a result of distraction or momentary failure of concentration. "Technical errors" occur when there is a failure to carry out an action successfully even if the plan of action and technique are appropriate.[2, 3]

The magnitude of the medical error problem from recent studies suggests that medical errors cause tens of thousands of avoidable impairments, disabilities, handicaps and deaths annually as evidenced by the following studies.[4] In Utah and Colorado, USA, survey data revealed a medical error rate of 2.9% while a medical practice study in Ontario, Canada showed that 3.7% of patients in hospitals suffered prolonged hospital stay or disability or both as a result of medical errors; 33% of which were considered preventable. [5]

Annual deaths due to medical errors in the USA was estimated to be about 120,000 deaths annually and this is the fifth leading cause of death in the US, ahead of deaths due to all forms of accidents combined.[5] More Americans are killed in US hospitals every six months than died in the entire Vietnam War or three "jumbo" jets crashing every two days. [5] A cross sectional analytical study on the quality of the Australian health Care system reviewed 14,179 admissions in 2005 and 16.6% were found to have had adverse events leading to permanent disability (13.7%) and deaths (4.9%); 51% of these adverse events were preventable. [5]

In Nigeria, a recent study conducted at the University College Hospital Ibadan revealed an overall medical error rate of 25.2 % and 76% prescription error rate. [6] Prescription errors by departments were as follows: wards 33.6%, General Outpatient Department 24.6%, Medical Outpatient Department 23.4% and Accident and Emergency Department 18.5%. This study also revealed that there was no policy in place for reporting, monitoring, evaluating and preventing medical errors. [6]

In response to this challenge, leaders in patient safety movements have called for the correction of the health system defects that underlie these medical errors as well as an improvement in the recognition and reporting of errors and the disclosure of harmful errors to patients and their families.[7] Patient safety experts recommend openness to patients when errors occur. [8, 9] The ethically correct and standard practice should be timely and honest disclosure of medical errors to senior colleagues, the health care institution as well as to patients. This is an important part of patient care and an integral part of a physician's lawful duty. Disclosure of error is consistent with recent ethical advances in medicine toward more openness with patients and the involvement of patients in their own care and safety. Disclosing errors also upholds the physician's ethical duty to consistently tell the truth in the physician–patient relationship; an essential but decreasing virtue in the doctor-patient relationship. [8, 9]

This study therefore assesses the magnitude of the medical error problem based on the perception of the physicians and compares their knowledge and attitudes on medical errors and disclosures in government secondary and tertiary health facilities in Abuja, Nigeria.

2.0 MATERIALS AND METHODS

2.1 Study area

The study was carried out in the Federal Capital Territory Abuja (FCT). Abuja officially became Nigeria's capital on 12th December 1991. Based on the 2006 census, the population of the FCT was 1,405,201. However, the population has been increasing rapidly following huge influx of people from the 35 states of the country. [10] Current population of Abuja is estimated to above 5 million people.

2.2 Study design

A comparative cross sectional survey of physicians in the tertiary and secondary health facilities was conducted to obtain quantitative data.

2.3 Study population

All cadres of medical and dental practitioners regardless of number of years in practice (i.e. consultants, resident doctors, medical officers and house officers) in the selected government secondary and tertiary health facilities in the Federal Capital Territory (FCT) Abuja were studied.

2.4 Sample size determination

The formula for calculating sample size for the comparison of two independent proportions was used. [5,11]

$$n/\text{group} = \frac{2\,(Z\alpha + Z\beta)^2\,\pi\,(1-\pi)}{d^2}$$

2.5 Sampling Technique

A cluster sampling technique was used in this study. Each health facility was studied as one cluster. The 12 secondary and two tertiary health facilities were identified using available information from the Federal Capital Territory administration. Each health facility was classified as one cluster; therefore, one government tertiary health facility (= 1 cluster) was selected by simple random sampling technique out of the two tertiary health facilities and six government secondary health facilities (= 6 clusters) were also selected by simple random sampling out of the 12 secondary health facilities. All cadres of consenting medical and dental practitioners (i.e., consultants, resident doctors, medical officers and house officers) in all the selected health facilities were studied. The estimated numbers of physicians of all cadres (i.e., consultants, resident doctors, medical officers and house officers) in the government health facilities were as follows: One tertiary health facility had approximately 250 to 400 physicians while one secondary heath facility had about 25 to 70 physicians.

2.6 The questionnaire

A semi-structured, self-administered questionnaire was used. The questions were a mix of those constructed and developed by the researcher and those curled and modified from a standardized questionnaire survey on medical errors among physicians in the USA; a project funded by the Robert Wood Johnson foundation. [12]

The questionnaire was divided into 5 sections (A to E):

Section A: Socio – demographic characteristics of participants.

Section B: Occurrence of medical errors (through the physicians' self-assessment and perception of near misses, mistakes, slips or lapses and technical errors.

Section C: Knowledge of physicians on medical errors (i.e. on various types of medical errors e.g. near misses, slips or lapses etc.

Section D: Attitudes of physicians towards disclosing medical errors to professional colleagues, the health institutions and patients.

Section E: Medical error disclosure practices among physicians. Operational definitions: minor error (an error that prolonged hospital stay or caused discomfort to patients) and major error (an error that led to death or disability) were used to assess error disclosure rates.

2.7 Validity and reliability

There was training for the research assistants for two days on the study objectives and the questionnaire administration. The questionnaire was pre-tested among physicians at Suleja general hospital out of Abuja for face validity, clarity, stability and to avoid contamination bias followed by necessary corrections and modifications.

2.8 **Data collection**

The questionnaires were administered by the researcher and the trained research assistants. There were 4 teams of research assistants with each group consisting of 2 persons to administer the questionnaires over a period of 3 months. The questionnaires were administered either during or at the end of an organized professional or educational activity and as an independent activity. The questionnaire may be completed in about 10 minutes, on the average.

2.9 **Data analysis**

Data from the questionnaire were entered and analyzed using SPSS software. The socio-demographic characteristics such as age, gender, nationality, professional ranks etc. and other relevant findings were summarized and displayed in appropriate tables and charts. For the analysis of the perception of physicians on the occurrence of medical errors, responses were dichotomized as follows: 'Very often', 'sometimes', and 'not too often' were categorized as 'yes' responses and 'never' as 'no' responses. The overall medical error occurrence rates for the tertiary and the secondary levels was estimated as the total number of the 'yes' responses to the occurrence of the various error categories surveyed i.e. near misses, mistakes, slips/lapses and technical errors. The Likert scale was used for the assessment of attitudes i.e. 'strongly agree' and 'agree' responses were classified as 'agree' while 'strongly disagree', 'disagree' and 'neutral' responses were classified as 'disagree'. On the knowledge scale as well as the practices of disclosure and non-disclosure scales, 'no' and 'I don't know' responses were analyzed as 'no' responses against the 'yes' responses. The overall medical error disclosure rates for the tertiary and the secondary levels were estimated as the total of the 'yes' responses to the disclosure of the error categories surveyed. The knowledge scoring system used was a score of $\geq$ 50% was considered good knowledge and <50% as poor knowledge. The analytic focus was therefore on positive responses. Test statistics such as Chi square (χ^2) and Fisher's exact test were used to test significant differences between two proportions or groups as appropriate. Also logistic regression analyses were used to determine the significant predictors of medical error occurrences and disclosure practices. Multivariate analyses were conducted using the following as independent variables: level of the health facility, training level, specialty and some socio-demographic characteristics; and answers to questions as factors and covariates or dependent variables. Only variables significant at the alpha = 0.05 were retained in the final multivariate model for the outcomes and in most cases, actual values were reported.

2.10 Ethical considerations

Ethical approval was obtained from the Federal Capital Territory health research ethics committee. Also permission was obtained from the relevant hospital authorities and heads of departments, units and teams. Written consent was obtained from all participants for the survey. The participants were assured of confidentiality of information given. Participation in this study was

voluntary and participants were free to withdraw at any stage of the study without any penalty. The researchers maintained a responsibility for honesty and integrity at all stages of the research process and the data collected were used only for this study.

2.11 Limitations of the study

The self-reporting nature of this study may be compromised by recall bias. This was minimized by assessing medical error occurrences and disclosures in the prior three months only.

3.0 RESULTS

A total of 485 doctors were interviewed, with 255 (52.5%) from the tertiary level and 230 (47.4%) from the secondary level. Respondents from the secondary level were older than those from the tertiary level with mean age of 36±7.5 years compared to 34±7.3 years. This was statistically significant $p < 0.05$. The sex distribution of the respondents was also different with a higher proportion of male respondents, 340 (70.1%) than female respondents, 145 (29.9%) as shown in table 1 below. In addition, most respondents belong to the surgical sub-specialties 221(45.6%) as compared to the Physicians 149(30.7%). This was statistically significant $p < 0.05$.

Table 1 Socio-demographic characteristics of respondents

Variables	Tertiary Level (n =255) n (%)	Secondary Level (n =230) n (%)	Total (N=485) N (%)	Statistic χ^2	p-value
Age (years)					
20-29	89 (34.9)	48 (20.9)	137 (28.2)	8.69	0.034*
30-39	115 (45.1)	116 (50.4)	231 (47.6) 98		
40-49	42 (16.5)	56 (24.4)	(20.2)		
50-59	7 (2.8)	7 (3.0)	14 (0.03)		
≥ 60	2 (0.4)	3 (1.3)	5 (0.01)		
Mean age (± SD)	34±7.3	36±7.5	35±7.4	5.46†	0.016
Sex Male	178 (69.8)	162 (70.4)	340 (70.1)	0.05	0.822
Female	77 (30.2)	68 (29.8)	145 (29.9)		
Nationality					
Nigerians	252 (98.8%)	229 (99.6)	481 (99.1)	0.80	0.372
Others*	3 (1.2)	1 (0.4)	4 (0.01)		
Marital status					
Married	149 (58.4)	116 (50.4)	265 (54.6)	40.09	0.001*
Single	99 (38.8)	66 (28.7)	165 (34.0) 55		
Others**	7 (2.8)	48 (20.9)	(11.3)		

Mean number of years in practice	7.9± 5.5	8.04±6.1	8±5.8	3.76†	0.654
Professional ranks					
Consultants	28 (11.0)	34 (14.8)	62 (12.9) 250	73.57	0.001*
Resident doctors	162 (63.6)	88 (38.3)	(51.5)		
House officers	33 (12.9)	11 (4.8)	44 (9.1)		
Medical officers	32 (12.5)	97 (42.2)	129 (26.6)		
Sub-specialties of the physicians					
'Surgical'	126 (49.4)	95 (41.3)	221 (45.6)	2.15	0.032*
'Non- surgical'	87 (34.2)	62 (26.9)	149 (30.7)		
Others***	42 (16.4)	73 (31.7)	115 (23.7)		

P-values < 0.05 are significant. Others = foreigners. Others** = Widows/widowers, cohabiting, separated, divorced. Others*** = no specialty of interest.

† = t test.

3.1 Perceptions of physicians on medical error occurrence rates at the tertiary and secondary levels

Figure 1 show that the medical errors occurrence rates were perceived to be mostly higher at the secondary level over the previous three months than at the tertiary level. For example, near misses (85.7% vs. 85.4%, p > 0.05) and mistakes (77.5% vs.73.3%, p > 0.05).

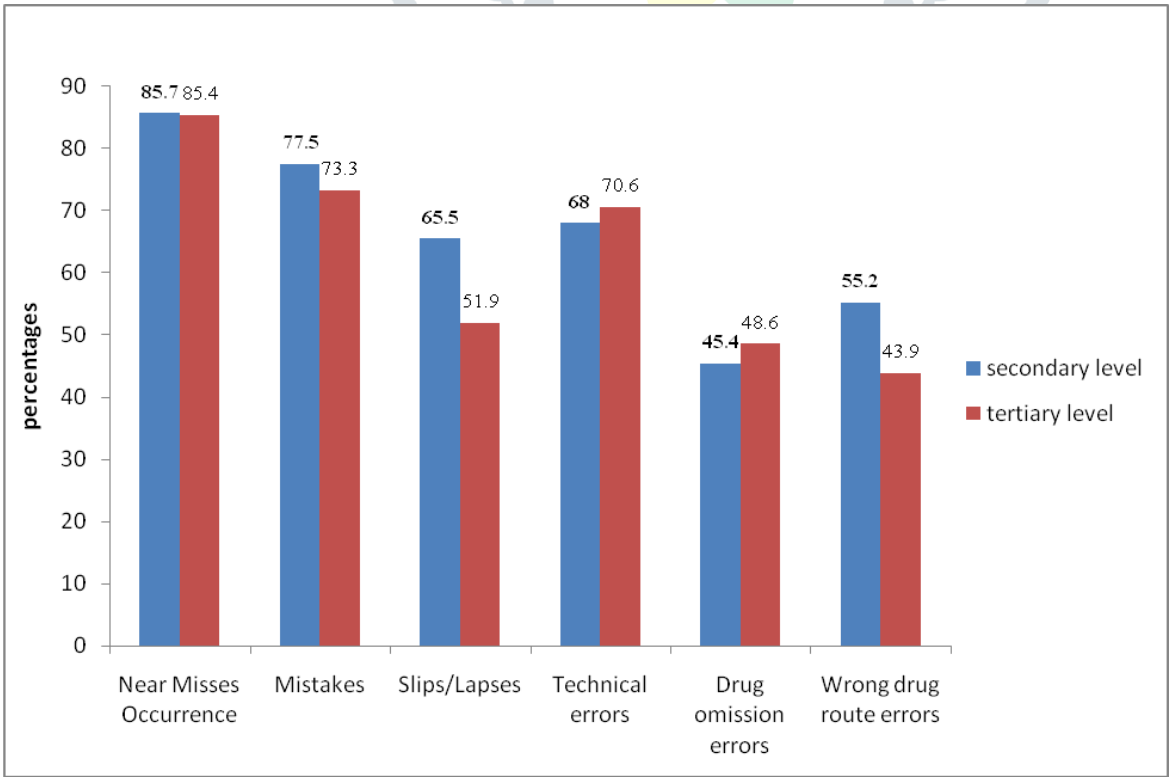

Figure 1 Perceptions of physicians on medical error occurrence rates at the tertiary and secondary levels

The medical error rates among physicians below the rank of consultant were perceived to be generally higher than among consultants at both tertiary and secondary levels; for example, slips/lapses 56.8% > 14.2% and 74.4% > 14.5%). The differences between the corresponding cadres at both the tertiary and secondary levels were not statistically significant e.g. mistakes (21.4% vs. 23.5%, p > 0.05) and (79.9 vs. 87.2, p > 0.05) for both comparison groups, as shown in the table 2 below.

Table 2 Comparison of the physicians' perceptions of medical error occurrence rates by cadres

	Category of error	Medical error rates		Total	Statistic	p-value
	Physicians' cadre			(N = 485)	χ^2	
		Tertiary level (n=255) n (%)	Secondary level (n=230) n (%)	N (%)		
1.	**Near miss**					
	Consultants	7 (23.5)	9 (24.4)	16 (25.8)	0.004	0.945
	Non consultants	211 (92.9)	188 (95.9)	399 (94.3)		
2.	**Mistakes**					
	Consultants				1.139	0.286
	Non consultants	6 (21.4)	8 (23.5)	14 (22.5)		
		181(79.9)	170 (87.2)	351 (82.9)		
3.	**Slips/Lapses**					
	Consultants				2.073	0.150
	Non consultants	4 (14.2)	5 (14.5)	9 (14.5)		
		129 (56.8)	146 (74.4)	275 (65.0)		
4.	**Technical errors**					
	Consultants				0.396	0.529
	Non consultants	5 (17.8)	6 (17.6)	11 (17.7)		
		175 (77.0)	150 (76.5)	325 (76.8)		

* Statistically significant

The sub-specialty with the highest overall medical error rate was surgery (34.7%). as shown in table 3 below.

Table 3 Comparison of the physicians' perceptions of medical error occurrence rates by sub-specialties

Subspecialty	Medical error rates			Statistic χ^2	p-value
	Tertiary level (n=255) n (%)	Secondary level (n=230) n (%)	Total (N = 485) N (%)		
Surgery	13 (31.7)	11 (39.2)	24 (34.7)	0.528	0.467
Radiology	8 (28.5)	6 (35.2)	14 (31.1)	0.528	0.467
Obstetrics& Gynaecology	19 (25.3)	18(39.1)	37 (30.5)	2.603	0.154
Family Medicine	8 (33.3)	9 (28.1)	17 (30.3)	0.213	0.645
Paediatrics	7 (24.1)	8 (38.0)	15(30.0)	0.834	0.659
ENT	6 (26.0)	6 (35.2)	12 (30.0)	1.606	0.205
Internal Medicine	10 (26.3)	9 (34.6)	19 (29.6)	0.990	0.320
Anaesthesia	5 (25.0)	5 (33.3)	10 (28.5)	0.714	0.398
Laboratory Medicine	5 (25.0)	5 (29.4)	10 (27.0)	0.106	0.745
Ophthalmology	5 (25.0)	5 (26.3)	10 (25.6)	2.815	0.934
Community Health	6 (24.0)	5 (25.0)	11 (24.4)	0.597	0.440
Dentistry	6 (23.3)	5 (23.8)	11 (23.4)	0.197	0.657
Others	61 (23.9)	60 (26.0)	121(24.9)	0.301	0.583

Taking all the categories of errors together (i.e. near misses, mistakes, slips/lapses, technical errors; the estimated overall medical error rate at the secondary level was higher than at the tertiary level (66.21% > 62.28%, $\chi^2 = 1.202$, p = 0.273) as shown in Figure 2 below.

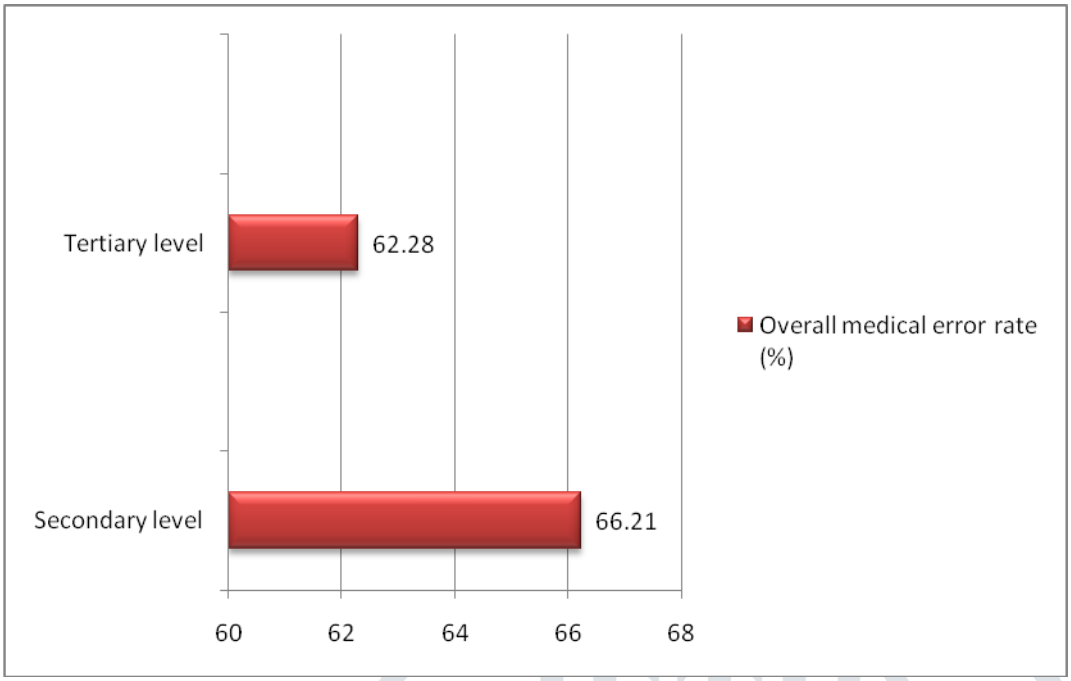

Figure 2 Comparison of the physicians' overall perceptions of medical error occurrence rates at the tertiary and secondary levels

3.2 Knowledge of physicians on medical errors

The physicians at the tertiary level had a better knowledge of medical errors with a score of 57.6% compared to their colleagues at the secondary level with 53.9%, ($\chi^2 = 0.683; p = 0.08$)

Attitudes of physicians towards medical error disclosure

The physicians' attitudes to disclosure of medical errors to colleagues, the health institution and patients were assessed. The secondary level of the health system showed a more positive attitude to disclosure of medical errors with 61.3% compared to the tertiary level with only 46.67% ($\chi^2 = 10.418, p = 0.001$).

We found that the attitude to medical error disclosure improves with increasing level of training at both the tertiary and secondary levels (75.5% > 58.6%) and (74.0% > 43.1%) as shown in table 4 below and this was statistically significant, p = 0.001.

Table 4: Attitudes of physicians to medical error disclosure by cadre

Level	Negative attitude n (%)	Positive attitude n (%)
Secondary		
Consultants (n = 34)	9 (25.5)	26 (75.5)
Below the rank of consultant (n = 196)	80 (40.8)	115 (58.6)

Tertiary		
Consultants (n = 28)	7 (26.0)	21 (74.0)
Below the rank of consultant (n = 227)	129 (56.8)	98 (43.1)
Total (N = 485)	225 (46.3)	260 (53.6)

$\chi^2 = 10.41, p = 0.001$

4.0 DISCUSSION

This study revealed that the overall medical error occurrence rates at both the tertiary and secondary levels were very high (62.2% vs. 66.2%). Our findings do not compare favourably with that in the United States of America where only 20% to 42% of patients reported personal experience with an error in their healthcare or in Germany where only 30% of patients reported errors in their personal health care.[13] However, despite the lower error rates in the USA, annual deaths due to medical errors in the USA was reported to be about 120,000 deaths and this was ranked the fifth leading cause of death ahead of deaths due to all forms of accidents combined [2.] In Australia, a study on the quality of the healthcare system also reported lower rates of medical error occurrences. The Australian study reviewed 14,179 hospital admissions; and found that 16.6% of all admissions were associated with medical errors, 13.7% of them led to permanent disabilities and 4.9 % resulted to deaths. The study further revealed that 51% of these adverse events were preventable [1.] The high rates of the occurrence of medical errors in medical practice suggest that some of our patients may have suffered impairments, disabilities, handicaps or deaths as a result of medical errors. In Africa, medical errors is said to account for at least 20 million deaths and Nigeria with a population above 150 million represents the people of Africa most affected by this problem [14.] Many of the sufferers of these errors include children as revealed by a study at the Lagos State University Teaching Hospital among paediatrics out patients. It was reported that up to 38% of the children suffered from drug related errors alone, including omission of child's age. [15, 16, 17.]

This study showed that physicians have an overall good knowledge of medical errors with the tertiary level ranking higher than the secondary level (57.6% vs. 53.9%; p = 0.41). This result is very close to an average knowledge score of resident doctors from seven Harvard-affiliated residency training centres and two Harvard Medical Schools' 58.4%, reported by Jericho and colleagues.[18] These researchers explored statistically significant difference between resident doctors and medical students and found that age and gender were statistically significant on multivariate models.[18] Our study however explored statistically significant difference between various cadres of doctors at the tertiary and secondary levels of our health system. We found statistically

significant difference not only on age and gender but also on number of years in medical practice and professional rank i.e., level of training.

A survey of physicians in tertiary hospitals in the USA showed that most of the respondents knew how to report medical errors but only few knew what errors to report.[19.] These findings are similar to our findings where majority of doctors had good knowledge of medical errors. This is also in accord with findings by Mohammed and colleagues at the University of Alexandra in Egypt where some 50% of the physicians surveyed had satisfactory knowledge of medical errors. [20] However, Ogundiran and colleagues from a study among surgeons in South Western Nigeria; found that only 47.1% of the surgeons knew that it was unethical not to disclose medical errors.[21] This result is slightly different from our finding and others in the literature, where knowledge scores on medical errors among physicians were at least 50% and above. This is probably linked to the higher medical error rates that have been reported among surgeons. [21]

Hingorani and colleagues in a cross-sectional questionnaire survey on the attitudes of patients and doctors on the amount of information given after unintended injury during treatment among ophthalmologists reported a negative attitude of 40%. [22] This is close to our finding of 46.39%. Also a comparative cross sectional study by Novack and colleagues in which physicians were given a hypothetical case involving the death of a patient as a result of a treatment mistakenly administered by a physician; about 33% of the physicians studied said they would provide incomplete and misleading information about the incident; while 67% of them said they would tell the truth.[12] This is similar to what was found among the physicians at the secondary level where 61.3% of doctors had positive attitude and 38.7% had negative attitude to disclosure. In addition, our study also revealed that medical error disclosure improves with increasing professional rank or level of training and number of years in practice as well as with age. In other words, consultants were more favourably disposed to medical error disclosure than physicians below the rank of consultant. Kaldjian and colleagues, found similar results in their study on disclosing medical errors to patients: attitudes and practices of physicians and trainees. [12] They found a significant difference based on training level. They reported that physicians with more training were more willing to disclose medical errors. They also found out that such physicians were less concerned about possible negative consequences. More experienced physicians were also more likely to believe that disclosure increases their patients' trust in them.[12] The results from our study and that of Kaldjian suggest that physicians become more comfortable with disclosure as their professional rank increase.

According to the results of a survey conducted by the University of Washington School of Medicine where 2,637 American and Canadian doctors were studied, 98% of them supported the disclosure of major errors to patients and 78% supported disclosing minor errors. [23] Also a study by Abdoul-Fatouh on patient safety culture among health care providers at a teaching hospital in Cairo Egypt; revealed that overall, 78.2% of physicians accepted the need for organizational learning for continuous improvement of patient safety through disclosure of medical errors.[24] In contrast, our study revealed lower disclosure rates where 61.3% at the secondary level supported disclosing minor errors, especially to patients and only 46.67% at the tertiary level supported disclosure of

major errors, especially to colleagues. These differences may be explained in the context of the differences in the work environment and the country.

CONCLUSION

This study suggests a heavy burden of medical errors with the tertiary health facilities having better knowledge of errors than the secondary facilities; however, the secondary facilities showed a more positive attitude to medical error disclosure and patient safety. There is therefore an urgent need to reduce the burden of medical errors and improve physicians' knowledge of medical errors. Physicians should also develop a more positive attitude to medical errors disclosure and patient safety.

ACKNOWLEDGEMENTS

We want to greatly appreciate the heads of the Department of Community Medicine past and present, especially Prof. F. Omokhodion and all consultant staff of the department for their very diligent training and mentoring especially Prof. Modupe Onadeko, Dr Aderonke Manuwa-Olumide, Dr KO Osungbade, Dr O Sekoni.

To Dr Lauris C. Kaldjian of the Department of Internal Medicine, University of Iowa Carver College of Medicine, USA; we wish to say thank you sir for your useful contributions especially at the formative stage of this study and for granting me access to some survey questions used in the instruments section from your work.

To Mrs Kemi Bankole (now of blessed memory) of the Graduate Programme Computer Laboratory, Department of Obstetrics and Gynaecology, University College Hospital Ibadan, we wish to say that you have been so helpful with the secretarial work in this study.

REFERECES

1. Baker GR, Norton PG. The Canadian Adverse Events study: the incidence of adverse events among hospital patients in Canada. CMAJ 2004; 170: 1678 -86.
2. Studdert DM, Brennan TA. No-fault compensation for medical injuries: the prospect of error prevention. JAMA. 2010;286:217–23.
3. Wilson R M, Runciman WB. The quality in Australian health care study. Med J Aust, 2005; 163: 458-71.
4. Studdert DM, Mello MM, Brennan TA. Medical malpractice. N Engl J Med. 2004;350:283–92.
5. Robertson GB. Fraudulent concealment and the duty to disclose medical mistakes. Alberta Law Rev 2007; 25:215-23.
6. Oluwole KS. Prescribing and dispensing practices at the University College Hospital Ibadan. West Afr J Med. 2009 May-June; 28(4):240-52.
7. Utsumi T. Creating Global University System, Global peace through the global university system, University of Tampere Press, Tampere, Finland (2003). Available on http://makeashorterlink.com .(Accessed 2011, Sept 05.
8. Weissman JS, Annas CL, Epstein AM, Schneider EC, Clarridge B, Kirle L, Gatsonis C, Feibelmann S, Ridley N. Error reporting and disclosure systems: views from hospital leaders. JAMA. 2005;293:1359–66.
9. Kachalia A, Shojania KG, Hofer TP, Piotrowski M, Saint S. Does full disclosure of medical errors affect malpractice liability? Jt Comm J Qual Improv. 2003; 29:503-11.

10. Okojie E. Professional medical negligence in Nigeria. Feb 2010. (www.cma.ca/cmaj/vol- 156/issue-2/0225.htm (accessed 2011 Feb 23). Accessed 2011 April 28).

11. Kirkwood BR and Sterne JAC. Essential Medical Statistics. 2nd edition. 9600 Garsington Road Oxford QX4 2DQ UK: Blackwell Science Ltd; 2003. p. 417-22.

12. Kaldjian LC, Jones EW. Disclosing Medical errors to patients: attitudes and practices of physicians and trainees. J Gen Intern Med. 2007 July; 22(7): 988–996. Published online 2007 May.

13. Mello MM, Studdert DM, Brennan TA. The new medical malpractice crisis. *N Engl J Med* 2003; 348:2281.

14. Oshikoya KA, Ojo OI. Medication errors in paediatric outpatient prescriptions of a teaching hospital in Nigeria. Nig Q J Hosp Med. 2007 April-June; 17(2):74-8

15. Clarke OL, Gouveia J, Thomson SR, Muckart DJ. Applying Modern error theory to the problem of missed injuries in trauma. Pharm World Sci. 2007 Oct; 29 (5): 557 – 64. Epub 2007 Mar 24.

16. Eze KC, Marchie TT, Eze CU. An audit of ultrasonography performed and reported by trainee radiologists. West Afr J Med. 2009 Jul-Aug; 28(4):257-61.

17. The Kaiser Family Foundation, Agency for Healthcare Research and Quality, Harvard School of Public Health. National survey on consumers' experiences with patient safety and quality information. Summary and chart pack. [December 2, 2004]. Available at http://www.kff.org/kaiserpolls/7209.cfm.

18. Jericho B G, Tassone R F. An assessment of an educational intervention on resident physician attitudes, knowledge, and skills related to adverse event reporting. J Grad Med Educ. 2010 June; 2(2): 188–194.

19. Clinton HR, Obama B. Making patient safety the center piece of medical liability reform. *N Engl J Med* 2006;354:2205-8

20. Mohammed AM., Ghanem MA, Kassem A. Knowledge, perceptions and practices towards medical ethics among physician residents of University of Alexandria hospital, Egypt. East Mediter Health J. 2012 Sep; 18(9):935-5.

21. Ogundiran T.O, Adebamowo C.A. Surgeon-patient information disclosure practice in South Western Nigeria. Med. Princ Pract 2012; 21:238-243.

22. Hingorani M, Wong T. Patient and doctors' attitudes to amount of information given after unintended injury during treatment: cross sectional questionnaire survey. BMJ 2009; 318: 640-1.

23. Hebert PC, Levin AV, Robertson G. Bioethics for clinicians: Disclosure of medical error. *CMAJ* 2011; 164:509-13.

24. Aboul- Fotouh AM, Ismail NA, Ez-Elarab HS, Wassif GO. Assessment of patient safety culture among health care providers at a teaching hospital in Cairo Egypt. East Mediterr Health J. 2012 Apr; 18 (4): 372-7.