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ORIGINAL SCIENTIFIC REPORT

Recognition and Disclosure of Medical Errors Among Residents in Surgical Specialties in a Tertiary Hospital in Ibadan

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Abstract

Background Medical error (ME) remains central to discussions regarding patient's safety and its frequency appears high in surgical specialties because of some peculiarities. We set out to study the perception of surgical residents about medical errors, their ability to recognize them and predisposition to disclosing their errors.

Methods This was a cross-sectional study among surgical residents at the University College Hospital, Nigeria. Data about their knowledge, perception and recognition of medical errors were obtained. Knowledge and practice of medical error disclosure was also examined. Each of these was scored on Likert scale and scores categorized. Chi-square test and logistic regression were used for analysis with p at <0.05.

Results 92 residents participated and 11(12.0%) were females. 32.6% of the respondents had less knowledge about medical errors and these were significantly junior residents. Residents with poor perception about ME were 43.5% and recent involvement with ME was significantly associated with good perception about ME. Delay in obtaining consultation and delay in diagnosis were identified respectively as MEs by only 40(43.5%) and 31(33.7) of the participants. While 82(89.1%) agreed that all errors should be reported to the consultant, only 20(21.7%) believed patients/relatives should be informed of all errors, while 49(53.3%) were well disposed to disclosing ME. Only 4(4.3%) residents had a formal training on ME.

Conclusions Knowledge of ME was low among junior residents and residents are less likely to disclose error to patients/relatives. A formal training on ME will impact on their recognition, practice, and disclosure of ME.

Introduction

Medical error (ME) has become a prominent and sensitive topic within the medical profession in recent times [1] following the 1999 report of the Institute of Medicine [2]. In the USA, ME is now the third leading cause of death [3], while in Australia, ME accounts for 18,000 deaths and over 50,000 disabled patients per year [4, 5]. ME has therefore become a major public health problem.

A ME is an act of omission or commission in planning or execution that contributes or could contribute to an unintended result [6]. MEs include errors in technique, judgment, drug administration, delays in the operating room, diagnostic errors and incomplete hospital record

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keeping [7]. The severity of ME has been classified as minor errors where there is a harm that is not life-threatening or permanent, serious errors where life is threatened with possibility of permanent injury, and near misses where there may be harm but without resultant injury either due to timely intervention or simply due to chance [8]. ME errors can also be described as catastrophic when they result in a grievous injury or death [9].

The frequency of errors has been noted to be high in surgery [10], so surgical patient may be more at risk of ME than other patients [9]. Surgical training is rigorous and quite tasking generally. The training also involves evolution through different levels of decision making [11]. While it is recognized that junior doctors generally have more proclivity to ME [12], surgical residents seem more likely to be involved in medical error than residents in the medical sub-specialties [13]. The margin for error in surgery might be narrower than in medical sub-specialties, and the surgical errors are apparently more tangible [14].

Recognition of errors is the first step to reducing the risk of ME, thereby increasing patient's safety [14]. Error recognition allows for the development of a tailored strategy that would lead to a personal or systemic change [15]. Prevention of errors, which is the most pragmatic approach, to dealing with errors [16] begins with its recognition, which subsequently leads to disclosure [13]. ME disclosure encourages concerted efforts to prevent such errors in future, and this increases the patients' confidence in the health system.

The introduction of the WHO surgical checklist was to reduce the tendency toward medical error, and this has been adapted in our hospital over the last four years, though the compliance rate and the effect of this on medical error detection, reporting and disclosure have not been evaluated. The hospital at present does not have an audit system for medical error reporting, but mortalities are reviewed on a regular basis. A high prevalence of medication errors among health-care professionals has previously been reported in a national survey across the geopolitical zones in the country [17], while another study exploring 'Surgeon-patient information disclosure practices in southwestern Nigeria' noted the tendency to non-disclosure of medical errors among two-thirds of surgeons [18]. It however appears that patients in our environment would like to know about medical errors [19]. To the best of our knowledge, there has been no study in our environment that has investigated the recognition and disclosure of errors among surgical residents, despite the common paternalistic treatment of patients and a residency training that is laden with a strong hierarchical structure. We aimed to determine the perception of surgical residents about medical errors, their ability to recognize ME and to identify the factors associated with surgical error disclosure among the trainees.

Materials and Methods

Study Design

This was a cross-sectional study carried out at the University College Hospital, Ibadan, with accredited surgical and surgical sub-specialty postgraduate programs.

Study Population

The study participants included all residents in the departments of surgery, orthopedics, plastic and reconstructive surgery, neurosurgery, obstetrics and gynecology, ophthalmology, otorhinolaryngology and oral and maxillofacial surgery at the University College Hospital, Ibadan.

Data Collection Procedure

All consenting surgical trainees, who must have completed at least one year of postgraduate training, were recruited. Data were obtained using a structured self-administered questionnaire, which provided details on the demographic data of the participants, knowledge and perception of ME, recognition of such errors and attitude toward disclosure of ME and the prevalence of surgical error in practice.

Ethical Consideration

The ethical approval for the study was obtained from the University of Ibadan/University College Hospital Ethical Review Committee. All participants also gave written informed consent.

Data Management

Data were analyzed using SPSS version 22. Questions for knowledge, perception and recognition of ME, as well as knowledge and practice of disclosure process for ME were scored on Likert scales with the minimum scores being 11, 11, 18, 7 and 9, respectively. The maximum scores were also 33,33,54,21 and 27, respectively. Scores at and above the mean were designated as better knowledge, favorable perception, good recognition skills, good knowledge of disclosure process and good practice of ME disclosure, respectively. The surgical specialties were grouped into core surgical specialties and other surgical specialties. Chi-

Table 1 Sociodemographic characteristics

Characteristics	Frequency	%
Age group (years)		
≤ 35	72	78.3
> 35	20	21.7
Sex		
Male	81	88.0
Female	11	12.0
Marital status		
Married	68	73.9
Single	24	26.1
Ethnicity		
Yoruba	63	68.5
Others	28	31.5
Year post-medical school (years)[a]		
> 8	36	39.1
≤ 8	56	60.9
Residency years		
≤ 4	51	55.4
> 4	41	44.6
Current position		
Junior Registrar[b]	44	47.8
Senior Registrar[c]	48	52.2

[a]Grouping based on the mean number of years among the residents which were 8.33 and 3.95, respectively

[b]Designation for residents before passing the part 1 professional examinations

[c]Designation for residents after passing the part 1 professional examinations

square test was used to test the relationship of the different categories of variables with the participants' sociodemographic characteristics. Significant relationships for disposition toward ME disclosure were further tested using logistic regression. Spearman's correlation was also used to determine the correlation between the mean scores. The level of significance was $p < 0.05$.

Results

Ninety-two out of 121 surgical residents (75.2% response rate) participated in the study with mean age 33.9 ± 4.0 years. Most of them were males, and there was almost equal number of the respondents in the junior and senior registrar category with 10 (90.1%) of the females being junior registrars. The other sociodemographic characteristics are as shown in Table 1. The respondents were from 10 surgical specialties (Table 2).

Table 2 Surgical specialties

Specialities	Frequency	%
General surgery[a]	21	22.8
Obstetrics and gynecology	11	12.0
Ophthalmology	10	10.9
Orthopedics[a]	10	10.9
Otorhinolaryngology	9	9.8
Neurosurgery[a]	8	8.7
Oral and maxillofacial surgery	8	8.7
Urology[a]	8	8.7
Cardiothoracic surgery[a]	5	5.4
Plastic and reconstructive surgery[a]	1	1.1

[a]Core specialties: These are the primary surgical areas

Table 3 Association between predisposition to ME disclosure and beliefs about ME

	Predisposition to medical error disclosure		*p* value
	Good	Poor	
Previous disclosure of ME			
Yes	42 (56.8)	32 (43.2)	0.17
No	7 (38.9)	11 (61.1)	
ME disclosure is not difficult			
Yes	13 (54.2)	11 (45.8)	0.92
No	36 (52.9)	32 (47.1)	
Avoiding reporting ME committed			
Yes	9 (30.0)	21 (70.0)	<0.01
No	40 (64.5)	22 (35.5)	
Have been previously reprimanded harshly for ME			
Yes	35 (63.6)	20 (36.4)	0.02
No	14 (37.8)	23 (62.2)	

Knowledge About Medical Errors

Mean knowledge score was 2.9 ± 0.33, and 30 (32.6%) of the respondents had less knowledge about MEs. Registrars significantly had less knowledge about ME than senior registrars ($p = 0.04$).

Perception About Medical Errors

About two-thirds, 59 (64.1%) reported that MEs were common, and 87 (94.6%) believed they were preventable, while 54 (58.7%) believed most surgical errors were never reported. Almost all, 88 (95.7%) agreed that ME is an important subject for residents. Also, 66 (71.7%) did not believe that ME is an indication of individual deficiency and only 19 (20.7%) said that MEs are mainly due to system failure. The mean perception score about ME was 2.6 ± 0.22, and 40 (43.5%) residents had poor perception

Table 4 Predictors of positive predisposition to ME disclosure

Predictors	Unadjusted estimates			Adjusted estimates[a]		
	OR	95% CI	*p* value	OR	95% CI	*p* value
Avoiding report of ME committed						
No	1	–		1	–	
Yes	0.21	0.08, 0.56	<0.01	0.22	0.08, 0.60	<0.01
Previous harsh reprimand for ME committed						
No	1	–	0.01	1	–	
Yes	3.32	1.31, 8.41		3.46	1.35, 8.90	0.01

[a]Adjustment made for sex and level of residency training

about ME. Females significantly had poor perception about medical errors ($p = 0.04$), and recent involvement with ME was significantly associated with good perception about ME ($p = 0.02$). Those with good perception about ME observed that most surgical errors were never reported ($p = 0.02$), and residents with poor perception about ME significantly believed self-reporting of an error is an admission of guilt ($p = 0.01$).

Recognition of Medical Errors

Mean score for recognition of ME was 2.5 ± 0.25, and 60 (65.2%) had good recognition skills. Only 40 (43.5%), 31 (33.7) and 67 (72.8%) identified delay in obtaining consultation, delay in diagnosis and misdiagnosis, respectively, as MEs, while 40 (43.5%) thought anesthetic complication was a ME.

Reporting of Medical Errors

Twenty-eight (30.4%) residents were involved in ME in the 3 months before the survey. The mean score for the knowledge about disclosure of ME was 2.1 ± 0.25, and 55 (59.8%) had good knowledge about disclosure of ME. While 82 (89.1%) agreed that all errors should be reported to supervising consultant staff only, just 20 (21.7%) of them believed patients/relatives should be informed of all errors. Also, 35 (38.0%) agreed that ME should not be disclosed to patients/relatives in some situations and 40 (43.5%) believed patient/relatives don't bother about ME as long as the outcome is good.

Process of Disclosure of Medical Errors

Mean score for the practice of ME disclosure was 2.1 ± 0.31, and 52 (56.5%) had good practice of ME disclosure. Sixty-eight (73.9%) reported that ME disclosure is difficult, and only 49 (53.3%) were well disposed to disclosing ME. Seventy-four (80.4%) had disclosed ME before and 54 (58.7%) were shy from using the word 'error' during disclosure. Senior registrars significantly had higher mean score for practice of ME disclosure than junior registrars ($p = 0.04$). The relationship between predisposition to disclose ME and some beliefs about ME are as shown in Table 3. Good disposition to ME disclosure was associated with having been harshly reprimanded for ME ($p = 0.02$). Significantly, those who were not well disposed to reporting ME avoided reporting ME that they committed ($p < 0.01$). The predictors of positive predisposition toward disclosure of ME are as shown in Table 4. There was a positive correlation between mean score for knowledge of medical error disclosure and mean score for practice of medical error disclosure ($\rho = 0.25$, $p = 0.02$).

There was no difference between the core surgery residents and the others in terms of knowledge, perception and recognition of ME, as well as knowledge and practice of ME disclosure. Only 5 (5.4%) were aware of the hospital's mechanism for reporting medical errors, and only 4 (4.3%) had had a formal training of medical error disclosure. Almost all, 84 (91.3%) thought a formal training on medical error will be useful to them

Discussion

Surgeons are particularly prone to technical and judgment errors compared to other doctors, and these are more likely to contribute to death [7, 20, 21]. We found in our study that although about 65.2% of the residents were able to recognize medical errors, only some were able to identify delay in obtaining consultation, delay in diagnosis and misdiagnosis as MEs. This constitutes a significant concern with errors in diagnosis. Nishizaki had also found the knowledge of diagnostic error, to be low among Japanese residents when compared to US residents [22]. The study concluded that the diagnostic error knowledge was indirectly related to increased clinical experience and self-study. We do think this factor is a possibility among our participants even though it was not tested for.

Knowledge and perception are keys to the recognition of MEs, and we found in our study that the junior registrars had less knowledge about ME than senior registrars. This is not surprising as formal training about ME was not readily available in the study area, so knowledge about ME is likely to be gleaned as the residents proceed in their training. This is why formal training about ME is important as those with less knowledge equally participate in patients' management. The training on ME could instill prevention skills in physicians [23] and positively influence their perception. The females' poorer perception to ME may be due to 91% of the females being junior registrars compared with 42% of the males, further indicating that the

level of training impacted on the perception of ME by residents. The finding that recent involvement with ME was significantly associated with good perception about ME may be because the experience brought the reality of these errors into the mind of the residents, making them to appreciate the importance of MEs.

An existent gap has been identified between surgical residents' evaluation of error frequency and their perceived involvement in such errors, which may be attributed to rationalization and minimization of the errors [13, 24, 25]. We found this true in our study with 64% of the residents believing that MEs were common, but only 30% reported being involved in MEs in the last three months before the study. This may be as a result of not willing to label ME committed as actual ME as found in this study or the avoidance of the guilt which some residents associated with reporting of ME. Admission of guilt was advanced as a barrier to self-reporting among those with poor perception of MEs.

Error disclosure following its recognition is now a moral, professional and an ethical obligation to patients [12]. There is an argument that non-disclosure of errors should be treated with the same morality as lying [26]. Error disclosure is important to patient's safety and central to transparency [27]. The barriers to error disclosures include inability to recognize error, fear of litigation, the fear of losing patient's trust and reputation as a surgeon, embarrassment, shame, lack of formal training in error disclosure among others [24, 28, 29]. Surgeons tend to express greater intention to disclose errors but actually disclose less information and less frequently use the word 'error' [13, 28]. We found this true, as many of our respondents were shy of using the word 'error' when disclosing MEs. It is intriguing though that surgical residents in a US study did not think that error disclosure was hard, though only very small percentage of them had disclosed a major error [13]. In contrast to this, many residents in our study thought ME disclosure is difficult with only half well disposed to error disclosure and majority had disclosed a ME in the past. It thus appears that the perception of the difficulty in error disclosure is inversely related to a previous participation in the process of error disclosure, and residents in this study were probably relating their actual experience in ME disclosure. Our finding that most residents agreed that all errors should be reported to supervising consultant staff only, with few of them believing that patients/relatives should be informed of all errors, agrees with the findings among Pakistani residents where only 11% have disclosed a medical error to the patient or family, though 57% of them informed the attending consultant [8].

Disclosure of ME committed by surgical residents in an American study was less when compared to non-surgical residents, perhaps because they see colleagues being punitively punished for errors and expect the same if they own up [14]. However, good disposition to ME disclosure in our study was associated with having been harshly reprimanded for ME. It is interesting that being harshly reprimanded reinforced the predisposition to ME disclosure rather than discourage it to prevent embarrassment and shaming. This may be related to the environment of the study, where residents are still largely shamed for errors. It is likely that the residents in this study view this culture as normal. On the other hand, those who were not well disposed to reporting ME avoided reporting ME that they committed which may be due to the knowledge that reporting ME leads to punishments. These findings may be attributed to the double-prong effect of a residency training program built on a strong hierarchical structure and a societal demand for immense respect and awe of the older person who often is the consultant. Thus, trainers question the trainees, but there is little room for the opposite and errors by residents are punished by punitive measures.

ME disclosure is particularly more challenging for residents who are surgical trainees under continuous evaluation for specialty certification, as it may be assumed to be a risk to jeopardize the achievement of their dreams [30]. A formal instruction in error disclosure has been advocated to boost the confidence of physicians in communicating openly with their patients when unanticipated events occur [31, 32]. The hospital's mechanism for reporting ME was known to very few residents and even fewer had had a formal training of ME disclosure. This showed that these residents were not adequately equipped with the resources that were required to prevent and manage ME. The knowledge that will be gained from a formal training on ME will be priceless, as knowledge of a behavior will encourage the performance of that behavior. Training about medical errors can be included as a curriculum in the residency training program by inculcating it at different levels like orientation program at the commencement of the residency training, regular workshops/seminars during the training years. The enforcement of instruments fashioned toward reducing MEs such as the WHO surgical checklist as well as the institution of courses to improve communication skills would also be helpful. The correlation between the knowledge of disclosure of ME and the actual practice of ME disclosure in this study corroborated this. The desire by many for a formal training on ME is good as it is likely to shift the attention away from individuals to the system and allow for underlying factors responsible for the occurrence of ME to be addressed [16]. It is also important that consultant staff lead the way in error disclosure conversations providing a veritable example for the trainees while also sharing their experiences with the residents to encourage error disclosure.

Conclusion

Many residents in this study believed ME was common and appreciated that it was important, but they did not recognize that it was an indication of system failure. The junior residents also had less knowledge about ME, and very few residents have ever had a formal training about ME. There was a less predisposition to disclosing ME to patient/relatives. We recommend that training on ME should be instituted for all residents in order to increase their knowledge, and this step will hopefully have a positive influence on their recognition and disclosure of ME.

Limitation

Only one tertiary hospital was used in this study, which limits the application of its findings. It is possible that there is recall bias in the data used, as different aspects of the questionnaire required the residents to recall their experiences in relation to ME. This was also a cross-sectional study, so causality cannot be established

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