How trainees would disclose medical errors: educational implications for training programmes

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OBJECTIVES The disclosure of harmful errors to patients is recommended, but appears to be uncommon. Understanding how trainees disclose errors and how their practices evolve during training could help educators design programmes to address this gap. This study was conducted to determine how trainees would disclose medical errors.

METHODS We surveyed 758 trainees (488 students and 270 residents) in internal medicine at two academic medical centres. Surveys depicted one of two harmful error scenarios that varied by how apparent the error would be to the patient. We measured attitudes and disclosure content using scripted responses.

RESULTS Trainees reported their intent to disclose the error as 'definitely' (43%), 'probably' (47%), 'only if asked by patient' (9%), and 'definitely not' (1%). Trainees were more likely to disclose obvious errors than errors that patients were unlikely to recognise (55% versus 30%; $p < 0.01$). Respondents varied widely in the type of information they would disclose. Overall, 50% of trainees chose to use statements that explicitly stated that an error rather than only an adverse event had occurred. Regarding apologies, trainees were split between conveying a general expression of regret (52%) and making an explicit apology (46%). Respondents at higher levels of training were less likely to use explicit apologies (trend $p < 0.01$). Prior disclosure training was associated with increased willingness to disclose errors (odds ratio 1.40, $p = 0.03$).

CONCLUSIONS Trainees may not be prepared to disclose medical errors to patients and worrisome trends in trainee apology practices were observed across levels of training. Medical educators should intensify efforts to enhance trainees' skills in meeting patients' expectations for the open disclosure of harmful medical errors.

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INTRODUCTION

Academic medical centres face the task of preparing the next generation of doctors to meet patient expectations for error disclosure. Patients uniformly express the desire that health care providers should promptly disclose and apologise for errors made while patients are under their care.[1–4] Yet, surveys suggest that a minority of harmful errors are disclosed to patients and disclosure conversations often fail to meet patient expectations.[5–8] At academic medical centres, trainees are frequently involved in medical errors, but may not know whether or how to disclose a mistake to patients.[9–11] Although trainees want to be open with patients, discussing errors with patients presents substantial challenges for students and residents.[9,12,13]

Preparing trainees for disclosure is particularly difficult because these delicate conversations require advanced communication skills, and because trainees and patients suffer considerable emotional distress after mistakes.[14] Despite the importance of this topic, only a minority of trainees receive training in error disclosure.[9] Furthermore, few trainees receive feedback about their disclosure skills or know where to seek help after making an error.[15,16] It is unknown if the lack of an organised curriculum to impart error disclosure skills is partly responsible for the fact that current disclosure practices often fail to meet patient and regulatory expectations. In the absence of formal curricula, trainees may learn disclosure skills through the hidden curriculum and the direct observation of senior clinicians.[17,18] This lack of formal training may lead trainees to struggle with disclosure conversations when they enter practice.

Programmes to enhance the disclosure of errors to patients are growing. The Joint Commission's accreditation standards require health care institutions to ensure that patients are informed about unanticipated outcomes that arise while patients are in their care.[19] Although prior work has examined *whether* trainees are likely to disclose errors,[9,11] little is known about *how* they would do so. Understanding what information trainees might communicate in disclosure conversations could help educators identify gaps between the disclosure content patients desire and the information trainees report that they would share. Furthermore, a better understanding of how disclosure practices evolve during medical training could help target curricula to different stages of training. Therefore, we undertook a cross-sectional survey at two centres to describe how medical students and residents at different levels of training would disclose hypothetical medical errors to patients.

METHODS

Setting and participants

Between June and October 2003, we administered questionnaires to 999 US trainees, including 629 medical students (320 in Year 2 and 309 in Year 4), 159 interns (postgraduate year 1 [PGY1]) and 211 residents (PGY2–3) in internal medicine at two academic institutions: Washington University in St Louis School of Medicine/BJC HealthCare (St Louis, MO), and the University of Washington (Seattle, WA). These institutions differ in that one is private and one is public. The states in which they are located represent two of the 18 states in which the malpractice climate was reported to be 'in crisis' at the time of the survey as a result of the limited availability of affordable malpractice insurance.[20] At the time the anonymous survey was conducted, neither institution required error disclosure training for students or residents. The institutional review boards at both institutions approved this study. The questionnaires were distributed to trainees at orientation sessions and conferences, and by e-mail. Respondents could complete paper or web-based questionnaires. The results of the same survey administered to attending doctors in surgery, medicine and paediatrics have been previously reported.[7,21,22] A distinct subset of survey responses regarding trainees' attitudes and experiences with error has been previously reported and was referenced for statistical analyses, but is not duplicated here.[9]

Survey content

We utilised the Institute of Medicine's definitions of 'adverse event', 'medical error' and 'near miss'.[23] We developed and pilot-tested our own definitions of 'serious error' and 'minor error'. We defined a serious error as an 'error that causes permanent injury or transient but potentially life-threatening harm' and a minor error as an 'error that causes harm which is neither permanent nor potentially life-threatening'. Survey definitions were repeated on every page of the questionnaire and key terms were capitalised or printed in bold throughout.

To explore how differences in errors might affect disclosure, we created two scenarios depicting serious errors for which widespread consensus supports disclosure to patients (Box 1).

BOX 1

Clinical scenarios

Type of scenario	Description
Insulin overdose (the more apparent error)	You admit a diabetes patient to hospital for a chronic obstructive pulmonary disease exacerbation. You handwrite an order for the patient to receive '10 U' of insulin. The 'U' in your order looks like a '0'. The following morning, the patient is given 100 U of insulin, 10 times the patient's normal dose, and is later found unresponsive, with a serum glucose level of 35 mg/dL^{-1} (1.94 mM). The patient is resuscitated and transferred to the intensive care unit. You expect the patient to make a full recovery.
Hyperkalaemia (the less apparent error)	You administer a new medicine with a common adverse effect of increasing the potassium level to an out-patient with hypertension. The patient's baseline potassium level is normal (4.0 mEq/L^{-1}). You order a repeat blood test to measure the potassium level, to be drawn the next week, but forget to check the laboratory results. Two weeks after the patient begins taking this new medicine, the patient begins to feel palpitations and goes to the emergency department. In the emergency department, the patient experiences an episode of ventricular tachycardia, requiring cardioversion. The patient's potassium level at this event is 7.5 mEq/L^{-1}. The patient is hospitalised for 4 days and makes a full recovery. The patient returns to your office for a follow-up visit. On reviewing the patient's chart, you see the overlooked laboratory results, which showed the patient's potassium level had increased substantially from 4.0 mEq/L^{-1} to 5.6 mEq/L^{-1}. Had you seen this elevated potassium level earlier, you would have discontinued the new medicine and treated the hyperkalaemia, thereby probably avoiding the life-threatening arrhythmia.

The errors were designed to be comparable in severity, but to vary by how apparent they would probably be to the patient. Respondents randomly received one of the two scenarios. The more apparent error referred to the administration of an overdose of insulin which occurred because the prescribing doctor's handwritten order for '10 U' was misinterpreted as '100 U'; this resulted in severe hypoglycaemia. The less apparent error concerned the occurrence of a hyperkalaemic dysrhythmia caused by failure to check the results of a potassium level ordered after starting a medicine known to cause hyperkalaemia. The patient would be unlikely to be aware of this error unless the doctor disclosed it.

For each scenario, respondents received parallel questions asking:

1 how serious the error was;
2 how responsible the respondent was for the error;
3 how upset the respondent would be;
4 how likely the respondent was to be sued, and
5 how likely the respondent would be to disclose this error to the patient.

Five questions measured the information doctors would volunteer to the patient about the error:

1 'What would you most likely say about what happened?'
2 'How much detail would you most likely give the patient about the error?'
3 'What most closely resembles what you would most likely say about the cause of the error?'
4 'What would you most likely say regarding an apology?'
5 'What would you most likely say about how the error would be prevented in the future?'

For each question, three response scripts represented increasing amounts of information (no disclosure, partial disclosure, full disclosure). The text of these responses has been published previously.[7] Several rounds of pilot-testing, including cognitive interviews with practising doctors, were conducted to ensure that the survey questions were clear, the scenarios were realistic, and the disclosure responses were plausible. Data from the disclosure scenario responses were combined for initial analysis and then analysed separately.

Table 1 Characteristics of survey respondents at two academic medical centres

	Overall	Year 2 medical students	Year 4 medical students	Interns (PGY1)	Residents (PGY2–3)
Responses (possible)*	758 (999)	280 (320)	208 (309)	151 (159)	119 (211)
Response rate, %	76	88	67	95	56
Mean age (SD), years		25.4 (3.0)	27.5 (3.9)	27.8 (2.7)	29.6 (2.8)
Gender*					
Male (%)		122 (44)	82 (40)	79 (54)	69 (60)
Female (%)		153 (56)	123 (60)	67 (46)	46 (40)

* Responses do not sum to 758 across all categories because respondents selectively omitted demographic data
PGY = postgraduate year; SD = standard deviation

Statistical analysis

Descriptive statistics included means and standard deviations for continuous variables and percentages for categorical variables. Questions that used 4-point Likert response scales were dichotomised at the midpoint (agree versus disagree) or grouped by responses of comparable quality (e.g. responses of 'very likely' and 'extremely likely' were combined). Categorical variables were compared using Pearson's chi-squared, chi-squared for linear trend, Fisher's exact tests, and odds ratios (ORs) as appropriate. All tests were two-tailed and a p-value of < 0.05 was considered significant. Because doctor sense of responsibility for the error, worry about loss of patient trust, and training to perform error disclosure may affect the quality of disclosure,[7,11] we performed bivariate analysis to examine their associations with four disclosure responses of importance to patients: intention to definitely disclose the error; explicitly mentioning that an 'error' had occurred; specifically describing the cause of the error, and providing a full apology. Because fear of litigation may exacerbate trainees' emotional responses to error, we performed bivariate analysis to determine if worry about lawsuits was associated with variation in responses to questions regarding feeling responsible, upset or worried about one's reputation. Comparisons were limited to plausible associations. Analyses were performed using SAS Version 9.1.3 (SAS Institute, Inc., Cary, NC, USA).

RESULTS

Characteristics of respondents

Surveys were completed by 758 (280 Year 2 students, 208 Year 4 students, 151 interns, 119 residents) of the 999 (76%) eligible trainees

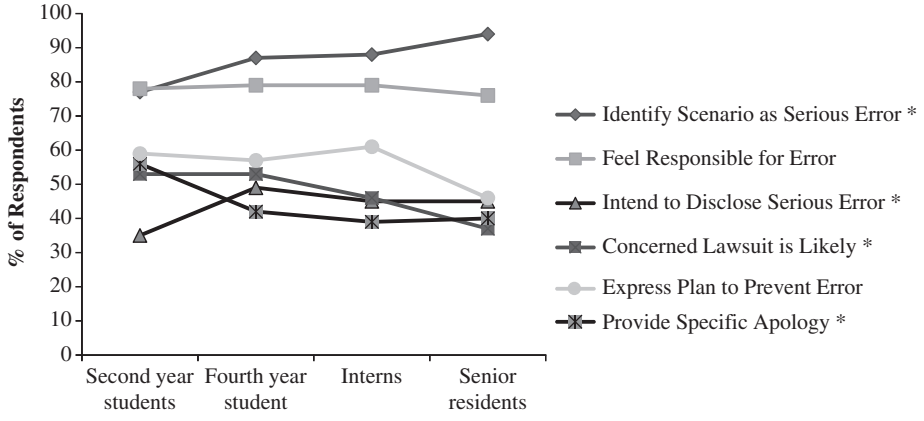

Figure 1 Attitude and disclosure content of 758 trainees regarding two hypothetical error scenarios by level of training. * = Chi-Square for linear trend $p < 0.05$.

Table 2 Disclosure content selected by 758 trainees in response to questions about two hypothetical error scenarios

Disclosure statement	Scenario	Both	More apparent error (insulin overdose)					Less apparent error (hyperkalaemia)				
	Trainee group	All (*n* = 758), %	All (*n* = 382), %	Year 2 (*n* = 144), %	Year 4 (*n* = 107), %	PGY1 (*n* = 73), %	PGY2–3 (*n* = 58), %	All (*n* = 376), %	Year 2 (*n* = 136), %	Year 4 (*n* = 101), %	PGY1 (*n* = 78), %	PGY2–3 (*n* = 61), %
What would you most likely say about what happened?												
No disclosure (no reference to adverse event or error)		2	< 1	< 1	0	1	0	4	3	6	3	3
Partial disclosure (mention adverse event but not error)		48	42	40	37	50	45	54	47	55	62	58
Full disclosure (explicit statement that error occurred)		50	58	60	63	49	55	42	50	39	36	38
How much detail would you be most likely to give the patient about the error?												
Nothing (no information volunteered)		9	7	6	8	3	10	10	11	7	14	10
Partial disclosure (non-specific information about what error was)		43	56	58	48	67	52	30	30	26	33	30
Full disclosure (specific description of exactly what error was)		49	37	36	44	30	38	60	59	67	53	60
What most closely resembles what you would say about the cause of the error?												
No disclosure (no information volunteered about cause of error)		14	9	8	7	8	12	20	18	18	21	28
Partial disclosure (non-specific information hinting at cause)		45	71	68	77	66	72	19	23	16	19	15
Full disclosure (detailed description of why error happened)		40	21	24	16	26	16	61	59	66	60	57
What would you be most likely to say regarding an apology?												
No disclosure (no apology)		2	1	0	1	1	3	3	2	4	0	7
Partial disclosure (expression of regret)		52	50	42	53	60	53	53	43	57	60	57
Full disclosure (explicit apology)		46	49	58	46	38	43	44	55	39	40	37
What would you be most likely to say about how the error will be prevented in the future?												
No disclosure (volunteer no information about prevention)		6	7	8	8	4	5	6	8	3	3	7
Partial disclosure (non-specific pledge to prevent recurrences)		37	51	46	51	50	66	22	19	22	22	32
Full disclosure (present specific steps to prevent recurrences)		57	42	47	42	46	29	72	73	75	76	62

PGY = postgraduate year

(Table 1). Of respondents, 332 (44%) were in training at Washington University in St Louis and 426 (56%) were from the University of Washington.

Response rates did not vary significantly by scenario or by institution. Not all respondents completed every question and thus denominators are lower for certain

questions. The highest non-response rate for any question in the survey was 1%.

General attitudes regarding scenarios

Most trainees (85%) agreed their scenario represented a serious error. Recognition that the scenario represented a serious error increased with level of training (trend $p < 0.01$) (Fig. 1). Approximately half of respondents (49%) felt that a lawsuit would be somewhat or very likely as a result of the error. Concern about the likelihood of legal action declined with higher level of training (trend $p < 0.01$) (Fig. 1). Trainees reported their intent to disclose the error as 'definitely' (43%), 'probably' (47%), 'only if asked by patient' (9%) and 'definitely not' (1%). Reporting a definite intent to disclose the error rose with level of training (trend $p = 0.03$) (Fig. 1).

Emotional responses to error scenarios

A majority of trainees (78%) felt that, as the doctor, they would be very or extremely responsible for the error in their scenario. Almost all trainees (96%) reported that they would be very or extremely upset about the error, and 42% would be very or extremely concerned that their reputation would be damaged. Trainees who felt that the error would trigger a lawsuit were more likely to report the following emotional responses: feeling responsible (OR 1.83, 95% confidence interval [CI] 1.28–2.61); feeling upset (OR 2.18, 95% CI 1.02–4.66), and feeling worried about their reputation (OR 3.15, 95% CI 2.33–4.25).

Disclosure content

Respondents varied widely in the information they would disclose to patients. Overall, 50% of trainees chose statements explicitly stating that an error had occurred, whereas 48% mentioned the adverse event but not the error (Table 2). When asked how they would describe the cause of the error, 40% chose a specific description of exactly what the error was, 45% offered non-specific information, and 14% said they would not volunteer any explanation unless asked. Among the 319 trainees who indicated they would definitely disclose the error, many limited disclosure content (32% described the error as an adverse event and 52% made partial or no disclosure of the cause of the error). Nearly all trainees (98%) would offer some form of apology, but trainees were split between conveying a general expression of regret (52%) and making an explicit apology (46%). More experienced trainees were less likely to provide an explicit apology (trend $p < 0.01$) (Fig. 1). In discussing how to prevent recurrent error, 57% would offer specific steps, 37% would make a general pledge to prevent recurrences, and 6% would not volunteer any information. Senior residents were significantly less likely than all other trainees to offer detailed

Table 3 Variation in responses to a medical error scenario associated with the attitudes and training of 758 trainees

Response to an error scenario	'I would definitely disclose this error to the patient'	Selected a specific description of exactly what the error was	Selected a detailed description of why the error happened	Selected an explicit apology for the error	Selected an explicit description of plans to prevent future errors
Attitude or experience					
Have you received any education or training on how to disclose errors to patients?					
Yes (n = 260), %	48	58	48	44	58
No (n = 488), %	40	43	36	48	57
OR (95% CI) of scenario response associated with prior training on error disclosure	**1.40 (1.04–1.90)**	**1.80 (1.33–2.45)**	**1.66 (1.22–2.25)**	0.84 (0.63–1.15)	1.04 (0.77–1.41)
'As the doctor, how responsible are you for this error?'					
'Very' or 'extremely' responsible (n = 589), %	42	52	46	50	63
'Somewhat' or 'not at all' responsible (n = 162), %	44	36	18	35	36
OR (95% CI) of survey response associated with perceived degree of responsibility	0.94 (0.66–1.33)	**1.92 (1.35–2.75)**	**3.89 (2.53–5.96)**	**1.84 (1.28–2.64)**	**3.04 (2.12–4.40)**

OR = odds ratio; 95% CI = 95 confidence interval
Statistically significant associations are shown in bold

prevention plans (54/118 [46%] versus 377/634 [59%]; $p < 0.01$).

More apparent compared with less apparent errors

Fewer trainees reported that they would definitely disclose the less apparent (hyperkalaemia) error than the more apparent (insulin overdose) error (30% versus 55%; $p < 0.01$). In terms of disclosure content, trainees were less likely to explicitly state that an error had occurred after the unapparent error (42% versus 58%; $p < 0.01$). Apology content did not vary between scenarios, but trainees were more likely to communicate specific steps to prevent error recurrences in response to the less apparent error (72% versus 42%; $p < 0.01$).

Factors associated with the approach to disclosure

Trainees who had previously received training in error disclosure were more likely to express a definite intent to disclose the error, to provide a specific explanation of the error, and to describe in detail the cause of the error (Table 3). Similarly, trainees who felt responsible for the error in their scenario were more likely to specifically describe the error, to describe its cause in detail and to provide an explicit apology (Table 3). Respondents who felt that disclosure would decrease patient trust were less likely to report a definite intent to disclose the error (OR 0.71, 95% CI 0.53–0.94).

DISCUSSION

The circumspect disclosure content chosen by the 758 trainees in our study falls short of current disclosure guidelines and would probably not meet patient expectations.[2,3] It is of particular concern that more senior trainees were less likely than their junior colleagues to offer explicit apologies to patients or to address specific steps to prevent error recurrence. Possible explanations for these worrisome trends could include burnout, loss of faith in quality improvement systems, or an overall decline in senior trainees' empathic attitudes toward patients.[24] Efforts to involve trainees in quality improvement programmes, cross-link disclosure training with other teaching sessions on empathic communication, and emphasise the importance of making a sincere and explicit apology in disclosure training may help mitigate these trends.

The information trainees would disclose largely mirrored that chosen by attending doctors in our prior work.[7,21] For example, a majority of both groups did not describe the event as an error, did not offer a full apology, and did not provide specific plans to prevent future recurrences. Both groups also struggled with the disclosure of less apparent errors. The similarity between trainee and attending doctor responses suggests that trainees need role models who are more adequately prepared for full disclosure. Curricula that targets both trainee and faculty members disclosure skills may be important to the development of such role models.[15] The morbidity and mortality conference represents one example of a natural venue in which to focus on best practices in error disclosure in an audience of mixed-experience learners.

Educational implications

What can educators do to improve trainee approaches to disclosure? The first step is to start early. We noted an overall increase in willingness to disclose errors between Years 2 and 4 of medical school. This suggests that educators have an important window of opportunity in which to inculcate positive disclosure attitudes early in the medical education process.[15,25]

Secondly, we found that trainees were less likely to disclose an error when they felt it would result in the loss of the patient's trust. Baseline trust between patients and trainees may be especially fragile because both parties are aware of the trainees' incomplete expertise. Faculty staff should openly acknowledge this concern and facilitate the process of rebuilding trust after an error that involves a trainee. Attending doctors who lead disclosure conversations with patients should consider ways to openly support trainees as competent doctors (when appropriate) and facilitate mending the relationship between the trainee and his or her patient.

Thirdly, trainees uniformly anticipated that they would experience emotional distress after a serious error, highlighting an opportunity for faculty members to provide emotional support. Educators can normalise fallibility by sharing their own personal experiences of errors. They should also address trainees' fears about litigation, which heighten emotional distress. Although well-intentioned faculty members might exclude trainees from disclosure conversations to streamline communication or to protect them from distress, this approach hinders opportunities to model error disclosure techniques.[9] Simulated disclosures using actors or video may help prepare trainees for

difficult conversations in a less emotionally charged environment.[26]

Finally, we found a positive association between trainees' perceived responsibility for the error and the likelihood that they would offer a more comprehensive disclosure and apology. Although educators should encourage trainees to accept responsibility for errors, guidance is necessary. Policies that require trainees to immediately report errors to their supervising doctor are prudent. Transparent clerkship evaluation policies and non-punitive institutional error reporting systems could increase trainees' willingness to speak up about error. Faculty members' input in explicitly defining the trainee's role is critical, especially until standards for trainee responsibilities in disclosure are developed.

Limitations

Although this study represents the largest and most comprehensive study to date to describe how trainees would disclose medical errors, it has several limitations. The data were sourced from only two academic centres, which may limit their generalisability. The study was cross-sectional rather than longitudinal, which limits our ability to draw conclusions about the effect of training on attitudes over time. Although the response rate was robust, non-response bias may have affected the results. The scenarios were hypothetical and therefore may not reflect actual behaviours. Responses are subject to social desirability bias. Lastly, the data were collected in 2003, and trainee attitudes and behaviours may have changed during the period between data collection and analysis. However, recent studies continue to document an ongoing shortfall between trainee disclosure practices and patient expectations.[15,16] Therefore, we believe the data can still inform educators who are developing disclosure curricula.

Future directions

This work highlights several areas for future research. Large-scale, standardised evaluation of existing disclosure training models could help in the design, implementation and evaluation of best practices for disclosure training. A better understanding of the intensity and frequency of interventions required to make lasting improvements in trainees' disclosure skills is also needed. Assessment of the quality of actual disclosures, including direct feedback from patients, is another important next step. A closer examination of the effects of disclosure involvement on trainee emotional distress would also be informative. Lastly, studies that further explore the effects of the hidden curriculum on the dynamic between learners and supervising clinicians in relation to error disclosure could help prepare clinician-educators to better model ideal disclosure practices.

The current training environment may not encourage an approach to error disclosure that is consistent with patient expectations and national guidelines. Errors represent powerful teaching opportunities and their occurrences represent ideal opportunities for faculty staff to role-model effective disclosure techniques. Educators should consider developing disclosure curricula that highlight the content desired by patients and the specific support needed by trainees. Ensuring that trainees are skilled at error disclosure before they enter practice should be a core goal across medical education.

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