Emotion and Coping in the Aftermath of Medical Error: A Cross-Country Exploration

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Objectives: Making a medical error can have serious implications for clinician well-being, affecting the quality and safety of patient care. Despite an advancing literature base, cross-country exploration of this experience is limited, and a paucity of studies has examined the coping strategies used by clinicians. A greater understanding of clinicians' responses to making an error, the factors that may influence these, and the various coping strategies used are all essential for providing effective clinician support and ensuring optimal outcomes.

The objectives were therefore to investigate the following: a) the professional or personal disruption experienced after making an error, b) the emotional response and coping strategies used, c) the relationship between emotions and coping strategy selection, d) influential factors in clinicians' responses, and e) perceptions of organizational support.

Methods: A cross-sectional, cross-country survey of 265 physicians and nurses was undertaken in 2 large teaching hospitals in the United Kingdom and the United States.

Results: Professional and personal disruption was reported as a result of making an error. Negative emotions were common, but positive feelings of determination, attentiveness, and alertness were also identified. Emotional response and coping strategy selection did not differ because of location or perceived harm, but responses did appear to differ by professional group; nurses in both locations reported stronger negative feelings after an error. Respondents favored problem-focused coping strategies, and associations were identified between coping strategy selection and the presence of particular emotions. Organizational support services, particularly including peers, were recognized as helpful, but fears over confidentiality may prohibit some staff from accessing these.

Conclusions: Clinicians in the United Kingdom and the United States experience professional and personal disruption after an error. A number of factors may influence clinician recovery; these factors should be considered in the provision of comprehensive support programs so as to improve clinician recovery and ensure higher quality, safer patient care.

Key Words: patient safety, medical error, second victim, health professionals, coping, adverse events

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Making a medical error can be a stressful and traumatic event for health professionals, causing significant distress.[1–4] For this reason, health professionals have been described as second victims.[3,4] Following the publication of key white papers in the United Kingdom and the United States, the experiences of health professionals who have made medical errors have been widely documented across specialities and professions.[5–11] Diverse measures have been used to explore the aftermath of error, and these methodologic inconsistencies are a key barrier to obtaining a comprehensive understanding of this experience.[2] Most studies have focused on assessing the negative emotions experienced, but work exploring the positive emotions that may underpin coping, learning, and successful recovery from error has been limited. Current evidence indicates that the most effective coping strategies use error constructively to learn and make changes, but the interplay between emotion and coping after an error and the implications of this for providing appropriate support are not fully understood.[12,13] The continuing demand for clinician support strategies has been highlighted recently, but the development of support mechanisms is limited by a lack of knowledge about what type of support may be helpful in the emotional recovery from error, the factors that influence coping, and whether a one size fits all approach is appropriate.[14] There is also an absence of cross-country research around this issue; much of the current work stems from the United States, and current literature indicates that there has been greater advancement in clinician support pathways in the United States for affected clinicians than in the United Kingdom.[15] Health-care systems in the United Kingdom and the United States differ; for example, physicians may be much more exposed to malpractice claims in the United States, which intensifies bad feeling after an error in comparison to the suits pursued at an organizational level in the United Kingdom.[16] It is important to understand what is happening in both locations to recognize how ideas and experiences can be shared and adapted to provide more effective support.[17]

Influential Factors in the Aftermath of Medical Error

Medical errors vary in terms of the degree of potential or actual patient harm resulting from them. A "near-miss" [or close call] describes "any event that could have had adverse consequences but did not, and was indistinguishable from fully-fledged adverse events in all but outcome" (e.g., incorrect potentially harmful drug drawn up but not administered, wrong drug prescribed to the patient but no harm resulted), whereas an "adverse event" describes an error resulting in some degree of patient harm (e.g., wrong site surgery, harmful drug overdose).[17,18] The level of patient harm resulting from an error has been proposed as an important and potentially influential factor in how health professionals feel about the mistake and how they cope; it seems likely that harmful errors resulting would be more distressing to the health professional, but this has not been sufficiently explored.[19] Review findings further suggest that physicians and nurses often respond differently to making a medical error (although both groups experience distress).[2] The reflective approach championed in nursing, although valuable, may be a source of anguish after a mistake as nurses consider their

own role in the event.[7,20–22] Physicians seem to prioritize factors, such as professional loyalty and patient retention, and have been described as more likely to avoid reflection, sometimes ignoring or denying an error or, in rare cases, even colluding with colleagues to cover it up.[23,24] Based on this evidence, the emotional response to making an error and the coping strategy selected may vary depending on perceived harm or professional group.

Although research on the impact of errors on clinicians has primarily identified negative emotions, positive feelings have also been reported in this context. Health professionals have described feeling empowered to assert safety concerns after a mistake and that their relationships with colleagues or patients improved if they felt well supported, valued, or trusted.[21,25,26] Literature exploring health professionals' responses to workplace stress indicates that the emotions experienced in times of stress may be associated with the type of coping strategy selected. For example, among physicians, greater levels of emotional distress have been associated with the use of maladaptive coping strategies such as ignoring the stressor, keeping stress to oneself, and focusing on something else.[27] These types of coping strategies can produce undesirable outcomes for both patients and health professionals.[28,29] We therefore set out to gather preliminary data within this survey to explore whether the emotions experienced after making a medical error may be associated with the coping strategy used.

Rationale

This paper reports empirical cross-country work exploring the experiences of health professionals in the United Kingdom and the United States after making an error and extending the current literature by considering the factors that influence emotional response and coping strategy selection. Current work indicates that the negative emotions experienced are often a barrier to obtaining support after an error and that there is a lack of literature to form a consensus on how to effectively support health professionals.[15] The provision of support that facilitates the use of effective coping strategies has important implications for maintaining high safety standards and strong patient-practitioner relationships, which can both be threatened when errors are made.[30] Understanding the factors that influence emotional recovery and coping strategy selection may be valuable to further inform the development of effective organizational mechanisms to support health professionals; our findings are therefore considered in terms of the provision of staff support services.

STUDY OBJECTIVES

Self-reported survey data were used to explore the following:
1. the professional and personal disruption reported after making a medical error;
2. the emotions that occur most commonly after making a medical error;
3. the coping strategies reported as used after making a medical error;
4. whether emotional response varies because of location, error severity, and/or professional group;
5. whether coping strategy selection varies due to location, perceived harm, and/ or professional group;
6. whether there is any association between the emotions experienced after making an error and the coping strategy selected; and
7. awareness, perceptions, and willingness to use staff support services.

METHOD

Ethical Approval

Ethical approval was granted from the Yorkshire and Humber NHS Research Ethics Committee, UK, the Institute of Psychological Sciences at the University of Leeds, UK, and the institutional review board at Partners Healthcare (a consortium of several teaching hospitals of Harvard Medical School), Boston, USA.

Survey Tool

The Health Professional Experience of Error Questionnaire (HPEEQ) is a novel tool developed from a systematic review of the literature and drawing upon existing valid tools to describe different categories of error (terminology of the NPSA risk matrices) and to assess emotion (Positive and Negative Affectivity Schedule; PANAS) and coping strategies (Functional Dimensions of Coping Scale; FDC).[2,31,32] The questionnaire comprises 4 sections. Section A collects minimal demographic data on job role and speciality. Section B gathers data about the error (including degree of perceived harm and time elapsed since its occurrence) and its perceived professional and personal impact through several single items draw from the systematic review findings of common experiences after making an error. The emotions experienced in response to the error is assessed in section C through a validated measure of emotion (Positive and Negative Affectivity Schedule; PANAS) and a range of emotion items that were identified as connected with this experience in the systematic review.[31] Cronbach's alpha confirmed that the multi-item emotion scale with the additional emotion items was internally reliable ($\alpha = 0.80$). Section D assesses the coping strategies used via the FDC scale, a validated measure of coping.[32] Respondents list the activities and thoughts used to cope with making an error, and these are scored on the extent to which they served each of the 4 functions: approach, reappraisal, emotional regulation, and avoidance (see Box 1 for definitions). Respondents also indicated their awareness of local staff support services, perceptions of these services, and willingness to use them. The tool was piloted for relevance, comprehension, and ease of use with a multi-professional sample of health professionals, and only minor amendments were made as a result.

Box 1 Functions of Coping Identified by the Functional Dimensions of Coping Scale

Approach—thoughts/behaviors that the person believes will allow her/him to deal directly with the stressful encounter (e.g., if a mistake occurs due to short staff, an individual taking an approach strategy might ask the manager to ensure there is sufficient staffing on the ward).

Avoidance—thoughts/behaviors that the person believes will allow her/him to ignore the existence of the stressful encounter (e.g., not reporting an error to avoid having to deal with it).

Emotional regulation—thoughts/behaviors that the person believes will allow her/him to deal with the emotional consequences of the stressful encounter (e.g., an individual talking to a counselor about how s/he feels about making an error).

Reappraisal—thoughts/behaviors that the person believes will allow her/him to readdress and reinterpret the meaning of the stressful encounter (e.g., trying to identify learning points when undertaking a root cause analysis).

Settings

This study took place in 2 large teaching hospitals at the forefront of quality and safety initiatives and research: the Bradford Teaching Hospitals Foundation Trust (BTHFT), Bradford, UK and the Brigham and Women's Hospital (BWH), Boston, USA.

Recruitment

Study information and invitations were distributed by the following: (1) organizational newsletters, (2) e-mail distribution lists (US) and Trust intranet (UK), and (3) paper copies at training sessions or on wards. Study invitations did not target specifically named potential participants. In the absence of prior similar work, an a priori sample size calculation using G Power to test differences between professional group and perceived harm on the 12 most commonly reported emotions and the 4 coping strategies was undertaken based on a small-medium effect size (0.20). The number of emotion items to be included as dependent variables were limited to the most commonly occurring to ensure that the analysis had the necessary power.[33] To power the analysis adequately (0.80), a minimum total sample size of 76 was required.[34]

Sample

A responder sample was used, and a cross-section of health professionals was recruited in this way, but only data from the physicians and nurses were included because the sample sizes of the other health professions, despite being proportional, were too small to draw statistical comparisons.

Study Design & Procedure

A cross-sectional survey design was used to enable the statistical assessment of relationships between variables. Participants were presented with the study information sheet and consent form and completed an online or paper survey. No identifiable information was gathered, surveys were completed confidentially, and paper copies were returned using freepost envelopes.

ANALYTIC STRATEGY

Initially, we proposed that there may be differences in the emotions and coping strategies of health professionals in the United Kingdom and the United States, but preliminary exploration of the correlation matrix revealed that scores on the emotion and coping measures were consistent across both locations; therefore, location was not included as a variable in these components of the analysis. Descriptive statistics were used to explore the reported professional or personal disruption after making an error, the types of errors that were reported, their perceived severity (some harm versus no harm), and the frequency with which each emotion was experienced. A multivariate analysis of variance (MANOVA) explored differences between the 2 locations and professional groups on reported professional and personal impact. Free text responses were used to provide additional detail; these components were used to identify the activities and thoughts used to cope and to gather greater detail regarding perceptions of the use of staff counseling in the event of a medical error. Correlations were used to indicate whether the most common emotional responses seemed to be associated with particular coping strategies. A MANOVA was also used to determine whether the most commonly reported emotional responses or coping strategy selection differed dependent on perceived harm and/or between professions.

RESULTS

Demographics and Error Characteristics

The final sample (excluding 5 outliers to ensure findings were not misrepresented by extreme scores) comprised 120 physicians and 145 nurses (N = 265). A response rate calculation was impossible because of the recruitment strategy adopted. The UK sample included 61 physicians and 65 nurses (N = 126), and the U.S. sample included 59 physicians and 80 nurses (N = 139). Respondents varied in terms of experience and seniority and, given the different labeling of professional roles in each location, were classed as either senior or junior within their profession. Senior physicians included consultants and attending physicians (50); junior physicians included house officers, senior house officers, registrars, interns, residents, and fellows (70); senior nurses included band 7 and 8 nurses and nurse practitioners (49); and junior nurses were band 5 and 6 or registered nurses (96).

All those that responded to the survey said they had been involved in an error. Around half of the errors reported had resulted in some degree of patient harm (43.5%), with major harm reported in 8.3% of cases. Where there was no patient harm, the potential for the error to result in harm was also perceived as quite likely across the sample, with a number of participants reporting potential harm to be "possible," "likely," or "almost certain" (60.4%). The errors reported had occurred in the past 6 months (29.2%), between 6 months and 5 years ago (44.6%), and even more than 5 years ago (27.3%). Participants were asked to classify error type and could select more than 1 category. Treatment errors were reported most commonly (65.5%), but communication failures were often identified in conjunction with other mistakes (18.7%). The majority of errors were classified as "errors of execution" (65.8%) rather than "errors of planning" (34.2%). Almost half of the errors were perceived as being associated with deviation from policy (47.1%) and the remainder where this was not felt to be the case (52.9%).

Professional and Personal Disruption

Professional and personal disruption was reported; around a third of the sample reported that their performance at work or their personal life had suffered at least moderately as a result of making a mistake and that the error had created strained colleague relationships. Participants overwhelmingly indicated that their attention to safety issues had increased to some extent after the error (83.8%), and just over half indicated they actually valued their relationships with colleagues more after an error (55.8%). Organizational support after the error was generally considered adequate by (69.4%).

Responses varied between locations, with UK respondents reporting a stronger impact on performance at work ($F_{1, 260} = 75.47$, $P < 0.001$) and greater detriment to personal life ($F_{1, 260} = 9.51$, $P < 0.005$). U.S. respondents indicated that both their attention to safety issues ($F_{1, 260} = 53.93$, $= P < 0.001$) and the value placed on colleague relationships ($F_{1, 260} = 9.96$, $= P < 0.005$) increased substantially more than their UK counterparts after an error. Physicians across the sample reported significantly greater disruption to performance at work after an error ($F_{1, 260} = 9.35$, $P < 0.005$), whereas nurses indicated that their attention to safety issues following an error increased to a greater extent than physicians ($F_{1, 260} = 31.16$, $P < 0.001$).

Emotional Response to Making an Error

Emotional responses were diverse. As expected, participants reported experiencing higher levels of negative emotions rather than positive emotions after making an error, and mean scores

TABLE 1. Mean Score for Professional Groups on Emotion Items

Item	Profession	Mean	Standard Deviation	95% CI	
				Lower	Upper
Upset	Physician	3.34	0.114	3.11	3.56
	Nurse	3.91	0.112	3.69	4.13
Worried	Physician	3.04	0.119	2.81	3.28
	Nurse	3.77	0.116	3.54	4.00
Distressed	Physician	2.77	0.132	2.51	3.03
	Nurse	3.57	0.129	3.32	3.83
Scared	Physician	2.60	0.132	2.35	2.87
	Nurse	3.41	0.129	3.16	3.67
Nervous	Physician	2.78	0.128	2.53	3.03
	Nurse	3.29	0.125	3.05	3.54

for all of the individual negative emotion items were generally higher on the 5-point scale (see Appendix 2 for descriptive statistics for all items). The negative emotions experienced most commonly were feeling upset ($\overline{x} = 3.64$), guilty ($\overline{x} = 3.65$), worried ($x = 3.43$), distressed ($\overline{x} = 3.18$), scared ($\overline{x} = 3.02$), nervous ($x = 3.00$), unhappy ($\overline{x} = 3.03$), feelings of self-doubt ($\overline{x} = 3.19$), and regret ($\overline{x} = 3.24$). However, positive emotions of feeling determined ($\overline{x} = 2.71$), alert ($\overline{x} = 2.84$), and attentive ($\overline{x} = 2.55$) were also reported.

A significant difference between physicians and nurses was identified in terms of these most commonly reported emotions ($F_{15, 247} = 3.13$, $P < 0.001$), particularly with regard to the following items: upset, worried, distressed, scared, and nervous, for which, nurses reported significantly higher scores (Table 1). No significant interaction was identified between emotional response, profession, and severity of outcome, which suggests that variations in emotional response between physicians and nurses were not subject to the degree of error severity of the outcome ($F_{1, 260} = 0.031$, $P = 0.861$). The types of emotional responses were not significantly different for incidents that caused harm compared with those that did not.

Coping Strategy Selection

On average, participants tended to classify their coping behaviors as approach strategies ($\overline{x} = 3.63$) and attempted to face up to the mistake and address the problem directly, for example, by discussing the mistake with colleagues or superiors. In many cases, such activities were also classified as serving a "reappraisal" function ($\overline{x} = 3.20$) when the purpose of the discussion was to learn from the mistake. Coping activities that enabled health professionals to manage the anxiety and emotional distress of making a mistake were also described ($\overline{x} = 3.14$) but to a slightly lesser extent. Activities serving an "avoidance" function such as, taking leave from work or going on holiday were reported rarely ($\overline{x} = 1.15$). Table 2 provides examples of the coping strategies described in the free text.

Pearson product-moment correlation coefficient explored the relationship between the most common emotions and the use of each coping strategy. A positive correlation was identified between using emotional regulation to cope and feeling scared ($r = 0.16$, n = 265, $P < 0.05$), and also between the use of reappraisal strategies and feeling scared ($r = 0.22$, n = 265, $P < 0.001$), nervous ($r = 0.14$, n = 265, $P < 0.05$), and worried ($r = 0.16$, n = 265, $P < 0.05$). A negative correlation was identified between the use of approach coping strategies and feeling upset ($r = -0.13$, n = 265, $P < 0.05$), and avoidance strategies were negatively associated with feeling interested ($r = -0.18$, n = 265, $P < 0.001$), distressed ($r = -0.17$, n = 265, $P < 0.001$), and upset ($r = 0.16$, n = 265, $P < 0.05$). A MANOVA indicated that coping strategy selection was not a function of perceived harm or professional group.

Staff Support Services

Of the 265 respondents, 53.6% were aware of organizational support services, and 48.7% expressed willingness to use these services after an error. Although the potential value of staff support services was recognized, free text responses indicated that feelings of shame after an error and fears over confidentiality might act as a barrier to accessing support. Some respondents also indicated that support from a trusted existing source, such as a peer, may be preferential to a formal service.

DISCUSSION

This paper presents cross-country research highlighting the personal and professional impact of making a medical error and the range of coping strategies used. To our knowledge, this is the first survey to assess the impact of making a medical error

TABLE 2. Examples of Coping Activities Reported for Each Coping Function

Coping Function	Example
Approach	"Talked to my colleagues about it [the error]" (Junior Physician)
	"Talked about the situation and deal with it—avoidance doesn't solve the problem." (Senior Nurse)
	"Speaking to the patient immediately afterwards to explain error …the patient was extremely understanding and appreciative of being told what had happened" (Senior Physician)
Emotional regulation	"To apologise to the patient involved made me feel a lot better when I kept thinking about the event for some time" (Junior Physician)
	"Talking through difficult events and thoughts post event can relieve self created pressure" (Senior nurse)
	"Speaking to colleagues helped as time passed to reduce the feelings of regret, lack of self confidence and worry." (Senior Physician)
Reappraisal	"Ability to think logically and come up with a solution for myself gave me a sense of being able to 'cope'." (Senior Nurse)
	"Spoke to one of my friends who deal with the similar procedure routinely and she reassured me that there is always a chance to learn and improve from it." (Junior Physician)
Avoidance	"Taking some time out from work" (Nurse)
	"I have become quite good at compartmentalising things and put bad experiences into a separate place in my head so they rarely stop me from functioning." (Junior Nurse)

in both the United Kingdom and the United States and suggests that experiences are common across these 2 countries. This is significant because many in the United States assume that the fear of litigation is the principle driving force behind negative emotions after an error. Because the malpractice systems around clinical error in the 2 countries are different, the study suggests that litigation fear may not be as prominent a cause of negative emotions as was thought. In fact, those in the UK reported greater personal and professional disruption than their U.S. counterparts. Emotional response was different for physicians and nurses, with nurses reporting stronger negative emotions after an error. However, there was no difference in the emotional response as a function of the level of patient harm. Findings also indicated that many health professionals are unaware of the organizational support services available but may be willing to access these services, particularly if these are led by peers and confidentiality can be ensured.

Recognizing and adequately supporting health professionals after an error is essential for promoting patient safety. A supportive environment is likely to facilitate the open and honest discussion of error, increasing error-reporting and consequently learning and development opportunities.[1,35] Health-care organizations may gain through reduced absenteeism and a greater sense of organizational commitment from their staff. Our survey findings are considered in the terms of the clinician impact literature and in relation to the provision of clinician support services at the study hospitals and more broadly.

Emotion and Coping After Making an Error

Anxiety, distress, and the self-conscious emotions of guilt and self-doubt were prevalent across the sample, but the positive emotions of feeling determined, alert, and attentive were also reported. Although positive emotions were reported to a lesser extent than negative feelings, the positive emotions that received the highest scores seemed to indicate an active recovery process in which individuals seek to learn and make changes to their practice after a mistake. Directly engaging in improving practice as a result of an error reflects the concept of "thriving" after a mistake, which was identified in the trajectory of clinician recovery proposed by Scott et al.[36] Making an error may be a pivotal moment that presents a valuable opportunity to gather feedback on your own performance or that of your team. This is reflected in the current revalidation process being undertaken for physicians in the UK in which supporting information about errors and actions taken to improve care quality must be provided as part of the assessment process and maybe be a helpful strategy for supporting clinicians recovery from mistakes.[37]

Nurses scored significantly higher on the intensity of many of the negative emotion items, particularly those emotions related to personal distress such as feeling upset, worried, distressed, scared, or nervous. This finding suggests that a "one size fits all" approach may not be the most effective. Direct comparisons between the responses of physicians and nurses are limited, but literature to date suggests that nurses often experience strong feelings of self-blame and personal accountability as a result of error that may make them vulnerable to greater personal distress.[21,22] Several explanations for this are possible: nurses may be more likely to be at the "sharp end of the error," the greater intimacy and frequency of contact between nurse and patient may serve to heighten distress when things go wrong, nursing colleagues may be less forgiving of their peers, or a professional culture that inhibits emotional expression may have influenced physicians' responses to this self-reported measure.[38,39] The finding that there was no difference in emotional response

as a function of the degree of patient harm may appear counter intuitive, as it might be expected that greater patient harm would be linked to a stronger emotional response. One possible explanation may be that when errors do not result in harm, health professionals may be less likely to receive organizational or collegial support to cope with the experience. A lack of recognition that the health professional is affected by the error may therefore result in a stronger emotional response.

A number of significant links indicated that there may be an association between emotions and coping after an error. The use of an "approach" or problem-focused coping strategy that aims to address a mistake directly is widely regarded as preferable and was the most frequently reported in our sample.[39] Those who reported using an approach strategy such as contacting a peer to discuss an error also reported feeling less upset after making a mistake, but it is unclear whether they felt less upset as a result of this strategy, or those who felt less upset were more able to face up to the mistake in this way, or those who were willing to respond to this survey may be open and willing to think about their error. Moreover, the coping activities categorized by respondents as "approach" strategies indicated a preference for turning to clinical peers for support rather than nonclinician colleagues, such as those in more formal settings, for example, mental health professionals. These findings were consistent with previous work around physicians' preferences for support for emotionally stressful events, including being involved in an adverse event.[40] A preference for clinical peer support was further confirmed through the responses of UK participants, as staff support in the NHS is provided by a generic staff counseling service as opposed to via clinician peers. UK respondents highlighted particular challenges around communicating concerns to someone who was not from a clinical background. In addition, both studies identified several barriers to seeking support including confidentiality and fear of professional reputational harm.

The coping literature consistently describes "avoidance" strategies as maladaptive and unhelpful in a range of stressful or traumatic situations.[41] Here, somewhat surprisingly, "avoidance" strategies were associated with lower scores on the items "upset" and "distressed" but also on the item "interested." This may reflect a blunting of emotional response which enables individuals to adopt avoidant strategies (e.g., take time out from work, drink to forget about the event or not talk to others about the incident). It is certainly possible that some avoidance strategies are quite effective in the immediate aftermath of error. It is also possible that initial avoidance strategies may serve to lessen the negative emotional response enough to give clinicians time for some emotional recovery and get some "emotional first aid."[37] Further clarification of the direction of this relationship is necessary.

The dynamic relationship between emotion and coping after an error is challenging to capture; the emotional response to making a mistake may lead to the selection of a particular coping strategy that, in turn, may elicit a further emotional response. Prospective or experimental study designs are needed to offer greater insight into these links and to understand the experiences of health professionals more fully.

Limitations

Self-reported, retrospective measures were selected because of ethical obstacles associated with capturing data in the aftermath of a medical error, but these may have been vulnerable to bias, particularly in recall and social desirability. The recruitment process also led to an element of self-selection as the strategies used to make the survey available to as many potential participants

as possible inhibited our ability to calculate an accurate response rate; we made a conscious decision to make the survey widely available and not send targeted surveys to those known to have been involved in an error or near. It is possible therefore that the attitudes and experiences of those who did not respond may have differed from our sample. Participants were asked to recall emotion and coping responses relating to previous error, but the ability to retrieve this episodic information regarding a discrete event declines quickly over time, rendering these reports subject to inaccuracies, particularly in the detail.[42–46] Current emotional state may also influence the reporting of emotions.[46] Despite these limitations, there is consistent, powerful evidence that suggests emotionally charged memories are likely to be recalled more vividly, and this may be applicable to the experience of making a medical error.[47–51] Assessing the validity of the measurement tool in this relatively infant research area was challenging. Although pilot work provided face and content validity, we were unable to assess concurrent validity as there is no current validated measure that assesses the impact of making an error on health professionals nor is there agreement regarding the dimensions of the construct of "second victim" to establish construct validity.

Implications and Application

This work has important implications for the provision of staff support services in the aftermath of error. Effective management of the professional and personal disruption created is necessary to protect patients by ensuring that mistakes are reported to the institution and disclosed to patients and to support and remediate clinicians where necessary. Emotions felt at the time of decision making are thought to override rational thought processes in moments of uncertainty; people rely on their gut feeling rather than weighing the pros and cons of a particular course of action.[51,52] In the moment of realizing an error and deciding what action to take, it is likely that strong feelings of personal shame, guilt and embarrassment may inhibit health professionals from reporting their mistakes, even when the benefits of error reporting for learning and improving safety are fully accepted. Moreover, a full and frank disclosure to the patient and family may be inhibited if the emotional turmoil that clinicians, patients, and families may be experiencing is not recognized and addressed.

An effective clinician support program needs to take many factors into consideration. This study shows that clinicians feel both positive and negative emotions after making an error and that multiple coping strategies may be helpful in recovery. Clinicians should be given opportunities to avail themselves of various strategies, including speaking with peers, being involved in systems changes to prevent future errors, and possibly taking some time off to recover from acute emotional distress. Support should be easily accessible and confidential. The Brigham and Women's Hospital (BWH) has a robust peer support program that was developed and continues to improve based on a growing understanding of how best to help clinicians cope with adverse events. Every clinician has access to peer support at BWH, and more than 60 clinicians have been trained as peer supporters. When notified of an adverse event, a trained physician or nurse colleague reaches out to offer support and to connect the clinician with other resources if needed, rather than waiting for the involved clinicians to either begin to suffer or to have to reach out on their own. Group peer support is also available for teams involved in an emotionally stressful event. A direct application of the study findings to improve this service is the identification of specific coping strategies that peer supporters may suggest to clinicians. This work also highlights

how negatively both nurses and physicians are affected by adverse events and the need to educate the entire health-care community on the importance of a supportive environment after adverse events. None of this obviates the need for personal accountability and learning after errors. In fact, this study reinforces the importance that individual learning and advocacy in improving care have on coping after being involved in an adverse event.

An extrapolation from this and many other studies would suggest that helping support clinicians after adverse events might, in addition to preventing further errors and individual burnout, facilitate more transparent and compassionate disclosure. For this reason, these findings have also informed the institution-wide disclosure and apology program that is closely linked to the peer support program at BWH. Clinicians in this study revealed that speaking to patients about an error was one way in which they coped, but the use of such strategies indicates that clinicians must receive the necessary support outside the patient-clinician relationship to ensure they do not look to their patients for consolation.

Emotional skills training may be one strategy to help raise clinicians' awareness of the way that their emotions can affect the choices they make in patient care.[51] Such an approach may also be helpful for clinicians to recognize the impact of their emotions on the decisions made after an error, particularly when responding to an error and disclosing it to patients, families, and colleagues.

CONCLUSIONS

Significant professional and personal disruption is reported after making a medical error by health professionals in both the United Kingdom and the United States, with important implications on clinicians' coping and recovery and, consequently, patient safety. The findings have informed the development of both peer support as well as a disclosure and apology program at BWH. This work must be considered in terms of its conceptual and methodologic limitations, but these do not limit the opportunities to use these findings to further explore the factors that may influence clinician response and recovery after an error such as professional group and how staff support services can be delivered more effectively, taking into account such variations, to ensure optimal patient and clinician outcomes.

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APPENDIX 1: EMOTION ITEMS.

PANAS Emotion Items	Additional Emotion Items
Distressed	Unhappy
Upset	Assertive
Guilty	Self-doubt
Ashamed	Remorse
Hostile	Regret
Irritable	Humiliated
Nervous	Frustrated
Scared	Competent
Afraid	Shocked
Jittery	Resourceful
Alert	Smart
Excited	Fearful
Attentive	Worried
Enthusiastic	Effective
Inspired	Confident
Determined	Stupid
Strong	Worthless
Active	Frightened
Interested	Shame
	Efficient
	Impatient
	Shaky
	Tense
	Timid
	Jealous
	Thankful
	Relieved
	Trusted
	Inadequate
	Incompetent
	Self-centered
	Wise
	Angry
	Anxious
	Panicky

APPENDIX 2: DESCRIPTIVE STATISTICS FOR INDIVIDUAL EMOTION ITEMS.

Emotion item	Mean	Standard deviation	Minimum	Maximum
Guilty	3.65	1.31	1	5
Upset	3.64	1.26	1	5
Resourceful	1.55	1.01	1	5
Smart	2.40	1.43	1	5
Fearful	2.66	1.48	1	5
Worried	3.43	1.32	1	5
Ashamed	3.21	1.46	1	5
Determined	2.71	1.35	1	5
Active	2.38	1.42	1	5
Effective	2.03	1.23	1	5
Confident	1.87	1.12	1	5
Distressed	3.18	1.47	1	5
Scared	3.02	1.46	1	5
Competent	2.26	1.29	1	5
Strong	1.97	1.12	1	5
Hostile	1.62	1.04	1	5
Stupid	2.51	1.47	1	5
Efficient	2.07	1.24	1	5
Worthless	2.00	1.23	1	5
Frightened	2.54	1.45	1	5
Shame	2.86	1.45	1	5
Attentive	2.55	1.44	1	5
Impatient	1.77	1.15	1	5
Irritable	2.09	1.19	1	5
Inspired	1.64	1.10	1	5
Alert	2.84	1.47	1	5
Nervous	3.00	1.40	1	5
Afraid	2.72	1.43	1	5
Jittery	2.28	1.35	1	5
Inadequate	2.28	1.35	1	5
Incompetent	2.66	1.45	1	5
Self-centered	2.64	1.47	1	5
Panicky	1.38	0.822	1	5
Shaky	2.30	1.40	1	5
Tense	2.16	1.35	1	5
Timid	2.72	1.41	1	5
Jealous	2.26	1.33	1	5
Thankful	1.90	1.32	1	5
Relieved	1.85	1.31	1	5
Trusted	1.88	1.10	1	5
Wise	1.66	0.992	1	5
Angry	1.15	0.564	1	5
Anxious	2.28	1.32	1	5
Unhappy	3.03	1.42	1	5
Assertive	1.85	1.14	1	5
Self-doubt	3.19	1.45	1	5
Remorse	2.82	1.50	1	5
Regret	3.24	1.52	1	5
Humiliated	2.47	1.46	1	5
Frustrated	2.89	1.47	1	5
Shocked	2.88	1.50	1	5
Interested	2.45	1.43	1	5
Excited	1.37	0.797	1	5
Enthusiastic	1.62	1.13	1	5