The emotional impact of medical error involvement on physicians: a call for leadership and organisational accountability

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Summary

Objective: Involvement in errors often results in serious health effects, emotional distress, as well as performance and work-related consequences in staff members, in particular physicians. The aim of this systematic review was to evaluate current evidence on a) the impact of involvement in medical errors on physicians, b) needs and experiences in coping with the experience of error, and c) interventions to support physicians involved in errors.

Methods: A systematic review was conducted in a two-step procedure using predefined search protocols and inclusion criteria that cover the relevant literature published between 1980 and 2007.

Results: Of 3,852 identified candidate articles, 87 studies were selected for critical appraisal and 32 were included in the review. Involvement in medical errors often provokes intense emotional distress that seems to considerably increase the risk for burn-out and depression. The evidence suggests a reciprocal cycle of these symptoms and future suboptimal patient care and error. Communication and interaction with colleagues and supervisors are perceived as the most helpful resource by physicians. Physicians involved in errors usually feel not supported in coping with this experience by the institutions they work in.

Conclusion: Many professionals respond to error with serious emotional distress, and these emotions can imprint a permanent emotional scar. Given the significant burden on physicians' health, well-being and performance associated with medical errors, health care institutions and clinical leaders have to take accountability and provide staff with formal and informal systems of support.

Key words: patient safety; medical error; physicians; emotional distress

Introduction

Adverse events and medical errors are an inevitable reality of health care. International data show that the incidence of adverse events ranges between 3–16% of all hospital admissions [1, 2]. For the Canadian health care system this translates to roughly 185,000 hospital stays per year that will result in adverse events, of which 70,000 are deemed preventable [3]. Kopp et al. observed in a study in intensive care that there was one error resulting in a potentially or actually preventable adverse drug event for every five doses of medication administered [4]. Nearly a quarter of patients experience adverse events after discharge from hospital and recent studies also report that adverse events occur frequently in outpatient care [5, 6]. While many studies assessed the burden of adverse events in patients, the causes underlying these events and interventions to increase safety [7–9], the impact of involvement in errors and adverse events on health care professionals has gained far less attention in the public debate. Though working conditions such as sleep deprivation and overwork have been discussed as contributing factors [10–12] professionals involved in errors have long been characterised as "offenders". However, recent studies report that involvement in errors often results in serious health effects, emotional distress, as well as performance and work-related consequences in staff members, in particular physicians. The phrase "second victims" introduced by Wu describes physicians' considerable emotional reactions and often long lasting distress in the aftermath of error [13]. The aim of this systematic review was to evaluate current evidence on a) the impact of involvement in medical errors on physicians' health, quality of

life and performance; b) physicians' needs and experiences in coping with the error experience, and

c) interventions aimed to support physicians after being involved in errors.

Methods

The databases *Medline* and *Cinahl* were searched for relevant studies using a predefined protocol. The searches were conducted in October 2007. The references of retrieved articles were manually searched for further material. Since the use and indexing of terms relating to patient safety is often inconsistent we defined a search strategy with high sensitivity but low specificity. The search strategy consisted of freetext and MeSH terms related to "adverse events" or "medical errors" combined with the terms "medical staff" or "physicians" or "internship and residency". Studies were included in the review when they fulfilled all of the following inclusion criteria:

– Empirical study (qualitative or quantitative) and reviews; letters, abstracts, methodological and general articles were excluded;

– Journal articles, i.e., exclusion of books, HTA reports, grey literature;
– Published between 1980 and 2007;
– Published in English, German or French.

The biographic data and abstracts of retrieved studies were evaluated for concordance with basic inclusion criteria. Studies that violated any of the above criteria were discarded at this stage (e.g., duplicates, conference abstracts). The remaining studies were selected for full-text retrieval and were analysed in-depth by two reviewers. After initial review of all full-texts, studies were classified according to content and study type in a second analysis.

Results

The systematic literature search initially identified 3,852 candidate articles, of which 87 were selected for full-text retrieval. The majority of articles were discarded at this initial stage mainly because they were duplicates, or it was obvious from the bibliographic data that they violated inclusion criteria (e.g., "opinion pieces"). A further 55 articles were dropped after the critical appraisal. In summary, 32 studies were included in this study and reviewed. The majority of empirical studies (n = 23) investigated the emotional or health-related impact of error involvement on physicians (n = 14). Reviews predominantly addressed physicians' needs and experiences of dealing with errors, mainly in an unsystematic approach. Only a few studies were identified that investigated interventions to support staff in dealing with errors (n = 6).
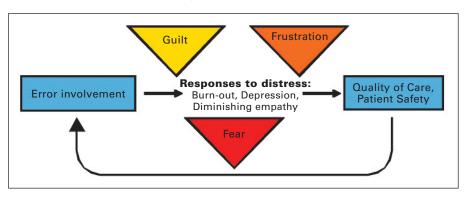
Impact of involvement in medical errors on physicians

A number of qualitative and quantitative studies report that involvement in medical errors often provokes intense emotional responses. Common reactions reported by individuals involved in error include distress, self-doubt, confusion, fear, remorse, guilt, feelings of failure and depression, anger, shame and inadequacy that often persist for longer periods [14–18]. Both, poor patient outcomes and higher degrees of perceived personal responsibility seem to amplify emotional distress [19]. In a qualitative study of needs and attitudes towards disclosure of errors both, patients and physicians reported strong emotional reactions and had needs following errors, which were not met [16]. The severe emotional distress commonly reported by residents as a reaction to being involved in errors may be explained by the perceived reasons underlying the errors [20]. Many residents identify intrinsic causes of error, such as lack of experience or knowledge, rather than extrinsic reasons, such as complex cases, and attribute the error to themselves. Aasland et al. show that involvement in adverse events also seriously affects private life [21]. In a survey among 1,318 registered physicians in Norway, 17% of those that had experienced at least one adverse event with serious patient injury indicated that this event had a negative impact on their private life, 11% reported that the event

Figure 1

Reciprocal cycle of error involvement, emotional distress, and future errors.

made it harder to work as physician, and 6% needed professional help. Recently, studies have become available that go far beyond investigating short-term emotional disturbances as outcomes of error involvement. These studies suggest that at least in a substantial fraction of physicians involved in medical errors, serious health- and job-related consequences have to be expected. Waterman et al. examined the effects of medical error experience on five work and life domains in a large survey of 3,171 physicians in internal medicine, paediatrics, family medicine, and surgery in the US and Canada [22]. Increased anxiety about future errors was reported most frequently (61%) as response to being involved in error, followed by loss of confidence (44%), sleeping difficulties (42%), reduced job satisfaction (42%), and harm to reputation (13%). Experience of one of these reactions was significantly more likely if responders were involved in a serious rather a minor medical error. Still, even among those involved in a near-miss increased anxiety about future errors (51%), decreased job confidence (31%) and job satisfaction (32%), and increased sleeplessness (34%) were common. Female gender and spending more than 75% of working time in clinical practice were significant predictors of reporting either of the stress-related reactions. West et al. assessed the association of self-perceived medical errors with quality of life, burn-out, depression, and empathy in a prospective longitudinal cohort study of internal medicine residents in the USA [23]. Subjects completed surveys every 3 months over a three year period (first cohort). In this study, a self-perceived major error was associated with subsequent significant decreases in quality-of-life (measured using linear analogue scale assessment, LASA), worsened scores in all domains of burn-out (measured using the Maslach Burn-out Inventory, MBI) and an increased likelihood of screening positive for depression at the subsequent time point (measured using a validated two-item screener, Odds ratio 3.3). Remarkably, this study also shows significant associations between distress at each survey point and a self-perceived error in the *subsequent* 3 months. Higher burn-out scores in all domains and decreased empathy with patients were associated with increased odds of error in the subsequent 3 months. For example, a 1-point increase in the depersonalisation score was associated with a 10% increase in the odds of reporting an error later. These results suggest that personal distress and self-reported error involvement are related in a reciprocal cycle (fig. 1): Feeling responsible for a serious medical error enters a vicious cycle by provoking burn-out, depression and reduced empathy, which in turn often result in suboptimal patient care and higher odds for future errors.

Association of burn-out with delivery of suboptimal quality of patient care has also been reported by others [24]. In a survey among internal medicine residents 53% of residents with burn-out (measured using the MBI) reported to provide at least one of five suboptimal patient care practices at least monthly, as compared to 21% of non-burned-out residents [25]. For example, burned-out residents were significantly more likely to report to "have little emotional reaction to the death of one of their patients" (70% vs. 19% non-burned-out residents), to "have found themselves discharging patients to make the service 'manageable' because the team was too busy" (68% vs. 37% non-burned-out residents), to "have made treatment or medication errors that were not due to lack of knowledge or inexperience" (50% vs. 15% non-burned-out residents), or to "have felt guilty about how they treated one of their patients from a humanitarian standpoint" (48% vs. 11% non-burned-out residents). Burn-out, but not gender, major depression or substance use were significant predictors of self-reported suboptimal patient care practices in multivariate analyses (Odds ratio 8.3). Among the domains of burn-out only high scores on the "depersonalisation" subscale were significantly associated with self-reported provision of suboptimal care practices at least monthly. This association reflected a dose-response relationship, i.e., the higher the scores for depersonalisation the more likely residents were to report suboptimal patient care. It must be noted though, that the cited studies refer to *self-reported* errors and did not validate these against objective criteria. It is thus possible, that burned-out or depressed physicians are simply more likely to *report*, rather than to *commit* errors. Vice versa, non-burned-out physicians may be more likely to underreport errors, e.g., due to social-desirability bias. A recent prospective cohort study that investigated the relationship between resident burn-out and depression and *objective* data of medical error involvement was not included in this review since it was published after the searches were conducted [26]. This study later confirmed the association of depression, but not burn-out with medication errors. Depressed pediatric residents made 6 times as many medication errors per resident month as non-depressed residents.

Table 1

Distribution of included studies according to study design and objective.

Objective	Empirical study			
	Review	Qualitative	Quantitative	
Emotional and health-related impact of error involvement	0	6	8	*14*
Needs and experiences in coping with errors	8	2	2	*12*
Interventions to support physicians	1	1	4	*6*
	9	*9*	*14*	*32*

Needs and experiences in coping with the experience of error

Few studies have investigated physicians' needs and experiences in coping with the experience of error, including factors and conditions that impede or contribute to a constructive approach. Mizrahi identified three major coping mechanisms medical professionals employ to cope with error [27]: Denial (negation of the concept of error, repression and redefinition of errors), discounting (externalising blame), and distancing (shared beliefs which allow for direct admission of guilt, e.g., "everyone makes mistakes"). To be able to cope with error, many physicians report a need for support in the repercussion of error. Talking and listening to colleagues as well as professional reaffirmation and reassurance seems to play a critical role in dealing with the experience of error and to draw constructive conclusions from it [17, 19]. However, while many physicians report communication and interaction with colleagues or supervisors as most helpful to deal with emotional distress after error involvement, affected individuals often struggle to find support [16, 28]. It is worth noting that in the qualitative study by Newman, all participating family physicians recognised their colleagues' distress and need for support described in a hypothetical scenario, but only one third of responders would have unconditionally offered support. The majority would only offer support in case of a close friendship. The available studies suggest that physicians involved in errors usually feel not supported in coping with this experience by the institutions they work in. Wu et al. report that nearly a third of surveyed house officers indicated that "the hospital atmosphere inhibited them from talking about the mistakes" and 20% reported that the "administration was judgmental about the mistakes" [17]. Sexton et al. describes in an international comparative survey study among physicians, nurses, and cockpit crew members that a quarter of medical staff indicated they would not be encouraged to report safety concerns in their hospitals and only one third responded that errors are handled appropriately [29]. "Personal reputation" (76%) and "the threat of malpractice claims" (71%) were commonly reported as barriers to acknowledging or discussing errors by staff in intensive care.

In the study by Waterman et al., 90% of surveyed physicians disagreed that health care organisations lend adequate support in coping with stress associated with medical errors (37% disagreed strongly) [22]. Physicians who perceived their institutions as unsupportive were four times more likely to report increased stress after being involved in serious errors. Though the majority of physicians were interested in counseling after an error occurred (82%), responders were also ambivalent towards seeking support and reported a number of barriers to pursuing counseling, e.g., time constraints or confidentiality of counseling.

The experience of error can also cause considerable changes in medical practice [15]. In the study by Wu et al., many residents described constructive changes as response to an error, such as increased information seeking (seeking more advice (62%)) and increased vigilance (paying more attention to details (82%); confirming clinical data personally (72%)) [17]. Predictors of constructive changes were female gender, mistakes caused by inexperience or faulty judgment in a complex case, greater acceptance of responsibility and more discussion of the mistake, e.g., with the supervising physician. In contrast, residents that reported a judgmental institutional response to the error were more likely to make defensive changes in medical practice (keep mistakes to oneself or avoidance of similar patients). While the acceptance of personal responsibility seems predictive for coping, learning from errors and taking constructive changes, accepting responsibility is also strongly associated with initial emotional distress [17, 30]. This suggests that physicians, in particular those at the beginning of their career, need institutional and personal support by their peers in coping with errors.

Interventions to support physicians involved in errors

Studies that evaluated the effects of interventions to support physicians are very rare though a number of measures, such as integration of patient safety in medical curricula and training, mentoring and above all, change in culture, have been suggested for alleviating the emotional distress of physicians [18, 31–33]. The traditional, institutional framework that is predestined for discussion of adverse events and errors are "Morbidity and Mortality Conferences" (MMC). The major advantages of MMCs are that they are well-established and integrated in everyday clinical care, offer the potential to overcome hierarchies, and, by connecting issues of clinical care with patient safety, are able to symbolise the "natural" occurrence of errors in the practice of medical care. However, in reality, MMCs and their equivalents are often evaluated with a considerable ambivalence, in particular by residents [17, 30]. Residents often value the opportunity to discuss errors and to learn how supervisors respond to errors of staff. MMCs then serve as formal "door openers" for further, informal discussions with colleagues [19]. However, as Hobgood et al. report for emergency medicine resident programmes, many programmes require resident remediation, in particular additional lectures, written reports, or extra clinical duties after committing a clinical error [34]. Residents also often fear getting "toasted" by colleagues. While MMCs can have a high utility as first instance for discussing errors with staff, analyses of MMCs in the US raise doubts whether this potential is effectively used in practice: In a recent analyses of 332 MMCs, only 37% of internal medicine case pre-

sentations included adverse events or errors resulting in adverse events (19%) [35]. In surgery MMCs, the fraction of case presentations that included adverse events (72%) or errors (42% of cases) were significantly higher. It also becomes evident from this analysis, that even when cases including errors are discussed, the incident is often not named as "error", be it implicit or explicit. Errors are frequently discussed as disagreements between physicians or nonspecific problems (29% of internal medicine case, 17% of surgery cases), or not discussed at all (24% of cases in internal medicine, 6% of surgery cases). These data show that MMCs are currently not sufficiently used to establish a learning and supportive environment for staff involved in errors. Coyle et al. investigated the effects of a patient safety educational programme for residents consisting of educational lectures and case discussions on residents' incident reporting behavior and attitudes [36]. While not directly aimed to provide support to affected physicians, positive incident reporting behavior and attitudes towards communicating errors is a necessary condition for providing counseling and support to individuals touched by medical events. However, behaviour and attitudes remained unchanged after 6 months of implementation in this study. Surveyed residents reported that lack of time, extra paper work, and concerns about career and personal reputation were major barriers to medical event reporting. Educational programmes may not sufficiently address culture and practice in medical care and may be ineffective as "hidden curricula" and role models remain unchanged [37]. Two studies were identified that assessed the effects of more comprehensive approaches.

Wilf-Milron et al. evaluated the adaption of aviation safety concepts to ambulatory care [38].

This programme included the introduction of key safety principles, granted immunity to error reporting physicians, provided a telephone hotline for direct incident reporting and receipt of emotional support ("caring for the caregiver"), event analysis and debriefing. During the observation period of 5 years, the number of reported events increased from nearly zero to 50 per month of which 40% were submitted by the involved physician. It is likely that the granting of immunity had major effects on incident reporting. Unfortunately, no data have been published relating to the effectiveness of the emotional support. One may only speculate that increases in error reporting may in part be due to the expectation of support and may – in itself – indicate a first step for taking of responsibility.

Cohen et al. evaluated the implementation of a comprehensive hospitalwide patient safety programme for cultural change [39]. A number of measures were taken to increase event reporting by staff, including a hospital hotline telephone system that allowed anonymous incident reporting. During the observation period of three years, the incidence of events was tracked and staff was surveyed regarding awareness of patient safety and comfort in reporting. The total number of incidents reported by staff increased substantially from 35 to 125 per 1,000 patient days. The fraction of non-anonymous reports increased significantly from 30% to 61% and the fraction of self-reporters, i.e., those reporting an event they were personally involved in, doubled from 7% to 14%. Staff attitude towards patient safety and trust in the institution when reporting also improved significantly but the effects were small.

Discussion

Being responsible for medical error can have a considerable impact on physicians. Many professionals respond to error with serious emotional distress, and these emotions can imprint a permanent emotional scar [18]. Involvement in error seems to considerably increase the risk for burn-out and depression and the evidence suggests a reciprocal cycle of these symptoms and future suboptimal patient care and error. Association of burn-out with medical errors has recently been confirmed in a prospective study that used objective measures of error rather than self-reports [26]. Though in this study neither depression nor burn-out were associated with logged sleep hours or work hours, the complex relationship between sleep-deprivation, mental health, and error warrants further study. Health care staff involved in errors find themselves in a conglomerate of individual values, professional ethics and institutional culture, and working conditions that often perpetuate uncertainty and isolation, and therefore hinders constructive approaches to the error experience. The evidence suggests that communication and interaction with colleagues and supervisors are perceived as the most helpful resource by physicians. Still, for many residents communication and support by their supervisors seems to occur rather at random, more or less conditioned by the personality of the involved individuals, rather than systematically and by institutional mechanisms, e.g., teaching physicians how to act as role models, or systematic debriefing programmes for undergraduate students [32]. It is crucial to understand for supervisors, accepted clinical leaders and those engaged in resident training that this support of staff needs to be proactive, as exemplified in the statement of a resident in the interview study by Engel et al. [19]:

"… *I was blessed with an attending physician who was diligent enough, who forced me to talk about it. Otherwise I would not have.*"

We found only few studies that evaluated the effectiveness of interventions to support staff in coping with errors, and none used highly specific outcome measures such as emotional distress, burn-out, or work-related quality-of-life. Some studies suggest that combining error reporting systems with emotional support systems increases reporting, but whether they also mitigate physicians' emotional distress remains unclear. Physicians commonly seem ambivalent about making use of counseling and frequently report a number of barriers to approaching support systems. Thus, institutional approaches to support staff should include both formal and informal components. Formal approaches could include devoting MMCs to error analysis and work-up but should also integrate measures that focus the emotional aspect of error. For example, the "Support our Staff" programme presented by Waterman et al. supports health professionals involved in medical errors and consists of group staff debriefing, individual counseling, and root-cause-analysis [22]. This programme combines voluntary and mandatory elements in a tiered mechanism that verifies whether additional support is needed. Many institutions around the world are currently installing and experimenting with promising ways to support staff and teams, often developed as grassroots initiatives [40–42]. Yet, little is known on the outcomes of these endeavors and care organisations searching for blueprints to establish support systems are currently looking in vain. Our call for leadership in health care organisations is thus accompanied by a call for research into the feasibility, acceptability, and effectiveness of interventions.

Limitations

Our study also has some limitations that need to be kept in mind when interpreting the results: First, we restricted our search to the medical literature but did not search resources covering exclusively social sciences, psychology and education research. Thus, we may have missed important contributions to the field. Second, we limited the scope to studies addressing the impact of error involvement on physicians. While this does not af-

fect the conclusions drawn for the medical profession, it narrows the perspective since many errors involve staff of different professions and interactions among these may also play a considerable role in coping. Indeed, health care organisations face the challenge to deal with multiple "second victims".

Some authors suggest that talking openly with patients affected by errors may have "relieving" effects to both parties and may not only fulfill the needs of patients but also help professionals to cope [43, 44]. Conversely, the study by Waterman et al. indicates that poor experiences with disclosure may also increase stress in involved physicians [22]. While there is not yet conclusive evidence on the impact of error disclosure on staff, it may be required to accompany disclosure policies by resources that enable staff to transfer these into daily practice and cope with negative experiences.

Nearly every young women and every young man that start medical training today will be involved in a serious medical error at some time in their career and will probably experience strong emotional reactions to this fundamental event. It is a challenge and a matter of accountability of the health care system as a whole and its clinical leaders in particular to prepare them for this situation and to provide support to them when it occurs.

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