

Postmortem Inquiries and Trauma Responses in Paramedics and Firefighters

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Following a critical event resulting in loss of life, members of emergency service organizations are frequently required to participate in postmortem inquiries that seek to understand the cause of the tragedy and ensure that such an event does not occur again. Although researchers have become increasingly knowledgeable about the effects of critical events on rescue workers, to date, no studies have focused on the stress and trauma experienced as a result of having one's actions questioned in such a process. This study compares trauma responses in firefighters and paramedics who have been questioned in postmortem inquiries following a critical event in the workplace and those who have not. Involvement in a review was found to be associated with significantly higher traumatic stress and depression symptoms. Those involved in reviews were more likely to have taken mental health stress leave. In addition, both media coverage of the event and the review were significantly associated with depression scores.

Keywords: *postmortem inquiry; critical incident stress; emergency responder; posttraumatic stress*

In the aftermath of September 11, 2001, the North American public is aware as never before of the stresses, danger, and potential for fatalities inherent in the work of emergency responders. Researchers have also become increas-

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ingly aware that when faced with tragic situations in the line of duty, these workers may experience symptoms of traumatic stress (Fullerton, McCarroll, Ursano, & Wright, 1992; Gibbs, Drummond, & Lachenmeyer, 1993; Marmar et al., 1999; Regehr, Hill, & Glancy, 2000). These traumatic stress reactions can occur not only as a result of disasters of national proportions but also following other tragic events such as transportation accidents resulting in multiple injuries and loss of life, the crash of an aircraft, or a fire at a nursing home resulting in many deaths. Although the initial public response to tragic events may be an outpouring of support and admiration for emergency workers, this support inevitably wanes, and society begins to consider what might have been done to facilitate a more positive outcome to the disaster. Following the occurrence of a significant event, such as a mass casualty or death of an emergency responder in the line of duty, frequently, a postmortem inquiry is performed in the form of a coroner's inquest, an internal investigation, or a specially formed public commission. Practice experience has shown that the experience of going through a postmortem review can be extremely stressful for workers. Emergency service workers are often faced with life-threatening and uncontrollable situations where quick thinking and reasoned action is required. Failure to deal with these acute situations optimally may result in professional condemnation, community sanctions, and possible legal actions.

One such type of inquiry that frequently occurs in Canada is a coroner's inquest. In Canada, a coroner may decide to hold an inquest when it is believed that circumstances relating to a particular death or deaths warrant public attention or that recommendations might be made by the inquest jury to prevent similar deaths in the future (Ministry of the Solicitor General, Office of the Chief Coroner, 2002). In addition, certain types of deaths, such as the death of an inmate in a federal prison, must result in an inquest. Originating in 11th-century England, the present day Canadian inquests are presided over by a coroner, and witnesses are examined by a crown attorney before a jury. In events such as deaths in a nursing home fire, several firefighters and paramedics may be called to testify as to their observations. As this is not a judicial process, generally these individuals do not have independent legal representation, although the emergency service organization often has a lawyer. The inquests are open to the public and the media and often receive considerable media attention. Although the purpose of inquests and other public inquiries is to prevent further deaths, they raise fears about possible findings of wrongdoing and consequent risks of criminal responsibility and civil liability.

Public inquiries, including inquests, have become prominent and powerful institutions. Critics suggest that they are a sociopolitical phenomenon that

have wide-ranging effects on public policy and service delivery (Hill, 1990). In part, inquiries help society deal with moral panic. The public attention becomes focused on a phenomenon, which is not necessarily driven by an increase in incidence but instead a surge in attention. Inquiries are a means for government to demonstrate concern for an issue and to appease the public (Hill, 1990). Furthermore, inquiries themselves frequently take on a tone of moral righteousness. The motto of the chief coroner's office of Ontario for instance reads, "We speak for the dead." All these political factors serve to increase pressures placed on emergency responders, whose actions may be the focus of the inquiry.

To date, there is a surprising dearth of research on the impact of postmortem inquiries on emergency service workers. Related research has found that testifying in court is the number one-ranked stressor among police officers (Evans & Coman, 1993). A study of female physicians determined that threat of malpractice litigation was a primary source of distress in female physicians (Richardson & Burke, 1993). One study of child welfare workers encountering reviews subsequent to the death of a child describes the devastating impact on both workers and the organization (Regehr, Chau, Leslie, & Howe, 2002). Theoretical and anecdotal articles also point to the stress of reviews of performance. Authors point to the stress experienced by nurses (Koehler, 1992) and police officers (Herrman, 1988) when their actions are scrutinized by the media and the court system and the subsequent undermining of the public's confidence when a member of an occupational group is being investigated (McDonald, 1996). Anecdotal literature on child protection workers suggests that death inquiries have a devastating impact on morale. Staff become depressed and anxious, work becomes defensive and routinized, resignations are common, and recruitment of new staff is difficult (Brunet, 1998; Hill, 1990). In addition, these inquiries can lead to further consequences such as civil litigation or criminal charges. Following a coroner's inquest into the death of a child in a hospital, two Canadian nurses were criminally charged ("Nurses Charged," 2002). One author suggests that internal police investigations frequently lead to compensation claims (Bale, 1990).

Although several studies confirm that traumatic events encountered in the line of duty cause stress responses in rescue workers, other researchers have argued that it is organizational stressors that cause the greatest degree of distress in emergency service personnel. Several large-scale studies of police officers in England, Australia, Canada, and the United States have concluded that although events such as dealing with victims of serious accidents, being attacked by aggressive offenders, or dealing with protesters caused stress in officers, the police organization with its rules, procedures, communication

paths, bureaucratic hierarchy, and management style was the greatest source of job stress (Brown & Campbell, 1990; Burke, 1993; Buunk & Peeters, 1994; Coman & Evans, 1991; Hart, Wearing, & Headey, 1995). The outcomes of this stress include high levels of alcoholism, a suicide rate that is 30% higher than that of comparison groups, and a rate of marital problems that is double that of comparison groups (Golembiewski & Kim, 1990). Similarly, ambulance workers involved in body recovery duties following mass disasters in England identified that poor relationships with management, not being valued for their skills, and shift work were the major stressors they encountered (Thompson, 1993). On the contrary, a primary mediating factor of organizational stress is social support within the organization, particularly from superiors (Burke, 1993; Buunk & Peeters, 1994; Gibbs et al., 1993; Leffler & Dembert, 1998; Regehr et al., 2000; Weiss, Marmar, Metzler, & Ronfeldt, 1995). That is, when people feel supported and valued, they experience lower levels of distress. Such evidence has led some authors to conclude that critical incidents exert little if any disruptive influence directly but rather operate through the exacerbation of daily hassles that occur in organizations that employ emergency service responders (Gist & Woodall, 1995). Other authors suggest that it is the combination of job context (organizational factors) and job content (critical events) that make the work of emergency responders so potentially stressful and demanding (Coman & Evans, 1991). In this regard, postmortem reviews carry the multiple stressors of trauma related to the event itself and trauma related to the organizational, media, and public response to the event.

In addition to event factors, public scrutiny, and social supports within the organization, it is important to consider the contribution of characteristics of the individual encountering the traumatic event. There is a growing body of literature that considers personality variables as determinants of trauma response: such as cognitive coping style (Beaton, Murphy, Johnson, Pike, & Corneil, 1997; Hart et al., 1995; Janik, 1992), sense of control over the event and the recovery process (Kushner, Riggs, Foa, & Miller, 1992; McCammon, Durham, Allison, Williamson, 1988; Regehr, Cadell, & Jansen, 1999), and perceptions of threat (Carlier, Lamberts, & Gersons, 2000). From the cognitive perspective, previous experiences of coping create assumptions and beliefs about self-efficacy within an individual regarding what situations can or cannot be mastered and how threats can be overcome (Lazarus, 1966). These expectations of success shape a person's reaction to a crisis, thereby influencing the outcome. Emergency responders who, in the face of disaster, manage to retain a belief that they can control outcomes have been found to manage the experience far more effectively than individuals who believe they are controlled by external forces (Bryant & Harvey, 1996; Gibbs, 1989).

However, although individual and social support factors may mitigate responses following an isolated traumatic event, this study hypothesizes that ongoing stressors related to the event such as postmortem reviews may serve to exacerbate traumatic reactions. Several possible factors may serve to contribute to traumatic responses as a result of postmortem reviews: (a) prolonged exposure to traumatic stimuli through the review process, (b) reduced control over the recovery process, (c) decrease in perceived social support as a result of questioning performance, and (d) stigmatization. This research seeks to understand the effects of postmortem reviews of tragic events on emergency service workers and the impact of individual control and social support factors in mitigating or exacerbating worker response to the reviews.

Therefore, it was the hypothesis of this study that emergency workers involved in postmortem reviews would have higher levels of trauma and depression symptoms than those not exposed. In addition, it was expected that public scrutiny in the form of media attention would be associated with higher levels of depression and traumatic stress symptoms. Furthermore, it was hypothesized that postmortem reviews would serve to undermine perceptions of control and self-efficacy and that emergency workers with a lower sense of control and efficacy would have higher trauma reactions and higher levels of depression. Finally, higher levels of social support both within the organization and in the emergency responders' personal lives were expected to be associated with lower levels of symptoms in both the group exposed to postmortem reviews and those not exposed.

METHOD

The research was conducted in two emergency service organizations in the greater Toronto area in Canada: a fire department and an ambulance service. Participants represented a convenience sample of members of both organizations. To ensure that participants had some degree of experience on the job and to minimize differences in exposure between those who had been involved in reviews and those who had not, a minimum of 6 months' experience was required for participants to be included in this analysis. Using this criteria, 264 firefighters and paramedics were included in the sample. In all, 178 participants were firefighters (67.4%), and 86 (32.6%) were paramedics. The mean age of participants was 33.7 years with an age range of 17 to 56 years. The average number of years of employment as an emergency worker was 10.4 years with a range of 0.5 to 33 years. Those involved in reviews were significantly older than those who had not been involved ($t = -3.529, p \leq .001$) and had significantly more experience as emergency services workers

($t = -4.676, p \leq .001$). The majority of the sample (64.4%) were married or in common-law marriages, 33.7% were single, and 1.9% indicated that they were widowed or divorced. The majority (70.9%) had college or university degrees. The majority of participants (91.7%) were born in Canada, and more than 70% had parents who were also born in Canada, suggesting that this is an ethnically homogenous population. Only 18.6% of respondents had attained the rank of officer or supervisor. Officers reported higher levels of traumatic stress symptoms than frontline workers ($t = -1.97, p \leq .05$), and they were more likely to be involved in reviews; however, there was no significant difference in trauma levels between those officers who had been in reviews and those who had not.

Measures

Demographic data, stressors, and support. Demographic variables were collected via a questionnaire that covered age, gender, marital status, education, and years in emergency service work. The questionnaire also addressed exposure to critical incidents, involvement in postmortem reviews, and media attention related to the review.

Social supports. To determine perceptions of situation-specific support from spouses, friends, family, colleagues, union, and employers, participants were asked to rate the level of support that they received from others on a scale ranging from 0 (*not at all supportive*) to 5 (*very supportive*). In addition, a standardized measure of social support was used to measure more global perceptions of social support. The Social Provision Scale is a brief (24-item) multidimensional self-report instrument that offers the possibility of discriminating between six distinct types of social support and assesses global support (Cutrona & Russell, 1987). The measure was tested on a total of 1,792 respondents, including psychology students, nurses, and teachers. The reported alpha level for the total scale is .91. Extensive validity testing is reported by the developers.

Current level of distress. This variable was measured by two scales, the Beck Depression Inventory (BDI) and the Impact of Event Scale (IES). The BDI is a self-report scale that assesses the presence and severity of affective, cognitive, motivational, vegetative, and psychomotor components of depression (Beck & Beamesderfer, 1974). Initially standardized on 606 psychiatric inpatients and outpatients, the reported reliability coefficient is .86. Test-

retest reliabilities are .48 for psychiatric patients after 3 weeks and .74 for undergraduate students after 3 months.

The IES (Zilberg, Weiss, & Horowitz, 1982) assesses the experience of posttraumatic stress for any specific life event. It extracts dimensions that parallel the defining characteristics of the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.) (American Psychiatric Association, 1994) criteria for post-traumatic stress disorder (PTSD), which are signs and symptoms of intrusive cognitions and affects, together or oscillating with periods of avoidance, denial, or blocking of thoughts and images. This scale is reported to have high internal consistency, with a Cronbach's alpha of .86 and a test-retest reliability of .87.

Individual factors. Two individual cognition measures were selected. The Internal Control Index is a 28-item instrument designed to measure the degree of control and autonomy that an individual experiences (Duttweiler, 1984). The instrument has been tested on a variety of student populations including college/university undergraduates and continuing education students ($N = 1,365$). An internal consistency coefficient (Cronbach's alpha) of .84 is reported (Duttweiler, 1984).

The Self-Efficacy Scale is a 23-item scale that measures general expectancies of success that are not tied to specific situations (Sherer & Adams, 1983; Sherer et al., 1982). The measure has been tested on 500 university undergraduates and 150 alcohol treatment inpatients. A Cronbach's alpha of .86 is reported.

RESULTS

Exposure to Traumatic Events, Postmortem Reviews, and Media Attention

Of the total sample, 83% indicated that they had been exposed to some type of critical event in the line of duty. The most common exposure was to multiple casualties (62.5%), followed by death of a child (50.0%), death of a person for whom they had responsibility (46.2%), a near death experience for themselves (40.5%), and violence perpetrated by others against themselves (35.6%). Those who participated in inquiries were significantly more likely to have encountered each of these events than those who had not (see Table 1).

Of the total sample, 23.9% had been involved in a formal review of a tragic event: 13% had been involved in reviews that were internal to their organiza-

tion, 11.7% had been involved in coroner's inquests, 2.7% had been involved in public inquiries, and 3.8% had been involved with criminal or civil courts subsequent to an event. Furthermore, 29.5% of the sample had media coverage of an event they were involved in, and for 10.6%, the media covered a review process in which they were involved. And 5% had media stories that directly related to themselves.

In the total sample, the mean score on the IES was 10.67 with a range of 0 to 65. Only 4.3% had scores in the high range (between 19 and 25), and 15.9% had scores in the severe range (more than 26). The mean score on the BDI was 4.53. The vast majority of participants (89%) had no depression, 8.4% scored in the mild range, 1.9% in the moderate range, and only 0.8% scored in the severe range.

It was acknowledged that those who had been involved in reviews were significantly more likely to have encountered critical events. Therefore, *t*-test analyses on the differences in IES and BDI scores were conducted with only those who had encountered critical events. Among those who had encountered any type of critical event, there were significant differences between group means on both the IES scores ($t = -2.697, p \leq .005$) and the BDI scores ($t = -2.754, p \leq .005$) for those who were involved in formal reviews and those who were not. That is, those who were involved in reviews had significantly higher levels of traumatic stress and depression (see Table 2). Similar analyses were conducted with individuals who encountered specific types of critical events. Again, with the exception of those experiencing violence against themselves, participants encountering all other types of critical events were significantly more likely to report higher IES scores (Table 2).

The most stressful type of review was an internal review, which resulted in a mean IES score of 24.00 ($SD = 19.95$), followed by coroner's inquests ($M = 17.50, SD = 16.08$). Only a very small subsample had been involved with litigation; however, their mean IES score was 35.50. The length of the review was significantly associated with IES scores ($r = .22, p \leq .01$) but not depression scores.

There was no difference in reported alcohol use, drug use, or medical leave from work either before or after encountering a critical event for either the review group or the nonreview group. However, although there was no significant difference in the use of mental health stress leave before a critical event between the groups, those who had been involved in reviews were significantly more likely to report the use of mental health stress leave after the event ($\chi^2 = 10.88, p \leq .001$; Phi = 0.24, $p \leq .001$).

Media coverage of the event and review was not related to IES scores, but media coverage of the event was significantly related to BDI scores ($t = -3.152,$

TABLE 1: Type of Critical Event and Involvement in Reviews

<i>Type of Event</i>	<i>% of Total Sample</i>	<i>% of Those Involved in Reviews</i>
Violence against self	35.6	62.1 ^a
Near death situation	40.5	58.6 ^a
Multiple casualties	62.5	89.7 ^a
Death of a person in care	46.2	84.5 ^a
Death of a child	50.0	84.5 ^a

a. χ^2 significant at $p \leq .005$.

$p \leq .002$) as was media coverage of the review ($t = -2.896, p \leq .005$). Thus, those who had more extensive media coverage of both the event and the review were more depressed.

Individual Factors

In the total sample, there were negative correlations between the BDI scores and the Internal Control Index scores ($r = -.34, p \leq .01$) and the Self-Efficacy Scale scores ($r = -.47, p \leq .01$). This suggests that as sense of control and feelings of self-efficacy decrease, symptoms of depression increase. However, there were no significant associations between self-efficacy and control and the IES scores.

Those firefighters and paramedics involved in reviews reported significantly lower self-efficacy scores when compared to those who had not been involved in reviews ($t = 1.131, p \leq .05$). There was no significant difference in sense of control between the two groups. For scores on both the BDI and the IES, the relationships between self-efficacy and control were constant between the groups of individuals who had been involved in reviews and those who had not. That is, control and self-efficacy were not associated with IES scores in either group and were associated with depression scores in both groups.

Social Support

Two aspects of perceived social support were significantly, although mildly, correlated with scores on the IES of the total sample: support from friends ($r = -.19, p \leq .05$) and support from employer ($r = -.16, p \leq .05$). Similarly, three aspects of perceived support were associated with BDI scores: friends ($r = -.20, p \leq .05$), family ($r = -.17, p \leq .05$), and employers ($r = -.24,$

TABLE 2: Trauma Scores and Involvement in Reviews

<i>Type of Event</i>	<i>Impact of Event Score</i>		<i>Beck Depression Inventory Score</i>	
	<i>Review</i>	<i>No Review</i>	<i>Review</i>	<i>No Review</i>
Violence against self	18.59	11.17	6.97	4.77
Near death situation	18.15	8.49 ^a	7.74	4.95 ^b
Multiple casualties	17.56	10.29 ^a	7.96	5.23 ^b
Death of a person in care	17.79	10.08 ^b	7.96	5.64
Death of a child	17.55	10.70 ^b	7.57	5.51
Any critical event	17.21	10.02 ^a	7.45	4.67 ^b

a. Significant *t* test at $p \leq .01$.

b. Significant *t* test at $p \leq .05$.

$p \leq .01$). The score on the Social Provision Scale was also significantly associated with both IES scores ($r = -.21, p \leq .01$) and BDI scores ($r = -.41, p \leq .01$). Thus, lower levels of trauma symptoms and depression were mildly to moderately associated with higher levels of social support.

There were no significant differences in perceptions of support between those who had been involved in reviews and those who had not except for perceptions of union support. Those who had been involved in a review were significantly more likely to view their union as supportive than those who had not been involved in a review ($t = -2.868, p \leq .005$).

Multiple regressions were used to predict overall severity of both depression scores on the BDI and posttraumatic stress symptoms on the IES. Variables in the initial analysis included measures of perceived social support, the individual variable measures of the Self-Efficacy Scale, the Internal Control Index, and review factors including type of review, length of review, and media coverage. The final equation for the IES, contained only one variable, the length of the review, and yielded a multiple *R* of .477, $F = 6.79, p \leq .01$, accounting for 19% of the total variance in posttraumatic stress symptom scores.

The final equation for the BDI contained only two variables, the Internal Control Index and support of the union. It yielded a multiple *R* of .533, $F = 7.92, p = .001$, accounting for 25% of the total variance in depression scores. Relying on the size of the standardized regression weights and zero order correlations as a rough indication of the relative importance of variables in predicting degree of symptoms, scores on the Internal Control Index served as the strongest predictors of depression scores.

DISCUSSION

As predicted in the hypotheses, involvement in a review was associated with significantly higher levels of traumatic stress symptoms and depression. As another indicator of distress, those involved in reviews were significantly more likely to report taking stress leave from work than those who were not involved in reviews, although they do not report differing use prior to encountering a traumatic event. Length of review was significantly associated with traumatic stress scores. In fact, length of review was the sole predictor of trauma symptoms in the regression analysis, independently accounting for 19% of the variance. Aside from litigation (for which there was an inadequate sample size), internal reviews were associated with the highest trauma scores, perhaps indicating that internal reviews undermine an individual's sense of support from the organization. Although media coverage of the event and the review was not associated with traumatic stress symptoms, it was associated with higher levels of depression. These findings serve as strong support of clinical impressions that have suggested that many emergency responders experience the review process as more taxing than the critical event itself.

Many previous studies have suggested that feelings of control and self-efficacy are associated with lower levels of trauma in emergency responders following a critical event (Bryant & Harvey, 1996; Gibbs, 1989; Kushner et al., 1992; McCammon et al., 1988). Although sense of control and self-efficacy were associated with lower depression scores in this study, they were not associated with traumatic stress scores. In the regression analysis, feelings of control were in fact the strongest predictor of depression scores. As we hypothesized, involvement in a review process was associated with lower self-efficacy scores, however, it was not associated with perceptions of control. Although the cross-sectional design of this study does not allow for causal conclusions, it may be that involvement in a review undermines a worker's sense of self-efficacy through the process of questioning decisions and professional competence.

Higher levels of social support were associated with lower levels of depression and traumatic stress scores for both those emergency responders involved in reviews and those who were not. Interestingly, the only measure of support that was significantly different between the review group and the nonreview group was support of the union. In addition, union support was one of the two predictors of depression scores in the regression analysis. It appears that when a worker is undergoing a review process, the union becomes an important source of support.

Limitations

A major limitation of this study is the sampling for the quantitative component. As indicated earlier, this is a convenience sample of paramedics and firefighters within two organizations and thus cannot be thought to represent actual rates of traumatic stress symptoms or depressive symptoms for all paramedics either within these organizations or within other organizations. Nevertheless, the symptom levels found in this study are not unlike those of other studies. For instance, 30% of ambulance personnel in Scotland reported symptoms in the high range of the IES (Alexander & Klein, 2001). Similarly, a study of firefighters reported rates of significant distress or severe distress on the IES of 26% (Bryant & Harvey, 1996). This compares to 20.2% of paramedics and firefighters in the high or severe range in our study. Furthermore, as organizational supports appears to be of importance, an additional limitation of the study is that the impact of different organizational responses cannot adequately be evaluated as only two organizations have been selected.

A second limitation of the data was the difficulty in quantifying symptoms of distress. The IES carries the limitation that it does not adequately address all aspects of PTSD to allow for a diagnosis. In addition, *DSM-IV* criteria are entirely subjective and are vulnerable to deception in both the areas of PTSD and depression. Therefore, discrepancies between self-reported distress and objective evidence of harm are highly possible (Bowman, 1999). Nevertheless, the IES and the BDI continue to be used extensively in trauma research, and therefore their use allows for comparisons with other studies.

Finally, the cross-sectional design of this study precludes a determination of causality. Thus, although self-efficacy is lower in the group that was subject to review, it is not clear whether the group had lower levels of self-efficacy prior to the review. The authors are currently collecting data from a number of new recruits to a fire service in Canada, which will be used in a longitudinal study of predictors of trauma responses in this group.

CONCLUSION

Traumatic incidents in the line of duty can exact high tolls from emergency service workers and the organizations in which they work. In addition, the postmortem inquiry that often follows these events can serve to intensify individual distress. Although postmortem inquiries are aimed at protecting the public and improving the quality of service, they may have the opposite result. Stemming from the belief that their efforts are not valued, workers can

become increasingly traumatized, demoralized, and possibly even distanced from the public. The final product may be higher costs for emergency, lower quality service, and an increased risk to public safety. Accountability and continuous improvement are important, necessary components of effective service delivery. The findings of this study, however, suggest that we must continue to search for better ways to provide public assurances of quality emergency services that do not unnecessarily contribute strain to an already stressful work environment.

These findings have implications for the management of emergency service organizations and for unions representing emergency workers. Armed with the awareness that involvement in both internal and external inquiries into tragic events is associated with higher posttraumatic stress and depression symptoms and increased use of mental health leave, organizations must address issues of support for workers. This study suggests that these problems increase as the length of time over which a review is conducted increases. In fact, length of review is the greatest predictor of posttraumatic stress scores in this study. On the other hand, lack of control is the greatest predictor of depression scores. It is gratifying to note that support of management and the union serves as a protective factor. It is suggested therefore that management and unions work to develop support programs for workers undergoing postmortem reviews, focusing on reducing their sense of isolation and supporting their sense of competence. In addition, providing education about the process may be useful to increase the sense of control that individuals feel when encountering this process. Emergency responders are a valuable resource, and ignoring the needs of those encountering public inquiry processes may not only result in losing the workers involved but may also serve to undermine the confidence of workers throughout the organization. Workers must believe that when things go wrong in a rescue, they will not be persecuted and abandoned.

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