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Posttraumatic Stress Disorder in Hospital Emergency Room Personnel

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Posttraumatic Stress Disorder in hospital emergency room personnel
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Final Report

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Main Research Findings

- 107 emergency room (ER) staff from 3 Vancouver hospitals completed a confidential questionnaire survey asking about posttraumatic stress symptoms (PTSS) and Posttraumatic Stress Disorder (PTSD)
- 21.7% displayed PTSS severity scores in the clinical range.
- 7.5% met full DSM-IV diagnostic criteria for PTSD or Acute Stress Disorder on the Posttraumatic Stress Diagnostic Scale, and an addition 3.5% met subsyndromal criteria.
- The most frequently cited distressing events involved threatened or actual assault of self or coworkers, followed by events involving severe injuries to children.
- High PTSS severity was associated with ER situations in which staff had to confront a sequence of emotionally distressing events without letup.
- 49% participated in post-event interventions aimed at reducing emotional distress.
- The most frequently used intervention was Critical Incident Stress Debriefing.
- 16% sought private counseling.
- Concern about career damage was cited as the main reason for not seeking treatment.
- Consistent with cognitive models of PTSD, cognitive symptoms of dissociation and post-event rumination predicted PTSS severity.
- The results indicate that PTSS and PTSD may contribute to ongoing anxiety-related problems and poor morale in ER staff.
- Staff recommended the development of an in-house preventive educational program for traumatic stress as well as certain procedural changes following traumatic events.

Executive summary

Context

The current research program was an extension of a pilot study that indicated emergency room (ER) hospital staff members were at increased risk for Posttraumatic Stress Disorder (PTSD) and post-traumatic stress symptoms (PTSS).

Objectives

The research objectives were to: 1) Determine the prevalence of PTSD in a larger sample of ER personnel at multiple sites, 2) Assess workplace factors proposed to contribute to the presence and severity of PTSD symptoms, 3) Assess work-related consequences of emotionally traumatic events and evaluate possible interventions to prevent or reduce PTSS, 4) Evaluate whether cognitive models of PTSD are applicable to traumatic stress symptoms in health care workers who routinely encounter work-related traumatic events, and 5) Examine whether functional cognitive processing during events offsets PTSD symptoms.

Method

A sample of ER health care workers (N = 107) drawn from VGH, St. Paul's Hospital (SPH), and Mount St. Joseph Hospital (MSJ) completed a questionnaire battery on a confidential, take-home basis.

Research Findings

Of this sample, 21.7% (23 of 107) reported clinically significant posttraumatic stress symptoms on the Posttraumatic Stress Disorder Diagnostic Scale, an empirically validated self-report measure of PTSD. Eight staff members (7.5%) currently met DSM-IV criteria for PTSD (n = 6) or Acute Stress Disorder (n=2). Four additional staff members met criteria for subsyndromal PTSD, i.e., fell one symptom short of the 6 symptoms required for a clinical diagnosis. Combining syndromal and subsyndromal individuals, 11 % of this group of ER workers reported

experiencing clinically significant traumatic stress reactions. The most common reason for failure to meet DSM-IV diagnostic criteria was insufficient symptoms of avoidance or numbing. In the case of ER-related trauma, this would involve avoidance of work-related situations or activities, and by definition, the sample was comprised of working staff members.

Nearly a third of the sample (n = 34; 32%), and 43% of participants with high PTSS severity scores, described their most distressing event as one that involved threatened or actual assault of self or co-workers. Traumatic incidents involving children were the next most frequent source of traumatic stress.

Four factors were found to underlie participants' descriptions of emotionally traumatic events, a) a breakdown in teamwork and communication, b) a sense of personal helplessness, c) increased concern about their own or the patient's family, and d) being forced to deal with a series of traumatic events without letup and with inadequate resources. Staff members with high PTSS severity were significantly more likely to describe the traumatic event as one that involved dealing with multiple traumatic events with inadequate resources.

Traumatic events produced three types of negative work consequences, an increase in negative attitudes toward the hospital, a reduction in work hours, and an increase in health complaints.

Nearly half of this sample participated in a treatment intervention following the distressing event. The most commonly used intervention was critical incident stress debriefing (CISD). Approximately 16% sought help from private counselors.

Three factors were cited as reasons for NOT seeking help. First, a large group of participants believed treatment was unnecessary, a belief which appears to have been accurate in that these particular individuals reported few symptoms of emotional distress. The other factors

that prevented ER staff from seeking help were concern about others' opinions of them and worry that seeking treatment would somehow harm their careers. Patients with higher PTSS severity reported greater concern about what other people would think and a sense of personal failure for requesting help.

The results provided support for contemporary cognitive models of PTSD in that PTSS severity was related to a variety of cognitive factors, including peritraumatic dissociative symptoms, negative interpretations of the meaning of spontaneous memories of the event, and rumination about the event. There was little support, however, for our hypothesis, derived from earlier analogue work, that processing information about distressing ER events in a meaning-based manner would be associated with fewer intrusive memories of those events.

Future Research

Further work is needed to replicate these findings in still larger samples and, in particular to cross-validate measures developed in this research to assess the features and consequences of traumatic events in the ER. More research extending contemporary cognitive models of PTSD to emergency settings is also warranted.

Implications

These findings suggest that PTSS leads to ongoing anxiety-related problems in ER workers and contributes to poor staff morale. They also underscore the need to increase staff awareness of the nature of PTS symptoms, the factors that increase their risk of traumatic stress, and the usefulness of treatment for PTSS and PTSD. In particular, it may be useful to develop preventive educational programs that include cognitive treatment strategies found to be effective in reducing traumatic stress symptoms. Finally, it is clear that threatened and actual physical assault by hospital patients and visitors takes a psychological toll on ER staff.

Research Report

Research Problem and Context

Work-related PTSD

Posttraumatic stress disorder (PTSD) is a clinical condition that can arise following exposure to emotionally traumatic events. The disorder consists of three sets of symptoms, re-experiencing of the event, avoidance of trauma-related cues and emotional numbing, and chronic physiological arousal (APA, 1994). The re-experiencing cluster, which includes nightmares and intrusive recollections of the event, is often considered the hallmark of PTSD and, as will be discussed later, plays a key role in contemporary theories and treatments for traumatic stress.

PTSD was first recognized among people who were the direct victims of trauma, such as war veterans and rape victims. Clinical researchers soon noted however, that PTSD can also develop in people who *witness* distressing events that happen to others, and the diagnostic criteria for PTSD were broadened to reflect this fact (APA, 1987). Although relatively few studies have addressed the issue, significant rates of PTSD are found in workers who *routinely* witness upsetting events as part of their jobs, for example, emergency service personnel. Point prevalence PTSD rates of 2-17% were found for disaster rescue workers and 15-22% for ambulance attendants, compared to rates of 0.4 to 4.6% in the general population (e.g., Anderson, Christiansen, & Petersen, 1991, Clohessy & Ehlers, 1999; Davidson, Hughes, Blazer & George, 1991; Kessler, et al., 1995; Marmar, et al., 1996; Resnick et al., 1993).

Hospital emergency room (ER) health care workers routinely witness life-threatening situations experienced by their patients, and increasingly have to deal with physical and verbal aggression directed toward them (e.g., Fernandes et al., 1999). Thus, ER workers have higher levels of exposure than people in the general population to events that are implicated in the

development of trauma-induced anxiety. Despite that exposure, only two studies have examined PTSD in ER personnel. Both studies found that ER workers were at increased risk for post-traumatic stress symptoms (PTSS; Helps, 1997; Laposa & Alden, 2003a). The second study was notable because it was the first to assess a formal PTSD diagnostic prevalence rate and was conducted at Vancouver Hospital. In that study, we found that 12% of a small sample of Vancouver Hospital ER workers met formal criteria for PTSD (Laposa & Alden, 2003a). Confirming previous reports that PTSD can result in severe work impairment, our preliminary findings also indicated that 27% of those ER professionals reported that their PTSD symptoms interfered with their work performance in the past month. Moreover, 20% of participants reported that the traumatic work event made them consider leaving the profession (Laposa, Alden, & Fullerton, 2003).

Those results echo Gallery, Whitley, Klonis, Anzinger and Revicki's (1992) finding that a disproportionate number of emergency physicians reported high levels of stress and depression, and planned to leave emergency medicine. The findings are also consistent with epidemiological data suggesting that PTSD results in a significant loss of workdays (Greenberg et al., 1999). Furthermore, economic burden data indicate that the average cost of traumatic stress in the workplace is $46,000 per person (Friedman, Framer & Shearer, 1988, cited in Paton, 1997). Despite the increased prevalence of PTSD, fewer than 20% of the ER workers who participated in the earlier study sought help for their symptoms, either from hospital-based programs or independent therapists. A post-study discussion session with ER nursing staff revealed that both nurses and administrators were interested in identifying interventions for the prevention and treatment of traumatic stress.

The study also suggested that characteristics of the workplace environment may increase vulnerability to PTSD. For example, stress related to interpersonal conflict was associated with severity of PTSD symptoms (Laposa, et al., 2003). The study also indicated that violence towards staff members was frequently selected as one of the worst traumatic events. That finding is reminiscent of research at St. Paul's Hospital that revealed that violence toward staff reduced job satisfaction, and increased number of days off and leaving the profession (Fernandes et al., 1999). Finally, anecdotal reports from hospital staff suggested that time to recover between critical events was important to emotional wellbeing, which is consistent with research indicating that 66% of ambulance attendants reported insufficient time to recover emotionally between incidents (Alexander & Klein, 2001).

Overall the results of the pilot work suggested that traumatic stress has both human and economic costs for emergency health care in British Columbia. The study, however, was limited by the relatively small number of participants, and replication with a larger sample of ER workers was needed to establish whether the results were robust or a function of biases in participant selection. In addition, relatively little information was collected about the workplace factors associated with PTS symptoms or the effectiveness of current hospital-based interventions for workers. Thus, more detailed assessment of the workplace environment and staff evaluations of various interventions is needed for hospitals to determine what steps, if any, should be taken to deal with PTSS and PTSD in ER staff.

Cognitive Theories of PTSD

PTSD is classified as an anxiety disorder, and typically with anxiety the person fears an *impending* threat. A key scientific question is how a past traumatic event produces a sense of current danger. Contemporary psychological theories implicate cognitive factors as the answer to

that question.

Cognitive theorists propose that extreme anxiety affects how information about traumatic events is processed and stored in memory. Whereas typical autobiographical memories are cohesive and coded in temporal context, trauma memories are hypothesized to remain in a disorganized, fragmented form that increases the likelihood that memories will be spontaneously triggered by cues reminiscent of the event (e.g., Brewin, Dalgleish, & Joseph, 1996; Ehlers & Clark, 2000). Such ongoing intrusive thoughts and images are believed to create a sense of current danger that maintains the symptoms. In addition, people's cognitive appraisals of the event and their own reactions to the event are postulated to either moderate or exacerbate initial symptoms of traumatic stress. For example, people who hold themselves responsible for the event or who interpret intrusive recollections as evidence that there is something wrong with them or they are "going crazy" experience heightened arousal. As well, cognitive strategies adopted to manage the anxiety-provoking recollections, such as trying to suppress any memory of the event or ruminating about the event, contribute to symptom maintenance (Ehlers & Clark, 2000). Together, cognitive intrusions and negative appraisals are hypothesized to operate to create a sense of current threat and ongoing anxiety.

Most published research has focused on the relationship between cognitive processing and PTSD symptoms. Dissociation is a form of dysfunctional cognitive processing that is defined as an alteration in one's experience of the world marked by symptoms such as derealization, depersonalization, and altered time sense. Multiple studies indicate that dissociation is related to the presence and severity of PTSD in primary victims of traumatic events (e.g., Birmes et al., 2001; O'Toole, Marshall, Schureck, & Dobson, 1999, Marmar et al., 1996). In addition, a growing number of studies have demonstrated that the victim's negative appraisals of such events

and of their emotional reactions to them increase the likelihood and severity of PTSD (Dunmore, Clark & Ehlers, 1997; 1999; Ehlers, Mayou & Bryant, 1998). In the Vancouver Hospital pilot study, ER workers who reported dissociative symptoms during critical events experienced more distressing intrusive recollections of those events, as did those who displayed negative appraisals of their intrusive thoughts (Laposa & Alden, 2003a). In sum, empirical evidence suggests that cognitive models of PTSD show promise in explaining the development of PTSD in health care workers.

The role of intrusive recollections in the development and maintenance of PTSD is an issue of emerging research and clinical interest. Intrusions are defined as recollections of the trauma that occur when the individual is not purposely trying to recall the event, and are described as vivid, distressing, fragmented, sensory laden, and triggered by internal or external sensory cues (e.g. Ehlers & Steil, 1995). Intrusions primarily take a visual form, but can be experienced across all sensory modalities (e.g. tactile, auditory, somatosensory) or take the form of thoughts (Ehlers et al., 2002). Some researchers argue that the most parsimonious explanation for PTSD is that the symptom clusters of avoidance, numbing, and hyperarousal are a consequence of re-experiencing processes such as intrusive recollections. Consistent with such arguments, most contemporary treatments for PTSD include strategies designed to eliminate intrusions.

Intrusive memories of work-related traumatic events are common among emergency service workers (Thompson & Suzuki, 1991). For example, Durham, McCammon and Allison (1985) reported that among rescue personnel, intrusive thoughts about the disaster were the most frequently endorsed PTSD symptom (See also Genest, Levine, Ramsden & Swanson, 1990). Laposa and Alden (2003a) found that 52% of emergency department personnel reported

experiencing distressing intrusions in the past month. Notably, McFarlane (1992) reported that among firefighters, intrusion scores alone accounted for the etiological link between disaster and PTSD.

Despite the hypothesized critical role of intrusions, relatively little is known about how people develop intrusive recollections following a traumatic event. Synthesizing past theories, Ehlers and Clark (2000) suggested that maladaptive cognitive processing during the trauma is the key factor in intrusion development. Research directly assessing their intrusion development model is relatively sparse, and only one study has examined cognitive processing in health care workers. Understanding the development of intrusive memories would not only advance our understanding of PTSD but may also contribute to the development of prevention and treatment regimens for ER personnel.

Another question suggested by the scientific literature is whether it is possible to enhance *functional* processing of emotional material. To address that possibility in a health care context, we conducted an interview study in which we asked nurses about the cognitive strategies they used during critical incidents (Laposa & Alden, In Press). Notable here is the fact that 100% of participants reported that during a medical crisis they tried to focus their attention solely on the medical procedures needed to help the patient. This strategy, which we labeled *instrumental processing,* involved drawing on classroom training and clinical experience to process the event as a medical puzzle, rather than an emotional tragedy, and appears to represent a type of medical conceptual processing. Nurses described the strategy as effective in delivering treatment and controlling their own emotions. They also reported that events that led to a breakdown in instrumental processing, for example, unexpected complications or being hit with multiple

critical incidents, resulted in a surge in emotions which was associated with increased incidence of traumatic stress symptoms.

We then conducted a laboratory analogue study to examine the effect of instrumental processing on intrusive memories for emotionally distressing medical events (Laposa & Alden, In Press). Nursing students watched an anxiety-provoking video of an actual ER event and were either instructed to adopt the instrumental cognitive set described above or given no viewing instructions. As predicted, the instrumental processing group reported significantly fewer distressing memories in the week subsequent to viewing. Together the two studies raise the possibility that strategies that enhance meaning-based processing of trauma-related information might be of use to medical personnel. Systematic research on health care professionals in medical settings is now needed to evaluate that speculation. Such a finding would have implications for preventive interventions.

Research Aims and Objectives

The overarching aim of the research was to work with Vancouver-area hospitals to compile information about traumatic stress in the ER that could be used in prevention and treatment programs. Specific research objectives were as follows.

1) Determine the prevalence of PTSD in a larger sample of ER personnel at multiple sites.

2) Assess workplace factors suggested by the literature and hospital personnel to contribute to the presence and severity of PTSD symptoms.

3) Assess work-related consequences of emotionally traumatic events, as well as staff members' assessments of possible interventions to prevent or reduce PTSS.

4) Systematically evaluate whether cognitive models of PTSD apply to traumatic stress symptoms in a population of health care workers who routinely encounter traumatic events.

5) Evaluate whether dysfunctional processing is associated with intrusive memories of traumatic events and whether meaning-based processing during critical events might offset the development of such involuntary recollections.

Methodology

Research Design

The research used a correlational design to examine factors associated with PTSD symptom severity. In addition, between-group analyses were conducted to compare ER staff with and without clinically significant symptoms of PTSD.

Participants

Participants were 107 emergency room health care staff with direct patient contact. Demographic characteristics are presented in Table 1. As that table reveals, the research sample was largely comprised of women nurses of European heritage. Participants had considerable experience in health care in general (M = 15 years) and in ER settings in particular (M = 8 years). For some analyses, participants were divided into two groups, High PTSS severity, those participants who obtained posttraumatic stress symptom severity scores above the clinical cut-off on the Posttraumatic Stress Diagnostic Scale, and Low PTSS severity, participants whose scores were below the cut-off.

Procedure

Participants completed a questionnaire battery on a confidential, take-home basis. Volunteers were solicited to participate in clinical interviews to provide in depth consideration of the research questions. To enhance confidentiality, interviews were conducted by two UBC graduate student research assistants, who were trained in the interview techniques.

Measures[1]

The *Posttraumatic Stress Diagnostic Scale* (PDS; Foa, 1995) is a self-report measure that provides a clinical diagnosis of PTSD as well as an index of posttraumatic stress symptom (PTSS) severity (PDS Foa, 1995; Foa, Cashman, Jaycox & Perry, 1997). The PDS has good test-retest reliability and good convergent validity with ratings of PTSD as assessed in clinical interviews. As in previous research, the criterion A list of traumatic events was replaced with a list of work-related events rated by ER nurses as potentially traumatic. The original PTSD criterion A list of traumatic events was included at the end of the questionnaire battery to assess trauma unrelated to the workplace.

The *Description of Distressing Event Questionnaire* (DDE; Alden, Laposa, Kuhl, McNutt, & Bullock, 2004) was developed for this research to assess the significant features of distressing emergency room situations. Participants were asked to rate the extent to which each item described the event they considered most distressing. Items were rated on a series of 7-point Likert-like scales anchored by the phrases "not at all" and "very much". The items were combined into 4 subscales, *Teamwork and Communication Breakdown, Helplessness, Personal Significance,* and *Multiple Traumas*. Scale construction and psychometric information is provided below.

*Consequences of Traumatic Event*s Scale (CTE; Alden & Laposa, 2004) was developed for this research to assess work-related consequences following emotionally distressing ER events. Participants rated the extent to which their most distressing event led to a variety of negative outcomes. Items were rated on a series of 7-point Likert-like scales anchored by the phrases "not at all" to "very true". The items were combined into 3 subscales, *Negative Attitudes, Work Reduction,* and *Health Problems.* Scale construction and psychometric information is provided below.

PTSS Intervention Appraisal. Participants were asked which of 4 types of intervention programs they would find helpful if they were experiencing traumatic stress, Critical Incident Stress Defusing (CISD), counseling through their Employee Assistance Program (EAP), referral to a private counselor, referral to a specialized traumatic stress treatment program for health care workers, or a preventive educational program about traumatic stress. They were then asked whether they had used one of the programs and to rate how helpful it was. If they had NOT attended one of those programs, they were asked to rate 12 items describing reasons for not seeking treatment. Items were rated on 7-point Likert-like scales. Finally, they completed an open-ended question asking them to describe what they saw as the best type of intervention for ER staff experiencing trauma, stress, or depression.

The Peritraumtic Dissociative Experiences Questionnaire (PDEQ; Marmar, Weiss & Metzler, 1997) consists of 10 items measuring depersonalization, altered time sense, and other dissociative responses during critical incidents. The PDEQ has been shown to be internally consistent, reliable, and to have good discriminant, divergent and predictive validity (Marmar et al., 1997). In the current sample, the PDEQ was found to adhere to the original one-factor structure and to have good internal consistency ($\alpha = .90$).

Response to Intrusions Questionnaire (RIQ; Clohessy & Ehlers, 1999) is a 19 item inventory that measures the frequency of intrusive memories, intrusion-related distress, and cognitive appraisals of- and responses to intrusions. Four RIQ scales were used in the current research, positive appraisals of intrusions (PA), negative appraisals of intrusions (NA), attempting to suppress intrusive memories (S) and responding to intrusions with rumination about the event (R). In the current sample, three of the four RIQ scales had adequate internal consistency in light of the small number of items in each scale, $\alpha = .76, .88, .70$, for the PA, NA,

and S scales, respectively. As in previous research, the internal consistency for the RIQ Rumination scale was low, α = .56.

The *Conceptual Processing Scale* (CPS; Halligan, Clark & Ehlers, 2002) is a 7-item scale that assesses organized and contextualized processing of a situation's meaning. The CPS has been shown to predict fewer subsequent intrusive recollections of distressing events in laboratory analogue studies (Halligan et al., 2002.) In the current sample, the CPS was found to adhere to the original one-factor structure and to display good internal consistency, α = .88.

The Instrumental Processing Scale (IPS; Laposa & Alden, 2005) is a 9-item scale developed in earlier laboratory research to assess the tendency to focus on medical aspects of events and engage in medical problem-solving. The IPS was found to predict development of intrusions following an analogue trauma task. Internal consistency in the current sample was good, α = .81. The scale's validity is supported by a significant correlation with the CPS, $r = .37$.

Research Findings

Research findings will be organized according to the objectives described above.

1. Prevalence of posttraumatic stress symptoms and PTSD

Judgments of severity of posttraumatic stress symptoms (PTSS) and prevalence of PTSD was based on the PDS (Foa, 1995). PTSS severity is measured by summing participants' severity ratings on the 16 items that assess DSM-IV PTSD symptoms. The sample as a whole displayed a mean PTSS score of 5.9 ($SD = 6.1$). To place that score in context, the ER sample obtained a significantly higher score than the sample of non-traumatized individuals ($M = 3.6$, $SD = 4.2$) reported by Foa et al (1999), $t\ (169) = 3.39$, $p = .000$, and did not differ from Clohessy and Ehlers (1999) sample of ambulance drivers, $M = 7.1$, $SD = 7.6$; $t\ (93) = 1.02$, $p = .31$. According to Foa (1995), the clinical cut-off for PTSS of moderate severity is 11 or greater. By that criterion,

21.7% of our sample (23 of 107) reported clinically significant symptoms. Of that group, 20 people obtained scores that placed them in the moderate category, whereas 3 fell into the moderate to severe category.

To meet DSM-IV PTSD criteria, a person must report having experienced a traumatic event that threatened their own or another's life or physical integrity and to which they responded with intense fear, helplessness, or horror (Criterion A), endorse one (or more) re-experiencing symptoms (Criterion B), three (or more) avoidance/numbing symptoms (Criterion C), two (or more) symptoms of persistent arousal (Criterion D) of significant duration (Criterion E), and experience significant distress or impairment in functioning (Criterion F). PTSD is diagnosed if symptom duration is greater than one month and Acute Stress Disorder (ASD) is diagnosed if symptoms are present in the month after the event. Using these criteria, 8 people (7.5%) currently met DSM-IV criteria for PTSD (n = 6) or ASD (n=2). Four additional staff members met criteria for sub-syndromal PTSD, i.e., fell one symptom short of the 6 symptoms required for a clinical diagnosis. Combining syndromal and sub-syndromal individuals, 11 % of this group of ER workers reported experiencing clinically significant traumatic stress reactions.

Approximately half of the sample reported some PTSD/ASD symptoms but fell short of DSM-IV diagnostic criteria. The most common reason was failure to meet Criterion C, avoidance or numbing. In the case of ER-related trauma, this would involve avoidance of work-related situations or activities, and by definition, the sample was comprised of working health care staff members.

2. ER situations associated with PTSS

Most Distressing Event. As part of the PDS, participants were asked to select the event that bothered them the most from a list of 16 medical situations or, if those events were not

applicable, to describe the most emotionally distressing work event they could recall. The events selected can be combined into five thematic categories, which are presented in Table 2. The most frequently selected event involved threatened or actual assault of self or co-workers. Nearly a third of the sample as a whole (n = 34; 32%), and 43% of the high PTSS severity group, chose one of these events as the most distressing. Traumatic incidents involving child patients were the next most frequently selected type of event. Fisher's exact tests were conducted to compare high and low PTSS participants, and revealed no significant between group differences on any of the five categories, all $p>.2$. Thus, the general nature of the distressing event did not distinguish staff who developed clinically significant PTSS and those who did not.

Description of Event. A pool of 60 items was generated to reflect characteristics of distressing ER events. Items came from suggestions by hospital-based clinicians and staff, nurses who participated in a pilot interview study (Laposa & Alden, In press), and the research literature. Item inter-correlations and frequency distributions were examined and overlapping or infrequently endorsed items were eliminated. The remaining items were subjected to a principal components analysis with promax rotation. Items with double loadings or low component loadings were eliminated, and the items were re-factored. An examination of the scree plot and component content suggested that a 4-component solution best fit the data. The first component, *Teamwork Breakdown*, consisted of 8 items reflecting a lack of teamwork and poor communication during the event, and explained 24% of the shared variance. The second factor to emerge, *Helplessness*, comprised 8 items reflecting a sense of futility and powerlessness, and explained 13% of the shared variance. The third component, *Personal Significance*, explained 9% of the shared variance and comprised 6 items suggesting that the event raised personal questions about the meaning of life and death. The final component, *Multiple Traumas,* explained 6% of

the shared variance and comprised 5 items reflecting having to cope with a series of traumatic situations with inadequate recovery time between events and a lack of resources. Internal consistency for the 4 subscales was adequate, ά = .91, .70, .81, and .70, for the 4 scales respectively. Items and component loadings can be seen in Table 3.

To examine the association between event features and traumatic stress, a stepwise multiple regression analysis was conducted in which the 4 DDE factors were entered as predictors with PTSS severity as the criterion. *Multiple Traumas* the only subscale to enter the equation, *Beta* = .24, $t = 2.41$, $p = .02$. To determine whether differences in characteristics of traumatic events distinguished ER staff with clinically significant PTS symptoms, a series of oneway (Group) ANOVAs were conducted to compare staff who were above and below the PDS clinical cut-off for symptom severity. Consistent with the regression equation, the results revealed that the high and low PTSS groups differed significantly on *Multiple Traumas*, $F(1,101) = 4.15$, $p = .04$, $Eta^2 = .04$. In short, PTSS severity was significantly associated with ER situations in which staff were confronted with an ongoing serious of emotionally distressing events without letup.

3a) Work Consequences of Distressing Events

A pool of 13 items reflecting possible negative work-related consequences resulting from emotionally distressing events were generated following the procedure described above. Items were subjected to a principal components analysis with promox rotation, and items with low or double loadings on the components were eliminated. When re-factored, 3 components emerged with eigenvalues greater than 1. The first component, *Negative Attitudes,* explained 50% of the shared variance and consisted of 4 items reflecting an increase in anger and negativity toward health care and the hospital. The second component, *Work Reduction*, comprised 14% of the

shared variance and consisted of 3 items reflecting reducing work hours. The third component, *Health Problems,* accounted for 11% of the shared variance, and comprised 3 items reflecting an increase in physical and emotional symptoms. The internal consistency of the three scales was very good in light of the small number of items, ά = .87, .78, and .87, respectively. It should be noted that the three sets of items correlated with each other, *r*s of .44 to .54, suggesting that these were overlapping, but not interchangeable, responses. Item content and factor loadings can be seen in Table 4.

All three consequences scales were significantly correlated with PTSS severity (*r*s = .32-.40). To examine the unique association between the three sets of consequences and PTSS severity, the 3 scales were entered as predictors in a stepwise multiple regression with PDS PTSS severity as the criterion. *Health problems* entered the equation first, followed by *Work Reduction* with both scales making a unique contribution to the prediction of PTSS, *Beta*s = .29 and .22, *t* s = 2.80 and 2.08, *p*s = .006 and .04 for *Health Problems* and *Work Reduction*, respectively. Thus, higher PTSS severity was associated with a tendency to reduce work hours and experience more negative physical and emotional symptoms.

To compare high and low symptom groups, a oneway (group) MANOVA was conducted. The results revealed a significant difference between high and low PTSS groups on work-related consequences, *F* (4, 97) = 5.95, *p* =001. Follow-up univariate analyses revealed significant between-group differences on all three scales, *F*s (1,103) = 4.16, 13.82, and 11.32, *p*s = .04, .000.and 001, for *Negative Attitudes, Work Reduction,* and *Health Problems,* respective.

3b) Interventions for Traumatic Stress

Evaluation. Table 5 displays the number of participants who had used each of four interventions following the distressing incident, as well as the number who believed that type of

intervention would be helpful. As can be seen, the largest number of participants participated in Critical Incident Stress Defusing. Although only 2 staff members had sought specialized trauma treatment, nearly half felt it would be helpful for them. Participants' ratings and narrative comments also reflected considerable interest in an in-house preventive educational program. It is notable that 75% of participants who sought help (n = 39) rated the intervention in which they participated to be somewhat or very helpful to them (*M*= 5.2, *SD*= 1.9). Of staff in the high PTSS severity group, 83% rated intervention as helpful (*M* =5.6, *SD* =1.5).

Reasons for NOT seeking help. A pool of 12 items describing reasons for not seeking help was generated from the research literature and staff suggestions. A principal components analysis with promax rotation revealed 3 factors with eigenvalues greater than 1. Items with unique loadings on each component were summed to create 3 scales, *Social Concerns, Career Damage*, and *Unnecessary*, which explained 44% 17%, and 11% of the shared variance, respectively. The scales all had good internal consistency, ά = .81, .78, and .78, respectively. It should be noted that factors 1 and 2 displayed a moderate correlation, *r* = .46, which suggested they measured associated, but not interchangeable, dimensions. Items and factor loadings can be seen in Table 6.

The first two scales were significantly correlated with PDS PTSS severity scores, *r* = .32 & .43 for *Social Concerns* and *Career Damage*, respectively. A oneway (PTSS Group) MANOVA revealed a significant between-group difference with univariate analyses indicating that the multivariate effect was due to *Social Concerns* and *Career Damage*, Univariate, *F*s (1,70) = 5.02 and 4.73, respectively, both *p* = .02. To examine the unique association between the three sets of reasons, the 3 scales were entered as predictors in a stepwise multiple regression analysis with PTSS severity as the criterion. *Career Damage* entered the equation as a significant

predictor, *Beta* = .43, *t* = 3.90, *p* =.000. The other scales did not contribute unique variance to the predictive relationship.

Because the high PTSS severity group was of particular interest, the regression analysis was repeated for those participants alone. In light of the small n in this group, the criterion for predictor entry was relaxed to *p* =.10. The only scale to enter the equation was *Social Concerns*, *Beta* = 1.09, *t* = 2.03, *p* = .07, which indicated that within this group, greater symptom severity was associated with greater concern about what other people would think of them and a sense of personal failure for requesting help. Readers are cautioned that a small sample (n = 23) is more likely to produce unreliable results, and therefore these findings can only be viewed as speculative.

4. Cognitive models of PTSD

Pearson Correlation Coefficients between the PDS PTSS severity score and the cognitive measures can be seen in Table 7. Those results provided some support for cognitive models of PTSD in that PTSS severity was related to the PDEQ, RIQ negative appraisal, and RIQ rumination scales. A oneway (group) MANOVA also revealed a significant difference between the high and low PTSS groups on the PDEQ and RIQ, F (5,90) = 5.32, p = .000. Univariate analyses revealed that the significant multivariate effect was due to the PDEQ, RIQ negative appraisal, and RIQ rumination scales, F (1,96) = 6.38, 7.76, and 21.7, for the 3 scales respectively, all $p < .01$.

According to cognitive models, dissociation during the event, cognitive appraisals of initial symptoms and use of dysfunctional coping strategies, such as rumination about or suppression of memories of the event, all contribute to the maintenance of PTSS. To evaluate this position, a hierarchical regression analysis was conducted to predict PTSS severity. The PDEQ

was entered in the first step, the RIQ positive and negative appraisal scales in the second step, and the RIQ rumination and suppression scales in the third step. The results revealed that each step contributed significantly to the prediction of PTSS severity, R^2 Change = .08, .06, and .11, F = 8.60, 3.06, and 6.86, all *p*s < .05, for the three sets of variables respectively. The results for the individual scales can be seen in Table 8. Interestingly, dysfunctional cognitive processing of the event, as reflected in dissociative symptoms, and an absence of positive appraisals of spontaneous memories of the event contributed independent variance to the prediction of PTSS symptom severity in the second model. The PDEQ no longer contributed unique variance once RIQ rumination entered the equation. Although the cross sectional nature of the design does not allow the establishment of causality between the two variables, according to cognitive models peritraumatic dissociation precedes subsequent rumination about intrusive memories. The reduction in β for the PDEQ when RIQ rumination was added suggested that the effects of dissociation may have been mediated by the tendency to ruminate about the distressing event.

5. Intrusion Development

According to cognitive theorists, dysfunctional peritraumatic processing is related to intrusive thoughts and images of distressing events. We had also speculated that functional cognitive processing might offset the development of such intrusions. To evaluate those ideas, all three measures of peritraumatic processing (PDEQ, CPS, IPS) were entered in a stepwise fashion in a multiple regression equation to predict the sum of the 5 PDS items assessing severity of re-experiencing symptoms. Only the PDEQ significantly predicted severity of re-experiencing symptoms, $\beta = .27$, $t = 2.68$, $p = 009$. Thus, while there was a clear link between dysfunctional processing, reflected in dissociative symptoms, and re-experiencing phenomena, there was no

support for the notion that conceptual processing would offsets the development of intrusions and other re-experiencing phenomena, at least as assessed by these particular measures.

Research Conclusions

See Executive Summary at the beginning of this report.

Implications for Future Research on Occupational Health

- The current findings about factors that increase vulnerability to PTSS require replication. In particular, the experimental instruments developed for this research require cross-validation in larger samples and additional settings to ensure the findings are robust.
- It would be valuable to conduct detailed interviews with staff members who are planning to leave or have left Emergency Department settings to determine whether, as suggested by this data, PTSS and PTSD contributed to their exit. This information would have important implications for the delivery of emergency health care in Canada.
- Future research should also evaluate preventive educational programs based on treatment strategies that address the cognitive processes implicated in the maintenance of PTSS.
- It would be useful to consider procedural changes that might help staff cope with critical situations, such as multiple traumas and assault, and to systematically evaluate the effectiveness of those changes in preventing PTSS.
- Further research on strategies that prevent dissociation are warranted, as is more work to examine functional cognitive processing of emotionally traumatic situations in health care settings.

Policy and Prevention

a) Implications for policy and prevention

First, steps should be taken to increase hospital awareness of the potential role of traumatic stress in producing negative attitudes toward the workplace, reduction in willingness to take overtime and regular work hours, and thoughts about leaving emergency work.

Second, the findings highlight the need to increase ER staff awareness of the nature and prevalence of PTS symptoms in health care workers, as well as the factors that increase the risk of traumatic stress reactions such as dealing with multiple traumatic events with insufficient recovery time and events that produce subjective sensations of dissociation. The beneficial effects of attending existing treatments for traumatic stress should be publicized and reasons for avoiding treatment (e.g., feared career damage) should be debunked. Information about traumatic stress should be featured in preventive educational programs offered on site and in professional training programs for health care professionals. The research literature supports the effectiveness of interventions that address the cognitive processes associated with PTSD, and the current data suggest that cognitive modals are applicable to health care settings. In light of those facts, cognitive strategies for overcoming traumatic stress should be incorporated into experimental intervention programs and systematically evaluated.

Third, there is a need to consider ways to help ER staff cope with threatened and actual physical assault in the workplace. Almost one-third of this group of participants reported at least one emotionally traumatic assault-related experience. At the very least, these results underscore the need to reach out to staff immediately following those situations. The narrative comments included a number of suggestions as to how this could be meaningfully accomplished, including

immediate debriefing, overt communication of concern and support by supervisors and administrators, and some flexibility in scheduling following such events.

b) Relevant user groups for research results

The research results are likely to be of interest to the health care workers themselves, hospital personnel responsible for staff health programs, and university and college faculty and staff in health care training programs. The results are also relevant to health researchers in psychology, psychiatry, and nursing, and to researchers working in the area of PTSD.

c) Policy-related interactions.

Any policy-related interactions in the hospitals that participated in this research will be coordinated by my hospital-based collaborators, Dr. David Kuhl, Linda McNutt, and Linda Bullock, at Providence Health, and Dr. Soma Ganesan and Dr. William Koch, at Vancouver Hospital.

Dissemination and Knowledge Transfer

The first step in dissemination of these results is to discuss them in detail with my research collaborators at Providence Health Care and Vancouver Hospital. Together we will determine the best way to make them available to the ER staff participants and other health care staff and administrators. A second step will be to renew initial contacts with the UBC Department of Nursing to determine whether these results could be usefully incorporated into their training program. The British Columbia Nurses' Union, which provided a letter of support for the research, has also requested a summary of the findings to distribute to interested nurses across the province. To disseminate the findings to the broader research community, articles will be prepared from these data for submission to peer-review journals in psychology, nursing, and health care. My collaborators and I also plan to present the results at professional conferences.

Table 1

Demographic Characteristics of Sample

Age	40.6 (10.3)
Gender	21% Male 76% Female
Cultural background	70% European-Canadian 15% Asian-Canadian 5% Indo-Canadian 10% Other
Marital status	33% single 56% married, common-law, steady relationship 11% separated, divorced
Occupation	83% Nurse 11% unit clerk 4% Physician 2% Other
Hospital Affiliation	40% VGH 45% SPH 15% MSJ
Years at current ED	7.5 (6.4)
Years in other ED (N = 49)	4.9 (4.5)
Years in health services	14.8 (8.5)

Table 2

Events Selected as Most Distressing

Event	Entire Sample	High PTSS
Threatened or actual assault of self or coworkers	34 (32%)	10 (43%)
Severe injury or death of child	25 (24%)	4 (17%)
Emotional Identification, i.e., events involving or reminding participants of family or friends	18 (17%)	2 (9%)
Traumatic medical events, e.g., excessive bleeding or prolonged resuscitation followed by death	17 (16%)	2 (9%)
Multiple simultaneous distressing events	10 (9%)	3 (13%)
Other	3 (3%)	2 (9%)

PTSS = Posttraumatic stress symptom severity on the Posttraumatic Stress Diagnostic Scale (PDS)

Table 3

Description of Event Scale Items and Factor Loadings

Item	Scale	Teamwork Breakdown	Helplessness	Personal Significance	Multiple Traumas
1. There was a lack of communication		.84			
2. Patient was not treated in a dignified fashion		.81			
3. Interventions that should have done earlier were not done, so the situation got bad.		.80			
4. My co-workers didn't know what they were doing.		.80			
5. Things kept going wrong.		.80			
6. People were second guessing orders and actions.		.78			
7. People weren't working as a team.		.72			
8. There was chaos.		.62			
9. I felt helpless.			.87		
10. I felt overwhelmed.			.77		
11. I felt powerless over the situation.			.71		
12. I felt my efforts were futile.			.65		
13. I didn't have the experience to deal with the situation			.53		

Table 3….continued

	Teamwork Breakdown	Helplessness	Personal Significance	Multiple traumas
14.I didn't have enough recovery time between critical incidents		.47		
15. I felt guilty that I didn't catch the situation earlier.		.47		
16. We hadn't anticipated what would happen.		.47		
17. The family was present.			.79	
18. I felt badly for the patient's family.			.76	
19. It raised questions about the meaning of life.			.73	
20. The patient was obviously going to die.			.70	
21. The event had personal meaning for me.			.66	
22. The patient reminded me of someone I knew.			.61	
23. There was too much to do and not enough hands.				.68
24. There were multiple traumas occurring at the same time.				.67
25. I was understaffed.				.65
25. I was tired.				.63
26. I didn't have the resources (equipment, medication) to work with the situation.				.53

Table 4

Consequences of Distressing Event Scale Items and Factor Loadings

Scale Item	Negative Attitudes	Health Problems	Work Reduction
1. My attitude toward work and health care became more negative.	.91		
2. My attitude toward the hospital became more negative.	.88		
3. My interactions with my coworkers became more negative	.78		
4. I felt more angry with the system.	.79		
5. I get sick more often.		.93	
6. I have more headaches or other pains.		.90	
7. I became more depressed.		.84	
8. I reduced the amount of overtime I was willing to take.			.91
9. I reduced my work hours because of stress.			.82
10. I took time off from work.			.76

Table 5

ER Staff Evaluations of Interventions for Traumatic Stress

	Have Used*		Would Be Helpful*	
	Entire Sample	High PTSS	Entire Sample	High PTSS
Type of Intervention	n (%)	n (%)	n (%)	n (%)
Critical Incident Stress Defusing	35 (33%)	8 (35%)	66 (62%)	12 (52%)
Employee Assistance Program	18 (18%)	6 (26%)	40 (37%)	9 (39%)
Private counselor	15 (14%)	6 (26%)	41 (38%)	11 (48%)
Specialized PTS treatment for health care staff	2 (2%)	1 (4%)	49 (46%)	11 (48%)
Preventive educational program about PTSS and PTSD**			75 (70%)	19 (86%)

* Participants could check multiple options. ** Preventive programs not available

Table 6

Reasons for Not Seeking Treatment

Item	Scale	Social Concerns	Career Damage	Unnecessary
1. People might think less of me.		.89		
2. I didn't want to be seen asking for help.		.80		
3. I would feel a sense of personal failure that I didn't handle it on my own.		.78		
4. I thought it would make my feelings worse.		.69		
5. Concerns about confidentiality.			.84	
6. Financial cost.			.81	
7. Going to counseling might damage my career prospects.			.77	
8. I didn't think I needed it.				.91
9. I thought my feelings about the event would go away on their own.				.80
10. I didn't think it would help.				.74

Table 7

Pearson Correlation Coefficients between Posttraumatic Stress symptoms and Measures of Cognitive Processes

Scale	PDS PTSS	PDEQ	RIQ Positive Appraisal	RIQ Negative Appraisal	RIQ Rumination	RIQ Suppression	Conceptual Processing	Instrumental Processing
1. PDS PTSS	-							
2. PDEQ	.29**	-						
3. RIQ Positive Appraisal	-.14	.19	-					
4. RIQ Negative Appraisal	.25**	.47***	.09	-				
5. RIQ Rumination	.43**	.47***	.16	.51***	-			
6. RIQ Suppression	.05	.18	.18	.19	.32***	-		
7. Conceptual Processing Scale	-.17	-.14	.31**	-.10	-.03	.12	-	
8. Instrumental Processing Scale	-.11	-.03	.29**	.07	.21*	.26*	.37***	-

PDS = Posttraumatic Stress Disorder Diagnostic Scale, PDEQ = Peritraumatic Dissociative Experiences Questionnaire, RIQ = Response to Intrusions Questionnaire

* p <.05 **p< .01 *** p<.001

Table 8

Hierarchical Multiple Regression Analysis: Cognitive Measures as Predictors of Posttraumatic Stress Symptoms

Model	Unstandardized Coefficients			
	β	*SE*	*t*	sig
1 (Constant)				
DEQ	.23	.08	2.93	.004
2 (Constant)				
PDEQ	.20	.09	2.29	.03
RIQ Negative Appraisal	.15	.10	1.42	.16
RIQ Positive Appraisal	- .23	.12	- 2.03	.05
3 (Constant)				
PDEQ	.11	.09	1.27	.20
RIQ Negative Appraisal	.01	.10	.05	.96
RIQ Positive Appraisal	-.26	.11	-2.36	.02
RIQ Rumination	.64	.17	3.70	.00
RIQ Suppression	-.08	.11	- .72	.47

DV = PDS PTSS severity; DEQ = Peritraumatic Dissociative Experiences Questionnaire, RIQ = Response to Intrusions Questionnaire

References

Anderson, H.S, Christensen, A.K., & Petersen, G.O. (1991). Post-traumatic stress reactions amongst rescue workers after a major rail accident. *Anxiety Research, 4,* 245-251.

Alexander, D.A., & Klein S. (2001). Ambulance personnel and critical incidents: impact of accident and emergency work on mental health and emotional well-being. *British Journal of Psychiatry, 178*(1), 76-81.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC: Author.

Amir, N., Stafford, J., Freshman, M.S., & Foa, E.B. (1998). Relationship between trauma narratives and trauma pathology. Journal of Traumatic Stress, 11, 385-392.

Anderson, H.S, Christensen, A.K., & Petersen, G.O. (1991). Post-traumatic stress reactions amongst rescue workers after a major rail accident. *Anxiety Research, 4,* 245-251.

Beck, A. T., Steer, A., & Brown, K. (1996). *Beck Depression Inventory-II.* San Antonio, TX: Harcourt Brace.

Birmes, P., Carreras, D., Ducasse, J-L., Charlet, J.P., Warner, B. A., Lauque, D., et al. (2001). Peritraumatic dissociation, acute stress, and early posttraumatic stress disorder in victims of general crime. *Canadian Journal of Psychiatry, 46,* 649-651.

Blake, D., Weathers, F., Nagy, L., Kaloupek, D., Klauminzer, G., Charney, D. et al. (1997). *Clinical Administered PTSD Scale (CAPS).* Boston, VA:National Center for Posttrauamtic Stress Disorder, Behavioral Science Division.

Brewin, C.R., Dalgleish, T., & Joseph, S. (1996). A dual representation theory of posttraumatic

stress disorder. *Psychological Review, 103*, 670-686.

Brewin, C.R., & Saunders, J. (2001). The effect of dissociation at encoding on intrusive memories for a stressful film. *British Journal of Medical Psychology, 74*, 467-472.

Clohessy, S., & Ehlers, A. (1999). PTSD symptoms, response to intrusive memories and coping in ambulance service workers. *British Journal of Clinical Psychology, 38,* 251-265.

Davidson, J.R., Hughes, D., Blazer, D.G., & George, L.K. (1991). Posttraumatic stress disorder in the community: an epidemiological study. *Psychological Medicine, 21*(3), 713-721.

Dunmore, E., Clark, D., & Ehlers, A. (1997). Cognitive factors in persistent versus recovered PTSD after physical or sexual assault: a pilot study. *Behavioural and Cognitive Psychotherapy, 25,* 147-159.

Dunmore, E., Clark, D.M., & Ehlers, A. (1999). Cognitive factors involved in the onset and maintenance of posttraumatic stress disorder (PTSD) after physical or sexual assault. *Behaviour Research and Therapy, 37,* 809-829.

Durham T.W., McCammon S.L., & Allison E.J. Jr. (1985). The psychological impact of disaster on rescue personnel. *Annals of Emergency Medicine, 14*(7), 664-668.

Ehlers, A. & Clark, D.M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy, 38*, 319-345.

Ehlers, A., Hackman, A., Steil, R., Clohessy, S., Wenninger, K., & Winter, H. (2002). The nature of intrusive memories after trauma: The warning signal hypothesis. *Behaviour Research and Therapy,40*(9), 995-1002.

Ehlers, A., Mayou, R. A., & Bryant, B. (1998). Psychological predictors of chronic posttraumatic stress disorder after motor vehicle accidents. *Journal of Abnormal Psychology, 107*(3), 508-519.

Ehlers, A., & Steil, R. (1995). Maintenance of intrusive memories in PTSD: a cognitive approach. *Behavioral and Cognitive Psychotherapy, 23,* 217-249.

Fernandes, C.M.B., Bouthillette, F., Raboud, J.M., Bullock, L., Moore, C.F., Christenson, J.M., Grafstein, E., Rae, S., Ouellet, L., Gillrie, C., & Way, M. (1999). Violence in the emergency department: a survey of health care workers. *Canadian Medical Association Journal, 161*(10), 1245-1248.

Foa, E.B. (1995). *The Posttraumatic Diagnostic Scale (PDS) manual.* Minneapolis, MN: National Computer Systems.

Foa, E.B., Cashman, L., Jaycox, L.H., & Perry, K. (1997). The validation of a self-report measure of PTSD: The PTSD Diagnostic Scale (PDS). *Psychological Assessment, 9,* 445-451.

Foa, E.B., Molnar, C., & Cashman, L. (1995). Changes in rape narratives during exposure therapy for posttraumatic stress disorder. *Journal of Traumatic Stress, 8*, 675-690.

Friedman, R.J., Framer, M.B., & Shearer, D.R. (1988). Early responses to posttraumatic stress. *EAP digest, 8*, 45-49.

Gallery, M.E, Whitely, T.W., Lonis, L.K., Anzinger, R.K., & Revicki, D.A.. (1992). A study of occupational stress and depression among emergency medicine physicians. *Annals of Emergency Medicine, 21,* 58-64.

Genest, M., Levine, J., Ramsden, V., & Swanson, R. (1990). The impact of providing help: emergency worker and cardiopulmonary resuscitation attempts. *Journal of Traumatic Stress, 3*(2), 305-313.

Greenberg, P.E., Sisitsky, T., Kessler, R.C., Finkelstein, S.N., Berndt, E.R., Davidson, J.R., Ballenger, J.C., & Fyer, A.J. (1999). The economic burden of anxiety disorders in the 1990s. *Journal of Clinical Psychiatry*, 60, 427-435.

Halligan, S. L., Clark, D. M., & Ehlers, A. (2002). Cognitive processing, memory, and the development of PTSD symptoms: Two experimental analogue studies. Manuscript submitted for publication.

Helps, S.L. (1997). Experiences of accident and emergency nurses. *Accident and Emergency Nursing, 5,* 48-53.

Kessler, R.C., Sonnega, A.S., Bromet, E.B., Hughes, M., & Nelson, C.B. (1995). PTSD in the national commorbidity survey. *Archives of General Psychiatry, 52*(12), 1048-1060.

Laposa, J.M., & Alden, L.E. (2003) Posttraumatic stress disorder in the emergency room: exploration of a cognitive model. *Behaviour Research and Therapy*, *41*(1), 39-55.

Laposa, J.M., Alden, L.E., & Fullerton, L.M. (2003). Work stress and posttraumatic stress disorder in ED nurses/personnel. *Journal of Emergency Nursing, 29*(1), 23-28.

Laposa, J.M., & Alden, L.E. (In Press). An analogue study of intrusions. *Behaviour Research and Therapy.*

Marmar, C.R., Weiss, D.S., & Metzler, T.J. (1997). The peritraumatic dissociative experiences questionnaire. In J. Wilson & T. Keane (Eds.), *Assessing Psychological Trauma and PTSD* (pp. 412-428). New York: The Guilford Press.

Marmar, C.R., Weiss, D.S., Metzler, T.J., Ronfeldt, H.M., & Foreman, C. (1996). Stress responses of emergency services personnel to the Loma Prieta Earthquake Interstate 880 freeway collapse and control traumatic incidents. *Journal of Traumatic Stress, 9*(1), 63-85.

Maslach, C., Jackson, S. E., & Leiter, M. P. (1996). *The Maslach Burnout Inventory.* Third edition. Palo Alto, CA: Consulting Psychologists Press.

McFarlane, A.C. (1992). Avoidance and intrusion in posttraumatic stress disorder. *Journal of Nervous and Mental Disease, 180 (7),* 439-445.

Murray, J., Ehlers, A., & Mayou, R. A. (2002). Dissociation and posttraumatic stress disorder: Two prospective studies of road traffic accident survivors. *British Journal of Psychiatry, 180*(4), 363-368.

O'Toole, B.I., Marshall, R. P., Schureck, R. J., & Dobson, M. (1999). Combat, dissociation, and posttraumatic stress disorder in Australian Vietnam veterans. *Journal of Traumatic Stress, 12 (4),* 625-640.

Resnick, H.S., Kilpatrick, D.G., Dansky, B.S., Saunders, B.E., & Best, C.L. (1993). Prevalence of civilian trauma and PTSD in a representative national sample of women. *Journal of Consulting and Clinical Psychology, 61*(6), 984-991.

Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, AC: Consulting Psychologist Press.

Stamm, B. H. & Figley, C. R. (1996). Compassion Satisfaction and Fatigue Test. //www.isu.edu/~bhstamm/tests.htm.

Thompson, J., & Suzuki, I. (1991). Stress in ambulance workers. *Disaster Management, 3*(4), 193-197.

van Minnen, A., Wessel, I., Dijkstra, T., Roelofs, K. (2002). Changes in PTSD patients' narratives during prolonged exposure therapy: a replication and extension. *Journal of Traumatic Stress, 15*(3), 255-258.

Weiss, D.S., Marmar, C.R., Metzler, T.J., & Ronfeldt, H.M. (1995). Predicting symptomatic distress in emergency services personnel. *Journal of Consulting and Clinical Psychology, 63*(3), 361-368.

Footnotes

[1] A number of other measures were included in the questionnaire battery, most notably the Beck Depression Inventory (BDI-II; Beck, Steer, & Brown, 1996) State-Trait Anxiety Inventory ((STAI-S; Spielberger, et al.,1983), Compassion Fatigue Scale (Stamm & Figley, 1996), and Maslach Burnout Inventory (Maslach, Jackson, & Leiter, 1996). These measures were included to address the question of overlap between various emotional conditions and concepts related to the sequalae of emotionally distressing events. Because of limited space and because these measures do not directly address the central research objectives, the current report focuses on results relevant to the work environment and the specific research objectives.

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