



## Work-related critical incidents in hospital-based health care providers and the risk of post-traumatic stress symptoms, anxiety, and depression: A meta-analysis

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### ABSTRACT

This meta-analysis reviewed existing data on the impact of work-related critical incidents in hospital-based health care professionals. Work-related critical incidents may induce post-traumatic stress symptoms or even post-traumatic stress disorder (PTSD), anxiety, and depression and may negatively affect health care practitioners' behaviors toward patients. Nurses and doctors often cope by working part time or switching jobs. Hospital administrators and health care practitioners themselves may underestimate the effects of work-related critical incidents. Relevant online databases were searched for original research published from inception to 2009 and manual searches of the Journal of Traumatic Stress, reference lists, and the European Traumatic Stress Research Database were conducted. Two researchers independently decided on inclusion and study quality. Effect sizes were estimated using standardized mean differences with 95% confidence intervals. Consistency was evaluated, using the  $I^2$ -statistic. Meta-analysis was performed using the random effects model. Eleven studies, which included 3866 participants, evaluated the relationship between work-related critical incidents and post-traumatic stress symptoms. Six of these studies, which included 1695 participants, also reported on the relationship between work-related critical incidents and symptoms of anxiety and depression. Heterogeneity among studies was high and could not be accounted for by study quality, character of the incident, or timing of data collection. Pooled effect sizes for the impact of work-related critical incidents on post-traumatic stress symptoms, anxiety, and depression were small to medium. Remarkably, the effect was more pronounced in the longer than in the shorter term. In conclusion, this meta-analysis supports the hypothesis that work-related critical incidents are positively related to post-traumatic stress symptoms, anxiety, and depression in hospital-based health care professionals. Health care workers and their supervisors should be aware of the harmful effects of critical incidents and take preventive measures.

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### Introduction

Post-traumatic stress symptoms and even full criteria for the diagnosis of post-traumatic stress disorder PTSD (APA, 1994) have been recognized in rescue and ambulance workers (Alexander & Klein, 2001; Jonsson, Segesten, & Mattsson, 2003; Marmar, Weiss, Metzler, Ronfeldt, & Foreman, 1996). Hospital-based physicians and nurses (hereafter called health professionals) in critical care

also regularly deal with dying patients, severe injury and threat. After a critical incident, the immediate stress reactions enable health professionals to adequately deal with these situations, but a prolonged stress response could eventually cause health problems (Selye, 1976).

For the present study, a critical incident is defined as: 'a sudden unexpected event that has an emotional impact sufficient to overwhelm the usually effective coping skills of an individual and cause significant psychological stress' (see Caine & Ter-Bagdasarian, 2003, p. 59); this is not necessarily an extreme event (Kleber & Van der Velden, 2003). The subjective nature of critical incidents has been demonstrated before in intensive care nurses; among their most critical incidents were not primarily the extreme events but incidents like the dying of a patient they identified with, or miscommunication

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with serious consequences for patients (De Boer, Van Rikxoort, Bakker, & Smit, submitted for publication).

Normal recovery from critical incidents may take weeks or even months, and in frequent exposure, post-traumatic stress symptoms (intrusions, avoidance, hyper arousal) may accumulate and add to the development of PTSD and its most common co-morbid disorders, anxiety and depression (Michael & Jenkins, 2001; van der Ploeg & Kleber, 2003). Strictly speaking, in the first month after a critical incident, post-traumatic stress symptoms do not allow a PTSD diagnosis. From two days to four weeks after a critical incident, severe post-traumatic stress symptoms refer to acute stress disorder (ASD), that requires at least 3 dissociative symptoms, together with marked avoidance and arousal, whereas the PTSD diagnosis is more strict with regard to the number of avoidance/numbing symptoms (at least 3) and arousal symptoms (at least 2), but requires no dissociative symptoms (APA, 1994, 2011; Bryant, Friedman, Spiegel, Ursano, & Strain, 2010).

Social support and active problem focused coping generally help individuals to handle the traumatic stressor, control the situation, and avoid long-term emotional dysregulation (Alexander & Wells, 1991; Brewin & Holmes, 2003; Olf, Langeland, & Gersons, 2005; Taylor & Frazer, 1982). However, the threatening aspect of the stimulus is maintained in defensive coping, which is often reported after critical incidents, such as withdrawal, or denial (Acker, 1993; Birmes, Hazane, Calahan, Sztulman, & Schmitt, 1999). Though in the short-term defensive coping can be protective against overwhelming emotions, it ultimately has been proven to be ineffective and may prevent normal recovery (Ehlers & Clark, 2000; Gersons & Olf, 2005). In turn, enduring post-traumatic stress responses cause many health professionals to reduce their work hours or even to switch jobs (Laposa & Alden, 2003; Laposa, Alden, & Fullerton, 2003). Additionally, poor and non-empathic behavior toward patients may also originate in traumatic experiences (Jonsson et al., 2003).

Prevalence of post-traumatic stress symptoms among hospital-based health professionals who deal with critical incidents as part of their jobs, has been established in several studies. Among emergency room personnel (predominantly nurses) for example, 12% met full criteria of PTSD, and more than 30% reported post-traumatic stress symptoms, while in 37% the critical incidents caused clinically significant distress or impairment in social, occupational, or other important areas of functioning (Laposa et al., 2003). In a study among emergency room, intensive care, and general floor nurses, however, none of them was in the clinically significant range for PTSD (Kerasiotis & Motta, 2004). In a third study among emergency medicine residents in four different stages of their training, 11.7% met PTSD criteria and 30% had one or more symptoms in all three symptom clusters; in all clusters, the number of symptoms significantly increased with years of experience (Mills & Mills, 2004).

The use of different questionnaires and different control groups may explain part of the varying effects demonstrated. In addition, several situational and personal factors may have contributed to the mental health effects found in previous studies. In an extensive review, three factors consistently contributed to development of PTSD: a psychiatric history, childhood abuse, and a family psychiatric history. Factors like gender, age, and race are related to PTSD in some populations but not in others, while socio-economic status, education, intelligence, previous trauma, childhood adversity, trauma severity, social support, and life stress predict PTSD more consistently across different populations, but to a varying extent. Overall, factors operating during or after the incident, like trauma severity, lack of social support and additional life stress have somewhat stronger effects than pre-trauma factors (Brewin, Andrews, & Valentine, 2000). None of the studies in the latter

review, however, comprised mental health effects of potentially traumatizing incidents that are part of health professionals' jobs.

Although many health professionals feel impaired in one or more important areas of functioning, relatively few seek help (Laposa et al., 2003). Hospital administrators as well as health professionals themselves often seem to underestimate the impact of critical incidents on their personal and occupational life. The same phenomenon was observed among medical students with a near 15% rate of moderate to severe depression; possibly partly resulting from work-related critical incidents. Despite seemingly good access to health care, the depressive students hesitated to seek counseling because they feared this would indicate inadequate coping skills. Besides, they thought that if they would seek help others might question their ability to handle responsibilities, disrespect their opinions, and regard them as dangerous to their patients (Schwenk, Davis, & Wimsatt, 2010). These stigmatizing perceptions may be common with respect to post-traumatic stress symptoms in other health professionals as well, and underlie their denial, that seems even stronger than among firefighters and police officers.

Therefore, the objectives of the present meta-analysis are: a) to identify the consistency of the relationship between critical incidents and mental health consequences in hospital-based health professionals by demonstrating the pooled effect on the primary outcome *post-traumatic stress symptoms* and on the secondary outcomes *anxiety* and *depression*, b) to explore varying effects among different groups of health professionals, and c) to explore the relative impact of different kinds of incidents.

## Research methods

To identify relevant articles for this review, we began by introducing the following search terms: (1) *health personnel, health care provider, physician, doctor or nurse* and (2) *acute stress response, traumatic stress, traumatic stress disorder, post-traumatic stress disorder or acute stress disorder* in PubMed and PsychINFO. We also manually searched the reference lists from relevant publications, and the Journal of Traumatic Stress (special issues included). Finally, we screened the European Traumatic Stress Research Database for relevant ongoing studies. Inclusion criteria for eligibility were as follows: peer reviewed articles; published from inception to 2009; written in English, French or German; based on original research; and included a clearly defined control group. If more than one study reported on the same data, the paper with the most complete and relevant information was selected. Excluded were studies with military or mental health providers representing the high-risk group and articles that primarily reported on secondary traumatic stress, vicarious trauma, or compassion fatigue.

The review was performed taking guidelines for meta-analyses into account (Berman & Parker, 2002; Stroup, Berlin, Morton, Olkin, Williamson, Rennie et al., 2000). To diminish reporting bias and error in data collection, two independent reviewers used a standardized form (Berman & Parker, 2002) to abstract the data; disagreements were resolved through discussion and consensus. In cases where the available information in the articles was insufficient, additional data were obtained from the principal investigator.

The reported means and standard deviations (SD) were used to express the association between critical incidents and the pre-specified primary outcome (i.e. post-traumatic stress symptoms) and the secondary outcomes (i.e. anxiety and depression).

Because the quality of the studies retrieved can distort results in a meta-analysis, each study chosen for review was assessed by two independent researchers using a standardized form (Berman & Parker, 2002). Studies were rated regarding: quality of information (5 items, e.g. Was the paper published in a peer reviewed

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