

## PREHOSPITAL CARE

# Post-traumatic stress among Swedish ambulance personnel

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**Objective:** Emergency workers, including ambulance personnel, must cope with a variety of duty related stressors including traumatic incident exposures. Little is known about the variables that might be associated with post-traumatic stress symptom in high risk occupational groups such as ambulance personnel. This study investigated the prevalence of post-traumatic stress disorder among Swedish ambulance personnel.

**Methods:** To estimate the prevalence of trauma related disorders, a representative group of 362 ambulance personal from the county of Västra Götaland in Sweden was surveyed through use of a Swedish version of Antonovsky's 13-item short version of Sense of Coherence Scale, to measure reactions to traumatic events two instruments were used, Impact of Event Scale (IES-15) and the Post Traumatic Symptom Scale (PTSS-10). A total of 223 of the ambulance personnel reported that they had had experience of what they described as traumatic situations.

**Results:** Of those who reported a traumatic situation 15.2% scored 31 or more on the IES-15 sub scale. Scores over 31 indicate a stress reaction with certain likelihood of post-traumatic disorder. On the PTSS-10 subscale 12.1% scored 5 or more, which indicates a relative strong reaction. The study indicates that lower sense of coherence predicts post-traumatic stress. Other predictors for the extent of traumatic stress were longer job experience, age, physical and psychological workload.

**Conclusions:** The high prevalence of post-traumatic stress disorder symptoms in ambulance personnel indicates an inability to cope with stress in daily work. The strong relation between post-traumatic stress and Sense of Coherence Scale may be useful in predicting vulnerability for post-traumatic symptoms among recently employed ambulance service personnel. To prevent or reduce the upcoming of post-traumatic stress disorder symptoms it must be possible to take leave of absence, or for a longer or shorter time be transferred to non-emergency duties. This study presents a better understanding between post-traumatic stress and underlying factors among ambulance personnel.

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Post-traumatic stress disorder (PTSD) has been studied in many countries and populations and several variations and patterns are described.<sup>1</sup> Psychological disturbance after a traumatic incident is not a new phenomenon and has long been recognised in literature. For example, Samuel Pepys<sup>2</sup> described his continuing distress after the Great Fire of London in 1666. The severity and frequency of PTSD is related to the proximity and exposure to the trauma. High incidences have been reported for those in a combat zone and among veterans.<sup>3,4</sup> Chronic exposure to stress has been shown to be an important factor in the formation of post-traumatic stress symptoms.<sup>5</sup> Ravenscroft<sup>6</sup> studied the London Ambulance Service and concluded that job stress was the most important factor of sickness and 15% of the emergency workers reported symptoms that crossed the threshold for PTSD. Occupational stress in emergency situations can induce an acute or prolonged stress disorder.<sup>7</sup> There have been only a few studies aimed at the psychological consequences of traumatic emergency missions and the prevalence of stress disorder.<sup>8</sup> Wagner and colleagues<sup>9</sup> investigated the prevalence of post-traumatic disorder among fire fighters in Germany. Lundin<sup>10</sup> investigated stress reactions among rescue workers after the MS *Estonia* disaster. Prevalence rates of PTSD in rescue workers have been estimated to range from 3% to 24.5%.<sup>8,11</sup>

Emergency workers are often exposed to traumatic stress when helping people in emergency situations. Emergency workers have been shown to be vulnerable to the development of a symptom of post-traumatic stress. Stress reactions among helpers can be regarded as a natural behaviour and reaction when experiencing a traumatising event and by the stress

resulting from helping or wanting to help a traumatised or distressed person.<sup>12</sup> The repeated high daily stress endured by emergency workers who have to cope with events outside the range of human experience<sup>8,11,13</sup> indicate that emergency workers easily can develop PTSD.

Any trauma exposure can trigger traumatic stress disorder. Some situations are always traumatic, for example, car accidents, rape, violence. Experience has shown that victims of that sort of trauma often develop an acute traumatic stress disorder. If the symptoms remain for more than one month, PTSD is said to occur. Not only the victims but also the involved helper can develop psychological and physical symptoms.<sup>14</sup>

Selley<sup>15</sup> reiterates that health workers as well as primary victims are at risk of developing PTSD. Previous traumatic events have been shown to increase the risk for PTSD.

According to DSM-IV<sup>16</sup> the essential feature of PTSD is the development of symptoms after a traumatic stressor. PTSD is characterised by three interacting groups of symptoms; intrusive, avoidant, and hyperarousal phenomena.

Earlier studies<sup>2,4,5,15</sup> show that factors such as age, family patterns, and earlier experience of violence probably play a part in the development of PTSD. Post-stressor factors such as lack of social support, being unmarried, and drug misuse are factors associated with development of PTSD. Probably personality factors influence how well you can cope with different types of stressors, some people seem to be less likely to develop PTSD,<sup>2,14</sup> they are better educated, and have experience of coping with life stressors.

The DSM-IV<sup>16</sup> lists five intrusive symptoms and at least one is required for a PTSD diagnosis. These symptoms are distressing memories; distressing dreams of the event; acting or feeling as if the traumatic event were recurring; intense psychological distress; and physiological reactivity (sweating, heart racing, etc) when reminded of the event. Avoidance and numbing symptoms represent attempts to block out unpleasant memories and feelings and three are required for a PTSD diagnosis. Examples of these kind of symptoms are: efforts to avoid thoughts; feelings or conversations associated with the trauma; efforts to avoid activities, places or people which arouse recollections of the trauma; inability to recall an important aspect of the trauma; markedly diminished interest in participation in significant activities; feelings of detachment from others, restricted range of affect and emotional responsiveness and a sense of a foreshortened future. Hyperarousal symptoms cause individuals to feel constantly at risk, and two are required for a PTSD. Hyperarousal symptoms are: difficulty in falling or staying asleep; irritability or outbursts of anger; difficulty in concentrating; exaggerated startle response, and hypervigilance for signs of danger. PTSD should be diagnosed if the symptoms persist for at least one month. If the symptoms remit within one month after the traumatic event, the diagnosis of an acute stress disorder is indicated.

Given the repeated daily high exposure to human suffering and death and working in a hazardous environment, ambulance personnel are constantly exposed to traumatic stress. Although there is a growing interest in studying traumatic stress in Sweden all studies have concentrated on disasters and disaster victims. No study has investigated the prevalence of traumatic stress in ambulance crews who do not share an experience of a common disaster.

Sense of coherence (SOC), developed by Antonovsky<sup>17, 18</sup> is a theoretical construction used to explain why some people are more disposed than others to illness after stressful situations. The sense of coherence is defined as a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence. The course of living is structured, predictable, and explicable and the resources are available to meet the demands posed by these stimuli.

The SOC is defined as follows:

*...a global orientation that express the extent to which one has a pervasive, enduring though dynamic feeling of confidence that (1) the stimuli deriving from one's internal and external environments in the course of living are structured, predictable, and explicable; (2) the resources are available to one to meet the demands posed by the stimuli; and (3) these demands are challenges, worthy of investment and engagement (page 41)<sup>18</sup>*

In his Salutogenic Model, Antonovsky<sup>18</sup> suggested that sense of coherence is the key determinant in the maintenance of health and prevention of health breakdown. People with a strong SOC have the ability to perceive stressors as manageable, meaningful, and comprehensible. As SOC is assumed to be relatively stable in adulthood it is hypothesised that the strength of a person's SOC is determined in childhood and early adulthood, with stabilisation occurring about the age of 30.<sup>19</sup>

According to Antonovsky<sup>18, 19</sup> people with stronger SOC remain healthier than other people even if they have experience of the same stressful event. A person with a strong sense of meaningfulness will experience a stressful event as a positive challenge that is worth the emotional investment and commitment. The mobilisation of the generalised resistance resources (GRR), to cope with tension and stressors depends on a person's SOC as a whole. The extent of available GRR is important to determine if a stressful situation will result in a weakening or strengthening of the person's SOC.<sup>17, 19</sup>

People with high SOC tend to use problem focused strategies, they are flexible in their choices of strategies, and they are skilled in using feedback to re-direct coping attempts. Antonovsky proposed that people with a high SOC are more

**Table 1** Prevalence of Traumatic events experienced by the ambulance personnel

Type of event	Number
Events (n)	137
Taking care of family member	14
Taking care of fellow worker	8
Taking care of children	105
Other	70
Mass casualty	16

likely to select the coping strategy that is sufficient for dealing with the stressor. People with a high SOC are more likely to remove the source of stress, and to terminate the associated tension. High sense of coherence may prevent stress associated tension from developing into health problems, but sense of coherence is not a particular coping style. Over time, people with a strong SOC will experience shorter periods of harmful tension than people with a weak SOC, suggesting a main connection between level of SOC and health.<sup>17, 18</sup> The coping includes avoidance of habits that directly interfere with health and behaviours that lessen the severity of illness.

This study intended to examine the prevalence of post-traumatic stress reactions among ambulance personnel in daily work who do not share the experience of a common disaster. A further aim was to investigate whether different levels of SOC are related to different consequences of traumatic stress.

## METHOD

### Participants and procedure

The sample consisted of all ambulance emergency crews in the region of Västra Götaland, Sweden. Those who have combined duties as ambulance workers and fire fighters were excluded because there are biases between ambulance service duty and fire fighter tasks. The aim for the investigation was to isolate traumatic events unique for ambulance services, not influenced by other duties. There are also two different organisations with their own chain of command one for ambulance services and one for the fire brigades. Information attached to the questionnaire package contained written consent.

### Questionnaire

The questionnaire included demographic items, such as job experience, civil status, occupation, job satisfaction, and descriptions of a traumatic event.

A Swedish version of Antonovsky's 13-item short version of Sense of Coherence Scale (SOC) was used to measure the respondent's comprehensibility, manageability, and meaningfulness.<sup>18</sup> A 7-point Likert-type scale was used with response ranging from 1 (very often) to 7 (very seldom or never). Scores range from 13 (lowest sense of coherence) to 91 (highest sense of coherence). Internal consistency testing of the 13-item SOC scale has produced Cronbach  $\alpha$  ranging from 0.74 to 0.95.<sup>18, 20, 21</sup>

To measure reactions to traumatic events two instruments were used. One of the instruments was Impact of Event Scale (IES-15), developed by Horowitz *et al.*<sup>22, 23</sup> It is used worldwide for the assessments of post-traumatic phenomena. It is a self reported measure, which was developed on the basis of Horowitz's two-two-factor theory and can be anchored to any specific life events. The IES-15 consists of 15 statements related to a particular event. Seven items are designed to measure intrusiveness and eight to measure avoidance. The response format is a scale with four choices which are given numeric values; not at all =0, seldom =1, sometimes =3, and often =5. A scale score is computed by the addition of all 15

**Table 2** Spearman correlation coefficients between IES-15, PTSS-10, SOC and, age, education, experience, physical, and physiological workload

	IES-15	PTSS-10	SOC	Age	Sex	Year in ambulance service	Physical workload	Psychological workload	Support from management
<i>Spearman's ρ</i>									
IES-15									
Correlation coefficient	1.000	1.460**	-0.303**	0.276**	0.014	0.269**	-0.179**	-0.207**	-0.183**
Significance (two tailed)		1.000	0.000	0.000	0.836	0.000	0.007	0.002	0.006
Number	223	223	223	223	223	223	223	223	223
PTSS-10									
Correlation coefficient	1.460**	1.000	-0.403**	0.083	0.021	0.112	-0.189**	-0.197**	-0.021
Significance (two tailed)	1.000		0.000	0.219	0.755	0.095	0.005	0.003	0.736
Number	223	223	223	223	223	223	223	223	223

\*\*Correlation is significant at the 0.01 level (two tailed). \*Correlation is significant at the 0.05 level (two tailed).

responses. Thus the scale score can range from 0 to 75. The score of 20 is considered as the cut off value,<sup>24</sup> scores of 31 or higher indicate “a traumatic stress reaction with certain likelihood of PTSD”.<sup>23</sup> However, the IES was developed to test Horowitz’s two factor structure of post-traumatic stress reactions and does not assess the full range of symptoms associated with PTSD.

To complete IES-15 the Post Traumatic Symptom Scale (PTSS-10) developed by Holen *et al*<sup>24, 25</sup> was used. The PTSS-10 consists of 10 statements related to reactions (for instance nightmares) to a particular event. The response format is yes or no on each statement. A scale score is computed by adding the number of “yes” responses. The score of 3 is considered as the cut off value,<sup>24</sup> scores of 5 or higher indicate “a relatively strong reaction”.<sup>23</sup>

Participants were also asked to describe a traumatic event that they had experienced during their work as ambulance personnel. Primary stress is defined as an exposure to trauma directly as a helper with direct relation to the victim—that is, to take care of a family member or a fellow worker.

**Data analysis**

This analysis was based on data from 362 ambulance crew respondents. Descriptive statistics were compiled, and correlation matrices were examined for significant relations among PTSS-10, IES-15, SOC, description of traumatic events, and background data.

Comparisons of independent groups were performed using Spearman’s rank correlation and *t* tests. In some analyses categorisations were made, based on the prevalence of traumatic events depending on the type of exposure to trauma either as a victim or as a helper. Grouping was made in three groups, primary, secondary, and non-traumatic events. For SOC dichotomisations were made in three groups, weak, average, and strong sense of coherence. Permission from the Ethical Committee at the University of Gothenburg was given.

**RESULTS**

A questionnaire was distributed to 500 ambulance workers and the overall response rate was 72.4% (n=362). The respondents consisted of medical technicians (n=240), and registered ambulance nurses (n=122), 79% were men (n=286) and 21% were women (n=76). The mean age was 38.36 (SD=7.93); ranging from 22 to 60 years, and their average job experience in ambulances amounted to 12.1 years (SD=7.93) ranging from 1 to 33 years.

Traumatic events were reported by 223 of the ambulance personnel (61.6% of the sample) and 137 reported that they had no experience of a traumatic event. Table 1 shows that the most frequently reported traumatic event involved children. The category “other” included for example traffic accidents, suicides, and common incidents, for example, heart failure. Of the reported traumatic events 32 were classified as primary traumatic experiences, for example, the ambulance crew had experienced the trauma as a family member or fellow worker.

**The entire group**

The stress reactions for the whole sample (n=362) measured by the IES-15 and PTSS-10 were as follows: the average score on IES-15 was 12.25 (SD 11.14). The average score on PTSS-10 was 0.91 (SD 1.82). Stress reaction among those who reported a traumatic event (n=223) was the following average score on IES-15: 15.20 (SD 12.52) on PTSS-10: 1.34 (SD 2.14). Those who classified as primary stress events scored significantly lower on PTSS-10 scale 1.23 (SD 2.0) compared with those with secondary stress events who scored 2.03 (SD 2.43).

**Prevalence of PTSD symptoms**

Many of those who reported a traumatic event (n=223) had high scores on the IES-15 subscale. Thirty four scored 20 to 30

**Table 3** Comparison between primary-secondary traumatic events: IES-15 PTSS-10

Scale	Primary (n=22)		Secondary (n=201)		t
	Mean	SD	Mean	SD	
IES-15	16.09	14.52	15.10	12.31	1.57
PTSS-10	2.68	2.57	1.19	2.04	1.98*

\*Significant at the 0.05 level.

and as many as 15.2% scored 31 or more. Nine persons scored over 41 points, indicating severe stress reaction with high likelihood for PTSD. On the PTSS-10 scale 26 persons scored 3 to 4, and 27 persons scored 5 or more indicating a relative strong reaction. Of those who reported a non-traumatic event (n=137) two persons scored 20 to 30 and one person scored over 31 on the IES-15 subscale. On the PTSS-10 subscale two persons scored 3–4 and one person scored over 5.

There are correlations between IES-15 and SOC, age, education, and years in ambulance service, physical and psychological workload, and support from management but no correlation in sex and profession. PTSS-10 differs only in correlation to age and years in ambulance service (table 2).

Those who have high scores on IES-15 and PTSS-10 have been working for a longer time in the ambulance service, they are older, and have shorter general education. They also reported experience of high physical and physiological workload and described strong support from management.

#### Comparison between primary and secondary events

In table 3 the correlation between different types of events and IES-15 and PTSS-10 are shown.

Those who have to take care of a family member or a fellow worker score significantly higher on PTSS-10 scale, but there is no such difference on the IES-15 scale.

#### Comparison of persons with and without reported traumatic events

Table 4 shows that persons with trauma experience (n=223) did not differ significantly on demographic variables from those without trauma experience (n=137). On the SOC scale the former scored significantly lower. Those with low SOC and trauma experience did not differ in age from those with high SOC but they have been working significantly longer in the ambulance service.

#### SOC and sex

The median score for SOC differs for men and women, men with trauma experiences have a lower score than women. There is no such a difference in the group without traumatic events (table 5).

In short, the findings show that a vast majority of ambulance personnel have had experience of traumatic events. The prevalence of post-traumatic stress reactions among ambulance personnel is over 15%, and lower SOC, age and years in ambulance duty seem to be related to

**Table 5** Comparison between SOC and sex

SOC	Mean	SD	t
Non-traumatic events (n=137)			
Men (n=109)	69.90	8.57	-0.314
Women (n=28)	70.54	9.72	
Traumatic events (n=223)			
Men (n=175)	65.57	10.30	-2.062*
Women (n=48)	66.30	9.93	

\*Significant at the 0.05 level.

post-traumatic stress. Those who have experienced incidents with family members or fellow workers seem to have slightly higher stress reactions.

## DISCUSSION

The aim of the study was to investigate the prevalence of PTSD reactions among ambulance personnel and factors related to such stress symptoms. A substantial proportion of ambulance crew experienced symptoms of PTSD. The result is in line with previous work<sup>1, 8–11</sup> and supports the conclusion that emergency workers are at risk of developing PTSD, even if they are not exposed to major disasters. Ambulance personnel endure high daily stress and are repeatedly exposed to human suffering and death, and they work in a hazardous environment. They have to cope with death, grief, and events outside the normal range of human experience; situations that can be risk factors for inducing PTSD reactions.

About two thirds of the participants reported experience of traumatic situations and the vast majority (86%) of those were stress situations in relation to trauma at work. Of those who reported a traumatic event we found a current prevalence of 15.2% on the IES-15 scale and 12.1% on PTSD-10 scale. The stress reactions described were reported as consequences of regular daily duty and the personnel were representative for ambulance stations in the area. Stress reactions are part of the daily routine work performed by ambulance personnel and the impacts of these symptoms are scarcely highlighted.<sup>6, 28</sup> However recently some research has shown that the every day work can lead to occurrence of traumatic stress among rescue workers.<sup>14, 28</sup>

The study achieved a substantial response rate and 72% of the ambulance personnel in the region completed the questionnaires. The Västra Götaland region is representative of Sweden with respect to the proportion of urban and rural areas. In the region there is also a mix between large and small ambulance stations, and a sex and age variation in ambulance staff, and the ratio between registered nurses and ambulance technicians did not differ from other areas. Because of the confidentiality of the study we do not know the characteristics of the non-respondents. There is probably a risk of under-reporting because ambulance personnel with stress symptoms may avoid returning the questionnaire if they fear that there is no guarantee for anonymity.<sup>11</sup> There is also research<sup>26, 27</sup> pointing to emergency personal underreporting their psychological

**Table 4** Comparison between traumatic events: SOC, age, and years in ambulance service

Scale	No Traumatic event n=137		Traumatic event n=223		t
	Mean	SD	Mean	SD	
SOC	70.03	8.78	66.30	10.03	3.655***
Age	37.24	7.10	39.06	8.34	-2.144*
Years in ambulance service	10.968	7.430	12.818	7.978	-2.206*

\*\*\*Significant at the 0.001 level. \*Significant at the 0.05 level.

symptoms, because in the role of helping others they deny that they are vulnerable to the same risks as the victims.

The lifetime prevalence for PTSD is about 1%<sup>28</sup> so how can the high prevalence of post-traumatic stress reactions among ambulance personnel be explained? The type of stressors reported in this study are similar to those identified by Clohessy and Ehlers.<sup>11</sup> In their study incidents involving children were the most common events leading to intrusive memories. Ambulance personnel are working in a wide range of settings and environments from emergency medical services to taking care of chronically ill citizens, and they are exposed to very different types of stressors. On active duty they are, however, constantly exposed to trauma associated stimuli. Ambulance workers who have been traumatised by stressful stimuli will not avoid further stimulus unless they quit the profession, take leave of absence, or are transferred to a non-emergency duty station.

The most important factor to predict PTSD reaction is continuing exposure, intensity, and duration of trauma.<sup>1 29-32</sup> In this study there is some information about quality aspects of trauma but no deeper analysis have been performed. We found that the number of years in ambulance duty and lower SOC were the most valid factors related to the occurrence of PTSD symptoms.

There is strong evidence that lower SOC predict the outcome of higher scores on IES-15 and PTSS-10 subscales. Antonovsky<sup>17-20</sup> presupposes that there is no fundamental dichotomy between sick and healthy people. According to Antonovsky a sense of coherence is crucial for the maintenance of health by successfully coping with stressful events. Ambulance personnel have to cope with stressful events, and a sense of coherence including a sense of comprehensibility, manageability, and meaningfulness, seems to be of crucial importance for coping with a traumatic event. In our study the SOC score was 67.72 for the whole sample, which is comparable with a group of Swedish UN soldiers.<sup>33</sup> The SOC means for a larger population varies between 68.7 to 55.0.<sup>20 24</sup> United States university faculty members scored high and United States minority homeless women scored low. Between those who scored high on the PTSS-10 and IES-15 subscales there is a sex difference, men have lower SOC scores, in an entire population the SOC shall be genus neutral.<sup>17-19</sup> However, the difference is not striking and the numbers of persons is quite small. There is no such difference between men and women in the group without trauma experience.

The fact that low SOC was connected to a higher score for stress symptoms seems compatible with Antonovsky's<sup>17-19</sup> statement that a strong SOC is important to successfully coping with stressors. Apart from SOC no other coping styles were investigated. Coping can be defined as the process a person uses to modify adverse aspects of their environment as well as to minimise internal threats induced by stress. Coping strategies are most often described as either problem focused coping; an effort to recognise modifies or eliminates the impact of stressor or cognitive activity, or emotion focused coping; being an effort to regulate emotional states that are associated with exposure of stress.<sup>19 23 34 35</sup>

In recent years the ambulance organisations in the county have become aware of the nature of stressful emergency work and the necessity of having an organisation for debriefing and defusing. Despite the possibility of having access to a debriefing and defusing organisation for all ambulance workers, there is no difference in prevalence of PTSD in comparison with other emergency organisations.<sup>14 30 36 37</sup> In the study there is information about the quality of debriefing but no deeper analysis has been performed. There are some findings in the study that indicate that psychological debriefing may not be a useful prevention of PTSD after traumatic incidents, as current research also shows.<sup>38 39</sup> However, some of the traumatic incidents took place several years ago, before there was a functional debriefing organisation.

To summarise, our findings show that over 15% of the persons who reported a traumatic event in the ambulance service reported PTSD symptoms. There is also a strong connection between the number of years in the ambulance service and PTSD symptoms. This finding can perhaps be related to burn-out reactions, but no such investigation was made in this study. That fact emphasises the need for a deeper understanding of the psychological outcome of ambulance work. During nearly every duty day ambulance personnel are exposed to experiences that could be characterised as traumatic. The lack of coping strategies may facilitate stress symptoms and other mental and physiological illnesses. Groups with high levels of stress are vulnerable to changes in the environment, and the Swedish ambulance service is undergoing radical changes at the moment. This is in line with a study by James and Wright<sup>34</sup> pointing out that background stressors such as shift work and time pressure may be one factor in contributing to the upcoming of the overall distress, and possibly to some of the PTSD symptoms experienced by the participants.

The risk is also higher if ambulance workers have experience of previous traumatic events, which is in accordance with previous research.<sup>40</sup> Ambulance crews with many years in the ambulance service ought to be more likely to develop PTSD. Our study gives evidence for a relation between the number of years in the ambulance service and prevalence of PTSD symptoms. In the study we have not asked about numbers of traumatic events but it can be assumed that ambulance workers with many years in the service have a long history of many stressful events.

Some of the ambulance personnel might have symptoms that are the result of a series of events called prolonged duration stress disorder.<sup>38</sup> The relation between high SOC and low prevalence of PTSD is in agreement with Antonovsky's findings<sup>18</sup> that SOC is the key determinant in the maintenance of health and prevention of health breakdown. People with a strong SOC have the ability to perceive stressors as manageable. It can also be assumed that a high extent of traumatic stress has a clinical impact on bodily complaints and on psychiatric disorders, for example, depressions and substance misuse.

The outcome of the study will propose some measures to prevent PTSD and give further support to ambulance workers with PTSD symptoms. The SOC may be useful in predicting vulnerability for post-traumatic symptoms among recently employed ambulance service personnel. Information has to be spread among management and personnel to increase awareness of PTSD symptoms. The management has to identify those who suffer from post-traumatic stress, and take action accordingly. Some ambulance workers have such high stress levels that they need professional counselling. To prevent or reduce the upcoming of PTSD symptoms it must be possible to take leave of absence or for a period of time or to be transferred to non-emergency duty. That change could however be difficult because of an increased workload in the ambulance stations. The management has also to take into consideration that a change in the ambulance organisation can cause more stress and needs to be prepared to meet that challenge. An evaluation of the debriefing organisation also needs to be done.

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## Contributors

The study was conceived and initial designed by Anders Jonsson (AJ). The methods and questionnaire for the study were chose by AJ. The data were collected, put together and analysed by AJ with statistical advice from Mrs Margaretha Karlsson. The manuscript was written by AJ and Kerstin Segesten (KS). Bengt Mattsson provided helpful advice in the study design and act as a guarantor together with KS.

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