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## Surviving chaos : predictors of occupational stress and well-being in emergency nurses

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## Chapter 3

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# **The impact of traumatic events on emergency room nurses: findings from a questionnaire survey**

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## **Abstract**

**Background:** Emergency Nurses are routinely confronted with work related traumatic events and hectic work conditions. Several studies report a high prevalence of post-traumatic stress disorder (PTSD) in these nurses. Coping and social support seem to play an important role in the development of PTSD.

**Objectives:** This study examines (1) the frequency of exposure to and the nature of traumatic events in Emergency Nurses, (2) the percentage of nurses that report symptoms of PTSD, anxiety, depression, somatic complaints and fatigue at a sub-clinical level, and (3) the contribution of traumatic events, coping and social support to PTSD symptoms, psychological distress, somatic complaints, fatigue and sleep disturbances.

**Design:** cross-sectional data from 248 Emergency Nurses, from 15 Flemish (Belgian) general hospitals, were analyzed.

**Results:** Emergency Nurses were found to be confronted frequently with work related traumatic events. Death or serious injury of a child/adolescent was perceived as the most traumatizing event. Almost one out of three nurses met sub-clinical levels of anxiety, depression and somatic complaints and 8.5% met clinical levels of PTSD. Levels of fatigue were high but not directly related to the frequency of exposure to traumatic events. Emotional coping was related to an increase in all outcomes; avoidant coping was related to more somatic complaints; problem focused coping was related to a decrease in psychological distress and perceived fatigue. Social support from colleagues and supervisor (head nurse) was found to have a protective effect on the occurrence of PTSD symptoms.

**Conclusion:** Emergency Nurses are especially vulnerable to post-traumatic stress reactions due to repetitive exposure to work related traumatic incidents. This not only personally affects the nurses, but can also impact quality of care. Hospital management should act on the findings of this study and invest in supportive, communicative, empathic and anticipatory leadership, and provide time-out facilities, cognitive-behavioral interventions and psychological counseling for Emergency Nurses on demand.

## 1. INTRODUCTION

PTSD (Post-Traumatic Stress Disorder) is an anxiety disorder that occurs as a result of experiencing, witnessing, or being confronted with an emotionally traumatic event. A traumatic event is defined as a situation that is so extreme, so severe and so powerful that it threatens to overwhelm a person's ability to cope, resulting in unusually strong emotional, cognitive, or behavioral reactions in the person experiencing it (Meichenbaum, 1994). PTSD is characterized by three major symptom groups: (1) re-experiencing of the traumatic event, including intense fear, nightmares, horror and intrusive recollections of the event, (2) avoidance of trauma-related events and emotional numbing, and (3) chronic psychological arousal (American Psychiatric Association, 2000). The re-experiencing cluster is seen as the most important feature of the syndrome (Laposa et al., 2003). In addition, the symptoms must be present for more than one month and the disturbance should cause clinically significant distress or impairment in social, occupational, or other important areas of functioning. According to DSM-IV, PTSD may develop in three ways: (a) directly, through personal and direct exposure to a traumatic event (e.g. victims of war, extreme violence or sexual abuse), (b) by witnessing a traumatic event that involves the death, injury or suffering of another person, and (c) by learning, second hand, about a traumatic event that has been experienced by a family member or a close friend (American Psychiatric Association, 2000; Kerasiotis & Motta, 2004).

The incidence of PTSD symptoms is found to be higher in Emergency Nurses than in other nursing specialties (Figley, 1995; Boudreaux & McCabe, 2000; Alexander & Klein, 2001). In a British study, almost one third of the respondents experienced symptoms, indicative of PTSD (Helps, 1997). Another British and a Canadian study both found that about 20% of a sample of Emergency Nurses met the criteria for PTSD (Clohessy & Ehlers, 1999; Laposa et al., 2003). In two American studies, respectively 25% (Gates et al., 2011) and 33% (Dominguez-Gomez & Rutledge, 2009) met clinical cut-offs for PTSD. These figures are much higher than a PTSD prevalence of 14%, found in a population of internal/surgical ward nurses (Mealer et al., 2007).

The difference in PTSD prevalence between Emergency Nurses and nurses from other wards may be explained by a difference in exposure to traumatic events. All nurses have to deal with potentially traumatizing situations (O'Connor & Jeavons, 2003), but Emergency Nurses are routinely confronted with severe injuries, death, suicide and suffering and are also frequently exposed to verbal and physical aggression (Crabbe et al., 2004; Bennett et al., 2005; Mcfarlane & Bryant, 2007). A systematic review showed that 82% to 100% of emergency personnel are frequently exposed to work related traumatic events (Donnelly & Siebert, 2009). Another study revealed that 75% of Emergency Nurses were confronted in the past year with aggressive behavior, compared with 43% nurses of internal medicine wards, 23% of surgical wards and 9.9% of pediatric wards and gynecology. Verbal aggression over the same period was reported by 75% of Emergency Nurses, compared with 39% of their colleagues in

internal medicine wards, 25% in surgical wards and 12.4% in pediatric wards and gynecology (Winstanley & Whittington, 2004). In addition, Emergency Nurses often have to move from one traumatic event to another, leaving little time for recovery (Alexander & Klein, 2001; Gates et al., 2011; Kilcoyne & Dowling, 2007).

Although not every confrontation with traumatic events leads to PTSD, it is well known that exposure to traumatic events may have significant psychological consequences (Figley, 1995; Kerasiotis & Motta, 2004; Alden et al., 2008). Research has shown that emergency personnel reports symptoms of PTSD after professional confrontations with traumatic events, such as nightmares, recurrent images and thoughts, flashbacks, sleeping difficulties, irritability and depression, lack of interest in daily life, loss of hope in the future, amnesia, anger, loss of concentration and restlessness (Ravenscroft, 1994; Caine & Ter-Bagdasarian, 2003). These negative experiences may lead to increased absenteeism, and loss of productivity, due to a change in professional attitude. Moreover, even the quality of nursing care can be negatively altered (Donnelly & Siebert, 2009; Gates et al., 2011). One has thus to be aware that PTSD in emergency care providers can have wide-ranging effects, not only for the individuals themselves, but also for their work setting, as PTSD may lead to a decrease in job satisfaction and an increase in psychosomatic distress, sick leave and staff turnover (McIvor et al., 1997; Collins & Long, 2003).

Physiological and psychological responses to traumatic events should however be seen as a normal reaction and in most cases these responses diminish within a short period of time. In contrast, the repetitive exposure to significant stressors and/or the inability to cope effectively with the traumatic experience may result in the development of psychological disorders (Mealer et al., 2007). Repetitive exposure to traumatic events can thus be seen as an important risk factor for the development of PTSD in Emergency Nurses. From this perspective, confrontation with large scale events such as e.g. a mass collision, does not necessary have more impact than repeated, daily confrontation with small scale events. Marmar (1996) compared Emergency Nurses who witnessed a “large scale” disaster with Emergency Nurses who were repetitively confronted with “small scale” events during their daily work. No differences were found between the two groups in anxiety, depression and post-traumatic stress reactions, suggesting that repeated exposure to small scale events can indeed have serious consequences (Marmar et al., 1996; Clohessy & Ehlers, 1999).

Several authors investigated the nature and impact of traumatic events, reported by Emergency Nurses (Kerasiotis & Motta, 2004; Bennett et al., 2005; De Clercq et al., 2011; Healy & Tyrell, 2011). Research showed that Emergency Nurses are regularly confronted with a broad variety of traumatic events (De Clercq et al., 2011). The most distressing events, in decreasing order, were cot death; incidents involving children; dealing with patients’ relatives and family; confrontation with burn patients; dealing with psychiatric patients; and handling dead bodies. Furthermore, the hectic work environment and

overcrowding can hinder the recovery process and have a negative impact on the Emergency Nurse (Kilcoyne & Dowling, 2007).

In addition to type and frequency of exposure, female gender, professional seniority and more time on the job have been found to be predictors of PTSD symptoms in Emergency Nurses (Ortlepp & Friedman, 2002; Laposka et al., 2003; Dominguez-Gomez & Rutledge, 2009; Lavoie et al., 2011). Inadequate coping and lack of adequate social support may contribute to aggravation and persistence of PTSD symptoms. As far as coping is concerned, two general types of strategies can be distinguished: a problem-solving strategy and an emotion-focused strategy. Problem-solving (task oriented) coping involves attempts to do something about the stressful situation itself. Emotion-focused coping involves efforts to regulate emotions experienced because of the stressful event (Folkman & Lazarus, 1985). Both coping strategies can be active or avoidant. In more recent literature, avoidant emotional and task oriented coping is often merged and called avoidance coping (Leblanc, 2009). The effectiveness of coping strategies is time related. As a health professional, the Emergency Nurse is expected to have an active problem solving approach during an emergency care intervention. During confrontation with a traumatic event, an avoidant emotional coping strategy (e.g. distraction) can be important for the emergency care worker in order to be able to go on functioning, but in the longer term this may hinder the recovery process and can therefore lead to the development of PTSD symptoms (Clohessy & Ehlers, 1999).

Next to coping, social support can be seen as a buffer for the development of PTSD symptoms. Research showed that Emergency Nurses especially use informal resources of social support for coping with the strong emotions experienced after a traumatic event (Fernandes et al., 1999; Battles, 2007). Having a supportive social network and being able to talk things over with colleagues, was found to have a strong preventive effect on the development of PTSD (Lavoie et al., 2011). Lack of social support and poor team communication on the contrary has been found to be related to higher levels of fatigue, burnout and post-traumatic stress responses among emergency personnel (Van der Ploeg & Kleber, 2003).

## **2. THE STUDY**

### **Objectives**

The aim of the present study was: (1) to examine the frequency of exposure to and the nature of traumatic events in Emergency Nurses; (2) to examine what percentage report symptoms of post-traumatic stress, anxiety and depression, somatic complaints, sleep problems and fatigue reaching a sub-clinical or clinical cut-off, and (3) to study the contribution of frequency of traumatic events, coping and perceived social support to PTSD symptoms, psychological distress (anxiety and depression), somatic complaints, fatigue and sleep problems in Emergency Nurses.

## **Methods and procedures**

### ***Study design, setting and participants***

This cross-sectional study was carried out in the Emergency Department of 15 Belgian (Flemish) general hospitals, by means of a self-administered structured survey, from December 2007 until March 2008. Fifteen hospitals were selected from all over Flanders, in order to have a representative sample that met criteria for an optimal sample size (Raosoft Inc. sample size calculator). Every potential respondent received an invitational letter, containing information on the study, and an informed consent form. The first author, who is an Emergency Nurse, visited every Emergency Department and provided information on the objectives and the relevance of the study. Afterwards, the head nurse distributed the paper questionnaire to the Emergency Nurses. Each respondent was asked to fill in the questionnaire individually in his/her leisure time. One reminder was sent one month after the start of data collection. The completed questionnaires could be deposited anonymously in a sealed mailbox in the Emergency Department. The mailboxes were collected by the first author two months after the distribution of the questionnaires. The eligible population consisted of all the Emergency Nurses who had patient contact (n=302) and were working at least six months in an emergency care unit. Head nurses and nursing managers were excluded from the sample. A total of 248 completed questionnaires were returned (response rate 80.5%).

### ***Measures***

#### **Predictors**

##### ***Socio-demographic variables***

Data was gathered on the socio-demographic status of each respondent, including age, gender, work regime (as part- or fulltime), marital status, children living at home, education, seniority, shift work and task diversity (in-hospital emergency service, ambulance nurse, fast rescue team nurse, resuscitation team nurse).

##### ***Frequency of exposure***

Every respondent was asked how many times he/she was confronted with a work-related traumatic event in the past 6 months, and which work-related event had the highest impact. A work-related traumatic event was defined as “a self-experienced traumatizing event, directly related to the work of the respondent”. Conflicts with colleagues or supervisors, and events that occurred in the private life of the respondent were excluded.

### *Coping strategy*

In the present study, the Coping Inventory for Stressful Situations (CISS-21) (Endler & Parker, 1990; Schwarzer & Schwarzer, 1996; Cohan et al., 2006) was used to assess the coping strategies of the respondents. This instrument differentiates between three types of coping: emotion-oriented (emotion focused) (7 items), task oriented (problem focused) (7 items), and avoidant (avoidant emotion focused or problem focused) coping (7 items). Respondents are asked to focus on a recently experienced (in the last six months) traumatic event and to indicate to which extent statements are applicable to them, using a five-point rating scale, from 'not at all' to 'very much'. Sum scores were calculated for each of the three subscales.

### *Social support*

Social support from a supervisor and colleagues was measured by means of two subscales of the Leiden Quality of Work Questionnaire for Nurses (LQWQ-N) (Maes et al., 1999; Gelsema et al., 2005). Social support is defined as 'the feeling that one is cared for and has assistance available from other people' and 'that one is part of a supportive social network'. Social support supervisor (4 items) measures perceived social support by the supervisor (e.g. "I feel appreciated by my direct supervisor."). Social support colleagues (4 items) measures perceived instrumental and emotional support by colleagues (e.g. "My colleagues give me emotional support when I'm having difficulties."). This questionnaire was derived from the Leiden Quality of Work Questionnaire (LQWQ) (Van der Doef & Maes, 1999). The items of the LQWQ-N are occupation specific. In homogeneous samples, occupation specific instruments are preferred over general measures, as they explain more variance in relevant outcome variables (Van der Doef & Maes, 2002). The factor structure of the LQWQ-N was found to be stable and robust by means of factor analyses and reliability analyses (Van der Doef & Maes, 1999). All items are formulated as statements that have to be rated on a 4-point Likert scale, ranging from 'totally disagree' to 'totally agree'.

### Outcome variables

*Post-traumatic stress reactions:* The Impact of Event scale (IES) (Horowitz et al., 1979; Van der Ploeg et al., 2004) was used to determine the frequency of post-traumatic stress symptoms, in relation to a recently experienced (in the last six months) work-related traumatic event. The respondent was asked to give a brief description of this event. The IES consists of two subscales: 'Intrusion' (7 items), measuring the preoccupation with the traumatic experience, repeated thoughts or nightmares about the experience and a recurrent need to talk about it (e.g. "I had waves of strong feelings about it.") and 'avoidance' (8 items) measuring self-reported avoidance of certain ideas, feelings, or situations, related to the traumatic event (e.g. "I stayed away from reminders of it."). All items are rated on a 4-point Likert scale. In the present study, only the total score (sum score of the two dimensions) of the IES was used

(15 items), with higher scores being indicative of stronger post-traumatic stress reaction. Normative values for respondents without trauma history, as defined by Briere & Elliot (1998), were used to compare with the scores of the Emergency Nurses. A cut-off of 20 on the IES was used to differentiate between a mild and a moderate (sub-clinical) level (Orsillo, 2001), and a cut-off of 26 was used to distinguish between Emergency Nurses for whom confrontation with traumatic events had a moderate or a major (clinical) impact in terms of symptoms (Corneil et al., 1999), as a respondent with a score of 26 or higher on the IES has a probability of 75% or more having PTSD (Coffey & Berglind, 2006).

*Psychological distress and somatic complaints* were assessed by means of the validated Dutch version of the Brief Symptom Inventory (BSI). Only the subscales 'anxiety' (6 items), 'depression' (6 items) and 'somatization' (7 items) were used for this study. The BSI has been found to be a good and shorter alternative for the SCL-90R (Derogatis, 1993; De Beurs & Zitman, 2005). This instrument assesses the presence of specific symptoms in the past week. Items are rated on a 5-point likert scale ranging from 'not at all' to 'very much'. Higher scores are indicative of more problems in a specific dimension. 'Psychological distress' (19 items) was constructed as a sum score of the dimensions anxiety and depression. Normative values for healthy subjects, as defined by De Beurs & Zitman (2005), were used to interpret the score of the Emergency Nurses. The cut-offs defined by De Beurs & Zitman (2005) were used to examine how many Emergency Nurses reached a sub-clinical and clinical level of anxiety, depression and somatic complaints.

*Fatigue* was measured by means of the Dutch version of the Checklist Individual Strength (CIS-20R) (Vercoulen et al., 1999). This instrument assesses the presence of fatigue symptoms in the past two weeks. The CIS-20R consists of four dimensions (20 items). The main dimension is subjective experience of fatigue (perceived fatigue) (8 items), (e.g. "I'm feeling weak"). For the purpose of this study only this main dimension was used. The CIS-20R was initially constructed for patients with Chronic Fatigue Syndrome but is also applicable to healthy populations (Beurskens et al., 2000). Items are rated on a 7 point Likert scale ranging from 'Yes, that's correct' to 'No, that's not correct'. A higher score is indicative of a higher level of fatigue. Normative values for healthy subjects were used to interpret the scores of the Emergency Nurses (Vercoulen et al., 1999). A cut-off of 35 for the main dimension was used to define clinical levels of fatigue (De Vree et al., 2002).

*Sleep Problems* were assessed by a self-administered questionnaire, consisting of three questions, based on the DSM IV-criteria for sleep disorders (American Psychiatric Association, 2000) and including initiation, duration and maintenance of sleep (3 items) (e.g. "I have a restless or disturbed sleep"). Items were rated on a 5-point likert scale ranging from 'not at all' to 'very much'. This instrument assesses the presence of sleep problems during the past week. A higher score is indicative of worse sleep quality. Based on DSM-IV-TR (American Psychiatric Association, 2000) and the results from the America Insomnia

Survey (Kessler et al, 2010), scoring higher than four on two or more criteria was considered as indicative of a clinical sleep disturbance.

### ***Ethical considerations***

Approval from the ethical committee of Leiden University for this study was obtained. Confidentiality was guaranteed to all participants. Informed consent was signed by each respondent before data collection.

### ***Statistical methods***

The statistical software package for Windows, SPSS 18.0, was used for data analysis. Descriptive statistics (means, standard deviations, skewness and kurtosis) were computed. Pearson correlations, One Way ANOVA and Independent Sample-t tests were calculated between predictors and outcomes. Normality of distribution was assessed by the Kolmogorov-Smirnov test. The dimensions anxiety, depression, somatic complaints, sleep disturbances, fatigue, the total score of the impact of event scale and frequency of exposure were found to be skewed. Abnormal distributions were corrected wherever necessary, according to Tabachnick and Fidell (1996), by using square root, logarithmic or inverse correction methods, depending on the degree of abnormality. Hierarchical regression analyses were conducted to estimate the strength of the association between demographic characteristics (block-1), frequency of exposure (block-2), coping strategy (block-3) and social support (block-4) and the outcome variables IES total score, psychological distress, fatigue, somatic complaints and sleep problems. The sample size of 248 respondents would allow for about 25 predictors to be entered in the regression models, which is well above the number of predictors used in this study (Green, 1991). A p-value of 0.05 or lower was considered statistically significant.

## **3. RESULTS**

### **Personal characteristics**

The majority of the Emergency Nurses were female (55.6%). The mean age of the respondents was 37.76 years (SD 8.73). Almost 74% was cohabiting and 42% had no resident children. Most of the Emergency Nurses had a bachelor degree. The mean job experience (seniority) in emergency care was 11.21 years (SD 7.47). Almost one third of the Emergency Nurses worked full time (38 hours/week) and 88.7% worked in changing shifts, including night shifts. All of the respondents participated in in-hospital emergency care, but a major proportion also participated as nurses in emergency out-hospital services: 58% as an ambulance-nurse and 60% as a DELTA-nurse (fast rescue team). Further, 84% were members of an in-hospital resuscitation team. As these data are in line with the official database of the Belgian Federal Government the sample can be seen as representative ([Http://www.health](http://www.health).

belgium.be/eportal/healthcare/index.htm). After Bonferroni correction for multiple comparisons, male Emergency Nurses were found to have higher levels of fatigue than their female colleagues (MD = 6.75,  $t = 2.15$ ,  $p = .029$ ) and Emergency Nurses, working full time, were found to have higher levels of psychological distress than their colleagues working part time (MD = - 0.14,  $t = -2.49$ ,  $p = .014$ ). No differences in the outcome variables could be identified for marital status, children living at home, educational level, shift work and task diversity.

*Table 1: Nature of traumatic events in order of the percentage of respondents (N=219) mentioning an event as the most distressing one*

<b>Top 10 of traumatic events reported by ER-nurses</b>		<b>%</b>
1.	dealing with sudden death of young persons	31.6
2.	dealing with death or resuscitation of a baby or young child	25.6
3.	handling victims of car & train crashes (alive and death)	15.1
4.	confrontation with physical trauma & burns patients	8.7
5.	dealing with suicide	4.6
6.	dealing with aggression, violence & threat	3.9
7.	inability to deliver good quality of care	3.2
8.	inability to help chronically ill patients	2.9
9.	dealing with relatives of victims/patients	2.5
10.	confrontation with child abuse & negligence	1.1

### **Frequency of exposure to and type of traumatic events**

Thirteen percent of the respondents reported no confrontation with a traumatic event in the last 6 months, 15% reported only one event, 32% two or three events, 23% four or five events and 17% reported six events or more.

Table 1 shows the nature of the traumatic events the respondents were confronted with in the previous six months, and the percentage of respondents who mentioned an event as the most distressing one. 'Dealing with the sudden unexpected death of a young person' and 'dealing with death or resuscitation of a baby or a young child' were considered to be the most distressing event by 31.6% and 25.6% of the nurses respectively.

Table 2: Comparison of the outcome variables for the respondents of this study (N=247) with normative data and the number (percentage) of respondents reaching the sub-clinical and clinical cutoffs for anxiety, depression, somatic complaints and PTSD and the clinical cutoff for sleep problems and perceived fatigue.

Outcome variable	Mn (SD)	Sign.	Cutoff	Sub-clinical Level	Cutoff	Clinical Level
<b>Anxiety (BSI)</b>				N (%)		N (%)
ER-nurses sample	0.35 (0.46)	n.s.	0.42 -1.37	80 (32,4 %)	>=1.38	6 (2.4 %)
normative sample	0.33 (0.51)					
<b>Depression (BSI)</b>				N (%)		N (%)
ER-nurses sample	0.35 (0.53)	n.s.	0.36 -1.73	71 (28.7 %)	>=1.74	10 (4.0 %)
normative sample	0.31 (0.53)					
<b>Somatic Complaints (BSI)</b>				N (%)		N (%)
ER-nurses sample	0.26 (0.37)	n.s.	0.23 -1.36	92 (37.2 %)	>=1.37	6 (2.4 %)
normative sample	0.32 (0.53)					
<b>Sleep Problems</b>						N (%)
ER-nurses sample	1.14 (1.12)	-----			>=2 x score >=4	17 (6,9 %)
normative sample	-----					
<b>PTSR (total score IES)</b>				N (%)		N (%)
ER-nurses sample	11.90	.002	20-25	60 (24.3 %)	>= 26	21 (8.5 %)
normative sample	8.10					
Missing				6 resp.		6 resp.
<b>Perceived Fatigue (CIS20R)</b>						N (%)
ER-nurses sample	28.36	<.001			>35	71 (28.7 %)
normative sample	17.30					

Normative data and cutoffs: for BSI (De Beurs & Zitman, 2005), sleep problems (Kessler et al., 2010), IES (Briere & Elliot, 1998; Orsillo, 2001; Corneil et al., 1999) and CIS20R (Vercoulen et al 1999).

Abbreviations: sign = significance, n.s. = not significant, resp. = respondents

### **Psychological and somatic consequences**

The number and percentage of respondents reaching sub-clinical and clinical cut-offs for the different outcomes can be found in table 2. The normative data of the BSI dimensions anxiety, depression and somatic complaints for a Dutch sample of non-psychiatric respondents were used for comparative purposes. For none of the dimensions a significant difference was found between the mean scores of the Emergency Nurses and the normative group. A sub-clinical cut-off and a clinical cut-off score were determined according to De Beurs & Zitman (2005). For the dimension 'anxiety', 32.4% of the respondents exceeded the sub-clinical cut-off score, while 2.4% reached a clinical level of anxiety. For the dimension 'depression', 28.7% of the Emergency Nurses scored above the sub-clinical cut-off, while 4.0% had a clinical level of depression. Finally, for the dimension 'somatic complaints', 37.2% of the respondents exceeded sub-clinical levels while 2.4% scored above the clinical cut-off point.

For the dimension sleep problems, a cut-off was used, based on the scores on the 5-point likert scale. Nurses who scored 4 ('pretty much') or 5 ('very much') on two or three items were considered clinical cases, resulting in 6.9% of the respondents who reached a clinical level.

The mean score for the Emergency Nurses on the IES was significantly higher than the normative sample. In accordance with Corneil and colleagues (1999) a total score of 20 was used as a sub-clinical cut-off and a score of 26 or higher was used as a clinical cut-off, considered to be indicative of a traumatic stress reaction with likelihood of PTSD. In the present study, almost one in four respondents scored above the sub-clinical cut-off, and 8.5 % reached clinical levels of PTSD symptoms.

For the outcome perceived fatigue, the mean score on the main dimension of the CIS-20R was significantly higher than the normative sample of healthy subjects (Vercoulen et al., 1999). In the present study, 28.7% of the respondents reached the clinical cut-off score.

### **Correlations**

The correlations between independent and dependent variables are reported in table 3, together with descriptive data for each variable and a Cronbach's alpha for each construct. Correlations between the independent variables were all lower than .60, except for the correlation between age and job seniority ( $r = .98$ ). Job seniority was therefore excluded from the hierarchical regression analyses.

Table 3: Inter-correlations (Pearson correlation coefficients) for age, seniority, frequency of exposure, the dimensions of the Coping Inventory for Stressful Situations (CISS), the dimensions social support supervisor and social support colleagues from the Leiden Quality of Work Questionnaire for nurses (LQWQ-N), the total score of the impact of event scale (IES), psychological distress, somatic complaints, the subjective experience of fatigue score (perceived fatigue) of the Checklist Individual Strength (CIS-20R) and sleep problems, together with descriptive data for every variable.

Measure	$\alpha$	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Age	---	--												
2 Seniority	---	,97**	--											
3 Frequency of exposure	---	,04	,07	--										
4 CISS avoidance	.69	-,22**	-,20**	,17**	--									
5 CISS emotion	.74	-,02	-,01	,19**	,42**	--								
6 CISS task	.80	-,01	00	,20**	,32**	,12	--							
7 Social support supervisor	.93	,03	,06	,05	-,01	-,15*	,15*	--						
8 Social support colleagues	.85	-,08	-,08	,01	,10	-,02	,14*	,36**	--					
9 IES total (PTSR)	.95	,06	,08	,26**	,20**	,29**	,11	-,19**	-,12	--				
10 Psychological distress	.88	-,06	-,08	,17**	,15*	,45**	-,09	-,33**	-,12	,13*	--			
11. Somatic complaints	.84	,03	,02	,19**	,16**	,25**	-,08	-,24**	-,10	,13*	,58**	--		
12 CIS-20R perceived fatigue	.88	-,02	-,03	,10	,13	,39**	-,13*	-,26**	-,17**	,17**	,60**	,49*	--	
13 Sleep problems	.87	,02	,03	,18**	,13	,28**	-,06	-,20**	-,13*	,20*	,53**	,52**	,40**	--
	<i>M</i>	37,76	11,21	3,39	11,25	9,41	14,95	11,74	12,87	11,90	0,35	0,26	28,36	1,14
	<i>Md</i>	37,00	10,00	2,48	11,00	9,00	15,00	12,00	12,00	8,00	0,17	0,14	15,00	1,00
	<i>SD</i>	8,73	7,47	3,0	4,05	3,97	4,04	2,62	1,90	12,78	0,44	0,37	13,09	1,12
	<i>ran</i>	36	36	8,0	18	24	19	12	8	71	2,92	2	60	4

Abbreviations: PTSD: post-traumatic stress reactions,  $\alpha$ = Cronbach's Alpha \*  $p < .05$ , \*\*  $p < .01$

Table 4: Summary of hierarchical regression analysis: personal characteristics (block 1), exposure to traumatic events (block 2), coping strategy (block 3) and social support (block 4) as predictors of post-traumatic stress reactions, psychological distress, perceived fatigue, somatic complaints and sleep problems.

	IES total			Psychological distress			Perceived fatigue			Somatic complaints			Sleep problems		
	$\Delta R^2$	$\beta$	sign.	$\Delta R^2$	$\beta$	sign.	$\Delta R^2$	$\beta$	sign.	$\Delta R^2$	$\beta$	sign.	$\Delta R^2$	$\beta$	sign.
<b>Block 1: demographics</b>	0,01			0,02			0,02			0,01			0,01		
sex (Male=1 / Female = 2)		-,02			-,07			-,17	**		-,04			-,07	
age		,04			-,04			,03			0,04			,04	
work regime (PT=1 / FT=2)		-,07			,08			-,03			-,01			,06	
<b>Block 2: exposure</b>	0,10***			0,03**			0,01			0,03**			0,03**		
frequency of exposure		,23	***		,15	*		,04			0,17	**		,16	**
<b>Block 3: coping</b>	0,07***			0,19***			0,19***			0,07***			0,08***		
CISS avoidance		,09			,01			,01			0,15	*		,07	
CISS emotion		,20	**		,38	***		,39	***		0,14	*		,23	***
CISS task (problem focused)		,03			-,14	*		-,18	**		-,11			-,11	
<b>Block 4: social support</b>	0,04**			0,06***			0,04**			0,04**			0,03		
social support supervisor		-,16	**		-,24	***		-,13	*		-,17	**		-,11	
social support colleagues		-,07			-,04			-,13	*		-,06			-,09	
	R <sup>2</sup> model	0,22		R <sup>2</sup> model	0,30		R <sup>2</sup> model	0,26		R <sup>2</sup> model	0,15		R <sup>2</sup> model	0,16	
	adj R <sup>2</sup> model	0,20	***	adj R <sup>2</sup> model	0,27	***	adj R <sup>2</sup> model	0,22	***	adj R <sup>2</sup> model	0,12	***	adj R <sup>2</sup> model	0,12	***

Abbreviations: IES = impact of event scale,  $\beta$  = beta, PT/FT: part-time/full-time,  $\Delta R^2$  = change in explained variance, adj. = adjusted, sign. = significant

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

## **Regression analyses**

Hierarchical regression analyses was performed to estimate the strength of the association between demographic characteristics (block-1), frequency of exposure (block-2), coping strategy (block-3) and social support (block-4) on the one hand and the outcome variables IES total, psychological distress, perceived fatigue, somatic complaints and sleep problems, on the other hand. The results of these hierarchical regression analyses are reported in table 4.

With respect to the IES total score, measuring the severity of post-traumatic stress reactions, the regression model including only personal characteristics (block-1) did not significantly differ from the null model. Frequency of exposure (block-2) explained the biggest part of the variance (10%). Coping strategies (block-3) explained an additional 7% of variance, with emotional coping being associated with an increase in post-traumatic stress symptoms. Social support (block-4) explained an extra 4% of the variance. Better perceived social support from the supervisor was associated with less PTSD-complaints. The final model, including all four blocks, explained 22% of variance in PTSD symptoms.

With regard to psychological distress, the regression model including only personal characteristics (block-1) did not significantly differ from the null model. Frequency of exposure (block-2) explained an additional 3% of the variance in this variable. Coping strategies (block-3) explained the biggest part of the variance (19%). Emotional coping was associated with more distress, and task oriented coping was associated with less distress. Social support (block-4) explained an extra 6% of the variance. Adequate social support from the supervisor was significantly related to less distress. The final model, including all four blocks, explained 30% of the variance in psychological distress.

Neither the personal characteristics (block-1), nor frequency of exposure (block-2) significantly contributed to the fatigue outcome. Coping strategies (block-3) explained the major part of the variance (19%), with emotional coping being related to higher scores, and task oriented coping with lower scores for fatigue. Social support (block-4) added an extra 4% to the explained variance for this outcome. Adequate social support from the supervisor and from colleagues were both associated with less fatigue. The final model, including all four blocks, explained 26% of variance in this variable.

With regard to somatic complaints, the regression model including only personal characteristics (block-1) did not significantly differ from the null model. Frequency of exposure (block-2) explained 3% of the variance. Coping (block-3) explained 7% of variance, with avoidant and emotional coping being associated with more somatic complaints. Social support (block-4) added an extra 4% of explained variance. Adequate social support from the supervisor was associated with fewer complaints. The final model, including all four blocks, explained 15% of the variance in somatic complaints.

Finally, for sleep problems the regression model including only personal characteristics (block-1) was not significantly different from the null model. Frequency of exposure (block-2) explained 3% of the variance. Coping strategies (block-3) explained an additional 8% of variance: emotional coping was significantly associated with more sleep problems. Adding social support (block-4) to the model did not significantly increase the amount of explained variance. The final model, including all four blocks, explained 16% of variance in sleep problems.

#### **4. DISCUSSION**

##### **Key results**

The first research question concerns the frequency of exposure to and the nature of traumatic events in Emergency Nurses. As far as frequency of exposure is concerned, most of the Emergency Nurses in the present study were regularly confronted with traumatic events. As many as 87% of them reported confrontation with one or more traumatic events over the last six months. These results show a difference with findings in a general nurses population, indicating that 42% of respondents had not experienced a traumatic event in the last year (O'Connor & Jeavons, 2003). In line with our results, a British study on ambulance workers, consisting of nurses and ambulance technicians, found that 82% of the respondents had experienced a particularly disturbing event in the previous six months (Alexander & Klein, 2001). It is obvious that a general nurses population is less exposed to traumatic events than Emergency Nurses, who are, in terms of exposure, more comparable to ambulance personnel.

With respect to the type or nature of traumatic events that were encountered, confrontation with sudden death, especially of children and adolescents, is most frequently reported as the most distressing event in Emergency Nurses. Other impactful events included the exposure to serious injury and mutilation of victims of vehicle crashes, dealing with grief of family and relatives, and confrontation with (potentially) dangerous situations. These findings are in line with previous research (Alexander & Klein, 2001; Regehr et al., 2002; Jonsson et al., 2003; Laposa et al., 2003). According to our findings, Emergency Nurses are regularly confronted with potentially traumatizing events. This is consistent with previous research, indicating that the frequency of exposure to traumatic events in emergency care is high and almost continuous (Clohessy & Ehlers, 1999; Marmar et al., 1996).

The second objective of the study was to examine to what extent Emergency Nurses report sub-clinical and clinical levels of post-traumatic stress, anxiety and depression, somatic complaints, sleep problems and fatigue. The results of the study show that a substantial part of the Emergency Nurses (ranging from 28.7% to 37.2%) exceeded sub-clinical levels of both psychological distress and somatic complaints. Additionally, almost one in four Emergency Nurses exceeded the sub-clinical cut-off for PTSD-symptoms. Moreover, 28.7% of the respondents reached clinical scores for fatigue and 8.5% of the respondents

reached a clinical level for PTSD. These scores are alarmingly high and may even be an underestimation since some Emergency Nurses, eligible for the study, were on sickness leave at the time of this survey.

The third and final aim of the study was to examine the impact of traumatic events, coping and perceived social support on PTSD symptoms, psychological distress (anxiety and depression), fatigue, somatic complaints and sleep problems in Emergency Nurses. The results of the present study show that exposure to traumatic events is strongly related to PTSD symptoms and – to a lesser extent - to the other outcome variables, with the exception of fatigue. This can be explained by the fact that these other outcome variables are of a more general nature and are therefore less sensitive to reflect the direct impact of traumatic events. While there is no direct effect on fatigue, there is a strong relationship between coping and fatigue. The same effect was also found in previous research (Samaha et al., 2007). The development of fatigue may thus be a secondary effect, depending on the way Emergency Nurses are coping with the event. It is however important to note that the explained variance in the various outcomes was modest to low. This is especially true for somatic complaints and sleep problems. As a consequence, these results should be interpreted with care.

In the present study, emotion focused coping was significantly related to all outcome variables with the strongest relations being found for psychological distress and fatigue. Avoidant coping was associated with an increase in somatic complaints. An active, problem focused (task oriented) coping strategy was related to less psychological distress and fatigue. Previous research confirms this finding: emotional coping is a self-oriented emotional reaction to reduce stress (e.g. blaming oneself for being too emotional, angry, tense, self-preoccupied and fantasizing) that is frequently not successful in nurses. These reactions do often even increase the stress reaction (Jaracz et al., 2005; Watson & Sinha, 2008). Avoidant coping efforts, such as denial, mental disengagement, wishful thinking and emotional suppression of intrusion are experienced as unhelpful by Emergency Nurses (Alexander & Klein, 2001) and even have a long term negative effect on wellbeing (Clohessy & Ehlers, 1999). In contrast, task- or problem-oriented coping efforts (e.g. actually trying to solve or restructure the problem or attempt to alter the situation) are often seen as successful because they imply feelings of control, influence, commitment and resilience (Beasley et al., 2003; Jaracz et al., 2005).

Lack of social support is a significant predictor of occupational stress in Emergency Nurses, especially in relation to daily work conditions and organizational circumstances (Adriaenssens et al., 2011). In the present study, social support was found to have a small but significant effect on all outcome variables. The difference in importance between coping and social support as predictors, may be due to the fact that questions related to coping were answered in direct relation to stressful events, while questions related to social support regarded perceptions of the more general work context. As known from previous studies, more general questionnaires tend to explain lower amounts of variance in specific outcomes (Van der Doef & Maes, 2002). Despite this, qualitative social support from the supervisor was

associated with less Post-Traumatic Stress Reactions, psychological distress, somatic complaints and fatigue, while adequate social support from colleagues was associated with less fatigue in this study. These results confirm that the occupational social network can facilitate the recovery process (Ozer et al, 2003). There is a substantial body of knowledge showing that individuals, who have access to social support in stressful situations, seem to be better off than individuals without significant social support (Hamaideh, 2012; Hayes et al, 2010; Bradley & Cartwright, 2002). Social support is even found to be beneficial on endocrine and immune system parameters (Leblanc, 2009).

### **Implications of the study**

This study shows that Emergency Nurses are regularly exposed to occupation-related traumatic incidents, with significant negative effects on psychological and physical wellbeing. This is an important finding, not only for the Emergency Nurse but also for the hospital management, because these effects may generate a rise in sickness absence, a decrease in task performance and job satisfaction, a rise in turnover intention, and even a decrease in quality of care (Van Bogaert et al., 2010; Slatten et al., 2011). Screening and mentoring of high-risk individuals should therefore be considered, particularly following a major traumatic event or cumulative exposure (McFarlane et al, 2007; Healy & Tyrell, 2011).

This study shows a relatively strong relationship between coping strategies and the different outcomes. In the last decade, several intervention techniques have been described to improve the coping effectiveness of health care workers and to prepare them for future exposure. A Cochrane Review by Ruotsalainen et al (2008) examined the literature on interventions that include a cognitive behavioral approach (e.g. coping skills training, anticipatory coping interventions), eventually combined with relaxation techniques. The review found a significant effect on burnout, anxiety, stress and somatic symptoms in health care workers, compared with no intervention. In some studies, the effects were still present from six months to two years after the end of the intervention (Marine et al., 2008). This is congruent with previous research, showing that nurses who adopt a pro-active (anticipatory) coping style show more resilient behavior and report lower levels of depression (Greenglass et al., 2002; Kravits et al., 2010). Hospital management and supervisors therefore need to anticipate the effects of traumatic exposure, by teaching emergency personnel evidence based anticipatory methods of coping with stressful events (Laal & Aliramaie, 2010, McFarlane et al., 2007). In addition, after confrontation with a traumatic event, psychological guidance and counseling should be provided for exposed Emergency Nurses.

This study also shows that adequate social support from the supervisor was available and important for the Emergency Nurses. This is an argument for supportive, communicative, empathic and anticipatory leadership. Qualitative leadership can establish a supportive culture, with good team spirit and good interpersonal and interdisciplinary communication, that is appreciative of staff and demonstrates a

recognition of, and concern for, the stressful effects of traumatic events (Healy & Tyrell, 2011). In line with the findings of this study, research on Emergency Nurses shows that existing resources for social support are often preferred over obligatory official group debriefings (Fernandes et al., 1999; Jonsson et al., 2003; Battles, 2007).

### **Strengths and limitations of the study**

The high response rate and the relatively large sample of Emergency Nurses are important strengths of this study. Due to the cross-sectional design of the study, one cannot draw conclusions regarding causal relationships. The findings of this study are nevertheless in line with previous research on exposure to traumatic events. In addition, although the response rate of this study was high (80.5%) the data are collected by means of convenience sampling. Despite this, the sample proved to be representative. Although most of the measures that we used were validated, we also used a self-constructed sleep problem scale that is however based on DSM IV criteria. As a consequence, the results related to sleep should be interpreted with caution. This is especially true for the definition of a clinical level of sleep problems. Despite some limitations, this study is innovative since it points at important predictors of post-traumatic stress in Emergency Nurses. All of these predictors need attention and most of them can be influenced by managerial initiatives, group cohesion-enhancing interventions and supportive leadership.

## **5. CONCLUSIONS**

Emergency Nurses are confronted regularly with traumatic events and are thus vulnerable for developing PTSD. Repetitive exposure can result in the development of significant psychological disorders (Blumenfield & Byrne, 1997; Mealer et al., 2007). The results of this study show that levels of anxiety, depression and somatic complaints and post-traumatic stress reactions are indeed high. Almost a third of the respondents exceeded a sub-clinical level for these variables. Moreover, one out of seven Emergency Nurses reached clinical levels for PTSD. Frequency of exposure to traumatic events was strongly related to symptoms of PTSD and to a lesser degree to psychological distress, somatic complaints and sleep problems. Levels of fatigue in Emergency Nurses were found to be high, but were not directly related to the frequency of exposure itself, which might be due to an indirect effect of coping. Future research should explore this hypothesis.

Coping was found to be strongly associated with the reaction of the Emergency Nurse after exposure to traumatic events. Emotional and avoidant coping was not a successful strategy to deal with the event. In contrast, problem focused coping was related to less psychological distress and fatigue. Social support was found to have a protective effect on post-traumatic stress reactions. A final thought is that Emergency Nurses with personality characteristics such as strong stress resistance and resilience, a high level of role autonomy and independence, the ability to shift gears and accelerate pace as needed, good

multi-tasking skills and the talent to maintain calm amidst chaos may react more adequately to traumatic events (Stathopoulou et al., 2010). Future studies should explore whether this is indeed the case and whether nurses with certain personality characteristics, professional goals and/ or coping strategies are less vulnerable following exposure to traumatic events than others.

This study shows that Emergency Nurses are at risk for post-traumatic stress reactions due to repetitive exposure to work related traumatic incidents. This not only affects the Emergency Nurse personally, but also the environment they work in, and likely impacts on the quality of care provision and the job satisfaction of nurses.

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