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# Peritraumatic Distress in Accident Survivors: An Indicator for Posttraumatic Stress, Depressive and Anxiety Symptoms, and Posttraumatic Growth

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## 1. Introduction

In 1997, the Global Burden of Disease Study (Murray, 1997) predicted that by 2020 motor vehicle accident would be the third biggest contributor to worldwide burden of disease. With more than 50 million people reported in 2007 to be injured each year in road traffic accidents worldwide (Derriks & Mark, 2007), motor vehicle accidents are indeed contributing highly to burden of disease. Moreover, such accidents are regarded as one of the leading causes of posttraumatic stress disorder in today's world. As advances in injury care systems have increased the number of seriously injured people who are able to survive their injuries (MacKenzie et al., 2006), this has drawn increasing attention to psychiatric morbidity after injury among such survivors.

Recent studies have shown that accident-related posttraumatic stress disorder is fairly common. The prevalence of posttraumatic stress disorder determined by structured clinical interviews with injured patients consecutively admitted to the intensive care unit or emergency department ranges from 5–30% at 0–3 months after injury to 2–23% at 4–12 months after it (Bryant et al., 2010; Hamanaka et al., 2006; Hepp et al., 2008; Matsuoka et al., 2008; Matsuoka, Nishi, Yonemoto, Nakajima et al., 2010; O'Donnell et al., 2004; Schnyder, Moergeli, Klaghofer et al., 2001; Schnyder et al., 2008; Shalev et al., 1998). Recent large epidemiological studies using questionnaires have reported a 17–23% point prevalence of clinically significant posttraumatic stress disorder symptoms at 4–12 months after injury (Zatzick et al., 2007; Mayou et al., 2001). It is well known that this disorder can be associated with higher psychiatric comorbidity, attempted suicide, and physical illnesses such as asthma, hypertension, and peptic ulcer (Davidson et al., 1991), as well as carry high healthcare costs (O'Donnell et al., 2005; Walker et al., 2003). It remains, therefore, a serious public health problem that needs to be addressed (Kessler et al., 1995; Kessler et al., 2005.)

### **1.1 Depression and other anxiety disorders after motor vehicle accidents**

Major depression is also highly prevalent in individuals injured in a motor vehicle accident. The prevalence of major depression as determined by structured clinical interviews ranges from 10–19% at 0–3 months after the accident (O'Donnell et al., 2004; Matsuoka et al., 2008; Shalev et al., 1998) to 10–14% at 4–12 months after it (O'Donnell et al., 2004; Shalev et al., 1998). Although many symptoms overlap between posttraumatic stress disorder and major depression, the high comorbidity cannot be explained solely by this (Franklin & Zimmerman, 2001). Exposure to traumatic events has been shown to be linked not only to posttraumatic stress disorder, but also to depression (Duncan et al., 1996; Kilpatrick et al., 1987), and a recent study suggested that traumatic experiences during young adulthood and middle age are strong predictors of anxiety and depression among older adults (Dulin & Passmore, 2010). The treatment of psychiatric morbidity after injury is thus a matter of some urgency, especially for high-risk individuals. However, as it is difficult for emergency department staff to screen patients early after the event using a conventional questionnaire-based tool, given the large number of motor vehicle accident survivors they handle (Nishi et al., 2006), it is desirable to find indicators for posttraumatic stress disorder which can be easily assessed in order to provide preventive strategies as early as possible.

### **1.2 The importance of assessing peritraumatic distress**

Among the indicators for posttraumatic stress disorder, peritraumatic distress is a good candidate for screening individuals at high risk of developing the disorder. Peritraumatic stress can enhance trauma-related memory and sensitize the neurobiological systems (Charney et al., 1993), which links to the development of posttraumatic stress disorder. Many clinical studies and a meta-analysis have shown that perceived threat to life is a predictor of posttraumatic stress disorder (Holbrook et al., 2001; Matsuoka et al., 2008; Ozer et al., 2003; Schnyder, Moergeli, Trentz et al., 2001) and psychiatric morbidity (Matsuoka et al., 2008; Schnyder, Moergeli, Trentz et al., 2001). Peritraumatic distress is also linked with posttraumatic growth, which Tedeschi & Calhoun (2004) define as the positive psychological change experienced as a result of the struggle with highly challenging life circumstances. They state that only psychologically 'seismic' events shake the assumptive world, which leads to posttraumatic growth. Accordingly, peritraumatic distress can be an indicator for posttraumatic growth. A better understanding of peritraumatic distress would be significant for both prevention, especially in emergency settings, and treatment of posttraumatic stress disorder.

The aim of this chapter is to elucidate the predictive usefulness of peritraumatic distress and to examine the future directions for prevention with a focus on the use of the Peritraumatic Distress Inventory, an assessment tool for peritraumatic distress.

## **2. Method**

### **2.1 Participants**

Participants were selected from the Tachikawa Cohort of Motor Vehicle Accidents study conducted at the National Disaster Medical Center in Tokyo, Japan (Matsuoka et al., 2009). The inclusion criteria in the present study were as follows: 1) motor vehicle accident-related severe physical injury causing a life-threatening or critical condition; 2) age between 18 and 69 years; and 3) native Japanese speaking ability. The exclusion criteria were the following:

1) diffuse axonal injury, brain contusion, and subdural and subarachnoidal bleeding detected by either computed tomography or magnetic resonance imaging or both (with the exception of concussion), because the presence of traumatic brain injury creates considerable difficulties when assessing psychological responses to injury; 2) cognitive impairment, defined as a score of <24 on the Mini Mental State Examination; 3) currently suffering from schizophrenia, bipolar disorder, drug dependence or abuse, or epilepsy before the accident; 4) marked serious symptoms such as suicidal ideation, self-harm behavior, dissociation, or a severe physical condition preventing the patient from tolerating the interview; and 5) living or working at a location more than 40 km from the National Disaster Medical Center.

The above-mentioned study was conducted between 30 May 2004 to 8 January 2008, and the present study is part of that larger study. Patients with motor vehicle accident-related physical injury were consecutively admitted to the intensive care unit of the National Disaster Medical Center between 18 August 2005 and 8 January 2008. Of the 221 patients who met the inclusion criteria, 189 agreed to participate in the study. Fifty-nine patients were excluded because their peritraumatic distress could not be assessed due to memory loss. Ultimately, 130 patients participated in this study.

## 2.2 Procedures

The study protocol was approved by the Institutional Review Board and Ethics Committee of the National Disaster Medical Center. After providing a complete description of the study to the subjects, written informed consent was obtained from them. The median number of days between the motor vehicle accident and the initial assessment was 2 days (range, 0–23 days). The initial assessment was conducted after cognitive function was assessed by a trained research nurse or psychiatrist using the Mini Mental State Examination.

In a structured interview, data was collected on general socio-demographics, the motor vehicle accident in detail, injury severity score (Baker & O'Neill, 1976), Glasgow Coma Scale score (Teasdale & Jennett, 1974), status during the accident (e.g., vehicle driver), vital signs first recorded on admission to the emergency room, lifestyle, and family history of psychopathology. Also, the Peritraumatic Distress Inventory was conducted at initial assessment. Follow-up assessments were performed at 1 month (median, 37 days, range, 24–76 days) and 18 months (median, 561.5 days, range, 442–700 days) after the accident. The Impact of Event Scale-Revised and the Hospital Anxiety and Depression Scale were conducted at 1 month post accident, and the Posttraumatic Growth Inventory was conducted at 18 month post accident. The participants were asked to visit the National Disaster Medical Center or to return the completed self-report questionnaires in a stamp-addressed envelope. After each assessment, participants were given a gift voucher for their participation (1,000 JPY [12 USD]).

## 2.3 Measures

### 2.3.1 The Peritraumatic Distress Inventory

The Peritraumatic Distress Inventory is a 13-item self-report questionnaire which assesses not only any threat to life experienced but various emotional responses experienced during and immediately after a critical incident (Brunet et al., 2001). Responses are provided on a 5-point Likert scale ranging from 0 to 4 (0, not at all to 4, extremely true). It typically takes only several minutes to complete all of the items, meaning the Inventory can be used immediately after a motor vehicle accident.

The original Peritraumatic Distress Inventory has been demonstrated to be internally consistent, stable over time, and with good to excellent correlations between item and total scores (Brunet et al., 2001). Moreover, it was found to be valid against posttraumatic symptoms and peritraumatic dissociation as assessed by the Impact of Event Scale-Revised and the civilian version of the Mississippi Scale for Combat-Related Posttraumatic Stress Disorder.

With the original authors' permission, we translated the original English Peritraumatic Distress Inventory into Japanese. We followed the standard procedure of back-translation. Namely, the first author (DN) translated the English version into Japanese. This preliminary Japanese version was then backtranslated into English by an independent translator. The backtranslated version was examined by the original authors. Then we corrected the Japanese translation accordingly. This process was repeated until both sets of authors agreed that the original and backtranslated versions matched closely. Subsequently, we verified the internal consistency, test-retest reliability, concurrent validity with measures of peritraumatic dissociation and posttraumatic symptoms, and divergent validity of the Japanese version of the Peritraumatic Distress Inventory (Nishi et al., 2009).

### **2.3.2 The Impact of Event Scale-Revised**

The posttraumatic stress symptoms as assessed using the Impact of Event Scale- Revised at follow-up were considered to be the outcome. The Impact of Event Scale-Revised is a 22-item self-report questionnaire used to determine the level of symptomatic responses to a specific traumatic stressor (motor vehicle accident in the present study) in the past week (Asukai et al., 2002; Wolfe & Kimerling, 1997). The degree of distress for each item is rated on a 5-point scale (0, not at all to 4, extremely; range, 0-88).

### **2.3.3 The Hospital Anxiety and Depression Scale**

Depressive and anxiety symptoms as assessed using the Hospital Anxiety and Depression Scale were also considered as the outcome. The Scale is comprised of a 7-item anxiety subscale and a 7-item depression subscale that assess general psychological distress for the preceding week (Kugaya et al., 1998; Zigmond & Snaith, 1983). Each item is rated on a scale of 0-3, with high scores denoting greater psychological distress (range, 0-42).

### **2.3.4 The Posttraumatic Growth Inventory**

The Posttraumatic Growth Inventory, which assesses posttraumatic growth, measures the degree of change experienced in the aftermath of a traumatic event. The 21-item Inventory evaluates five factors: relating to others, new possibilities, personal strength, spiritual change, and appreciation of life. The degree of posttraumatic growth for each item is rated on a 6-point scale (range, 0-105) (Taku et al., 2007; Tedeschi & Calhoun, 1996).

## **2.4 Statistical analysis**

Univariate regression analysis was used to examine the relationships of total score and individual item scores on the Peritraumatic Distress Inventory with posttraumatic symptoms and depressive and anxiety symptoms. In a model for determining the predictive value of the Peritraumatic Distress Inventory, multivariate regression analysis was used to examine the relationships of the Peritraumatic Distress Inventory with posttraumatic stress symptoms and depressive and anxiety symptoms adjusted for 7 other covariates based on the following theoretical considerations.



For the covariates, age at motor vehicle accident, being female, history of psychiatric illness, family history of psychopathology, and lower education level are well-established pretraumatic risk factors across trauma type (Brewin et al., 2000; Ozer et al., 2003). As for educational level, we used graduation from junior high school as a reference (0), and assigned 1 to graduation from high school, 2 to graduation from junior or technical college, and 3 to graduation from university or higher educational institutions according to the Japanese educational system. Heart rate on admission was selected because some reports in the literature on motor vehicle accident showed its association with posttraumatic stress disorder (Bryant et al., 2000; Shalev et al., 1998; Zatzick et al., 2005). Injury Severity Score divided into 10-point increments was assigned as the objective accident-related variable. Injury Severity Score is a scoring system that provides a total score for patients with multiple injuries, and it correlates with measures of severity such as mortality and hospital stay (Baker & O'Neill, 1976).

Univariate regression analysis was also conducted to examine the relationships of total score on the Peritraumatic Distress Inventory with total score and individual subscale scores on the Posttraumatic Growth Inventory. Any association between the dependent variable and the independent variable was expressed as a regression coefficient (beta weight) and quantified by the 95% confidence interval (95% CI).

All statistical analyses used two-tailed tests. Statistical significance was established at a P value < 0.05. All data analyses were performed using SPSS statistical software version 19.0J for Windows (SPSS, Tokyo, Japan).

3. Results

Of the 130 patients participating, 79 (60.8%) attended the 1-month follow-up assessment and 51 (39.2%) attended the 18-month one. The patients who dropped out of the study did not differ significantly from those who participated in terms of the variables selected for investigation in this study, including total Peritraumatic Distress Inventory score.

Of the 79 participants at first follow-up, 16 (20.3%) were women and median age was 37.0 years (mean, 39.7; range 18-69), and 7 (8.9%) reported a past history of psychiatric illness. Median ISS was 6.0 (range 1-41) and median Peritraumatic Distress Inventory score was 15.0 (range 0-40).

The relationships of total score and individual item scores on the Peritraumatic Distress Inventory with posttraumatic stress symptoms and depressive and anxiety symptoms are shown in Table 1. The Peritraumatic Distress Inventory was an independent predictor for posttraumatic stress symptoms and depressive and anxiety symptoms after adjusting for potential confounders.

PDI item	IES-R		HADS	
	Beta (95% CI)	P	Beta (95% CI)	P
Univariate regression analysis				
1. I felt helpless to do more	4.00 (2.05, 5.94)	<0.01	1.80 (0.86, 2.74)	<0.01
2. I felt sadness and grief	3.05 (1.03, 5.06)	<0.01	0.94 (-0.06, 1.93)	0.06
3. I felt frustrated or angry	2.99 (1.11, 4.87)	<0.01	0.74(-0.20, 1.68)	0.12
I could not do more				

PDI item	IES-R		HADS	
4. I felt afraid for my safety	3.02 (1.04, 5.00)	<0.01	1.21 (0.24, 2.17)	0.02
5. I felt guilt that more was not done	1.43 (-0.97, 3.83)	0.24	0.23 (-0.92, 1.38)	0.69
6. I felt ashamed of my reactions	0.76 (-2.47, 3.99)	0.81	0.53 (-1.01, 2.07)	0.50
7. I felt worried about others	1.40 (-0.66, 3.46)	0.18	0.20 (-0.80, 1.19)	0.70
8. I was about to lose control	2.31 (-0.82, 5.45)	0.15	0.07 (-1.45, 1.59)	0.93
9. I had difficulty controlling my bowel and bladder	1.39 (-3.89, 6.67)	0.60	0.84 (-1.68, 3.36)	0.51
10. I was horrified	3.41 (1.46, 5.37)	<0.01	0.99 (0.01, 1.97)	0.047
11. I had physical reactions like pounding heart	4.04 (2.14, 5.93)	<0.01	1.64 (0.71, 2.58)	<0.01
12. I felt I might pass out	0.90 (-1.12, 2.92)	0.38	0.51 (-0.45, 1.48)	0.29
13. I felt I might die	2.63 (0.74, 4.52)	<0.01	1.00 (0.08, 1.92)	0.03
PDI total score	0.61 (0.34, 0.89)	<0.01	0.21 (0.07, 0.35)	<0.01
Multivariate regression analysis*				
PDI total score	0.49 (0.18, 0.80)	<0.01	0.15 (0.00, 0.30)	0.046

\*In the multivariate analysis, the predictive value of the PDI was adjusted for 7 covariates; age at MVA, being a female, history of psychiatric illness, family history of psychopathology, education level, heart rate at admission and Injury Severity Score.  
P, p value; CI, confidential interval; HADS, Hospital Anxiety and Depression Scale; IES-R, the Impact of Event Scale-Revised; PDI, the Peritraumatic Distress Inventory

Table 1. The predictive value of the Peritraumatic Distress Inventory for Impact of Event Scale-Revised and Hospital Anxiety and Depression Scale at follow-up (N=79)

The relationships between total score on the Peritraumatic Distress Inventory and total score and individual subscale scores on the Posttraumatic Growth Inventory are shown in Table 2.

	PDI total score (independent variable)			
	Beta	95%CI	P value	R <sup>2</sup>
PTGI subscales (dependent variables)				
Relating to others	0.25	0.02 – 0.48	0.03	0.09
New possibilities	0.14	-0.02 – 0.30	0.08	0.06
Personal strength	0.06	-0.07 – 0.18	0.36	0.02
Spiritual change	0.07	0.01 – 0.11	0.03	0.10
Appreciation of life	0.20	0.10 – 0.30	<0.01	0.26
PTGI total score	0.72	0.12 – 1.31	0.02	0.11

CI, confidential interval; PDI, Peritraumatic Distress Inventory; PTGI, Posttraumatic Growth Inventory; R<sup>2</sup>, multiple correlation coefficient, the index of goodness fitness in the model

Table 2. The predictive value of the PDI for PTGI at follow-up (N=51)

## **4. Discussion**

### **4.1 Summary in the present study**

This study showed that the Peritraumatic Distress Inventory could predict posttraumatic stress and depressive and anxiety symptoms at 1 month after motor vehicle accident and posttraumatic growth at 18 months after the accident. The predictive value of the Peritraumatic Distress Inventory for the Impact of Event Scale-Revised and the Hospital Anxiety and Depression Scale remained after adjusting for covariates in a multivariate regression analysis.

### **4.2 An indicator for posttraumatic stress symptoms**

As mentioned in the Introduction, it is no surprise that the Peritraumatic Distress Inventory predicted posttraumatic symptoms in the present study. Although some previous prospective studies have failed to show that this Inventory is an independent predictor of posttraumatic stress disorder, these studies used the Inventory from 2 weeks (Kuhn et al., 2006) to several months (Birmes et al., 2005; Simeon et al., 2005) following a traumatic event. The time of assessment in the present study was within several days following the traumatic event in most participants, in order to minimize the effects of inaccurate memory over time. It is likely that the Peritraumatic Distress Inventory has a better predictive value when used early after a traumatic event, making it well suited for use in emergency departments.

### **4.3 An indicator for depressive and anxiety symptoms**

The Peritraumatic Distress Inventory also predicted depressive and anxiety symptoms in the present study, although the predictive value for these symptoms was lower than that for posttraumatic symptoms. A previous study reported that posttraumatic stress disorder symptoms were a reliable predictor for depressive symptoms (Erickson et al., 2001). The Impact of Event Scale-Revised is one of the tools used most frequently for measuring posttraumatic stress symptoms; however, it was intended to assess posttraumatic stress disorder symptoms over the previous 7 days, whereas the Peritraumatic Distress Inventory can be used immediately after motor vehicle accident. Given our findings, the Peritraumatic Distress Inventory seems to be a useful indicator not only for posttraumatic stress disorder but also major depression or other anxiety disorders.

### **4.4 Two Peritraumatic Distress Inventory items showed high predictive values**

Items 1 and 11 of the Peritraumatic Distress Inventory showed higher predictive values for both posttraumatic stress and depressive and anxiety symptoms than other items. Item 1 inquires about helplessness. The author and colleagues previously discussed that non-drivers (passengers, bicyclists, or pedestrians) might be susceptible to subsequent posttraumatic stress disorder and other psychiatric morbidity (Matsuoka et al., 2008). Loss of control in a motor vehicle accident is suggested to be an important risk factor. Regarding item 11, some studies showed that high heart rate shortly after a motor vehicle accident is a predictor for later posttraumatic stress disorder (Bryant et al., 2000; Shalev et al., 1998; Zatzick et al., 2005), although other studies reported that heart rate was not an independent predictor (Buckley et al., 2004; Kraemer et al., 2008) and a review indicated that it cannot be accurately used to identify individuals who are at high risk for later posttraumatic stress



disorder (Bryant, 2006). To ask if survivors felt any physical reactions might be a better alternative to predict subsequent psychiatric morbidity.

#### **4.5 An indicator for posttraumatic growth**

The present results also suggested that the Peritraumatic Distress Inventory could predict posttraumatic growth, especially the 3 aspects of appreciation of life, spiritual change, and relating to others at 18 months after the accident. Multivariate regression analysis was not used to examine the predictive value of the Peritraumatic Distress Inventory for the Posttraumatic Growth Inventory because predictors for posttraumatic growth are not well established and our sample size was modest; however, the result was consistent with that of previous studies. According to Janoff-Bulman, these 3 subscales can best be understood as existential reevaluation (Janoff-Bulman, 2004), and a previous study showed that they had a positive association with posttraumatic stress disorder (Taku et al., 2007). The author and colleagues also showed that appreciation of life and spiritual change were positively correlated with posttraumatic stress disorder symptoms, which can be regarded as signifying coping effort in the face of enduring distress, rather than an outcome of coping success (Nishi, Matsuoka and Kim, 2010). The predictive value of the Peritraumatic Distress Inventory for appreciation of life was quite high in the present study, so managing peritraumatic distress may need specific coping efforts. This would point to the importance of clinicians and researchers identifying and being attentive to the survivor's own meanings and interpretations.

#### **4.6 The potential use of the Peritraumatic Distress Inventory in emergency departments**

The author and colleagues previously showed that a cut-off score of 23 on the Peritraumatic Distress Inventory maximized the balance between sensitivity (77%) and specificity (82%) (Nishi, Matsuoka, Yonemoto et al., 2010). Further investigation is required to determine its adequate usage bearing in mind its low positive predictive value (53%). However, the early identification of motor vehicle accident survivors who appear not to be at risk of developing posttraumatic stress disorder is one potential use of the Peritraumatic Distress Inventory because of its high negative predictive value (93%). Given the typical limits on the psychiatric resources available, the Peritraumatic Distress Inventory would likely be a useful indicator for posttraumatic stress disorder and psychiatric morbidity in emergency departments.

#### **4.7 Limitations**

This study has some limitations. Firstly, the sample size was modest. Secondly, the attrition rate was relatively high, although the patients who dropped out were not significantly different from those who participated in the follow-up assessments in terms of the Peritraumatic Distress Inventory and other covariates. In an earlier publication, we revealed that the factors of being male, unconscious during MVA, low cooperativeness, and less severe injuries were significant predictors of dropout (Nishi et al., 2008). Participants with less severe injuries did not need to come to the National Disaster Medical Center for treatment after discharge which might have affected the attrition rate. Also, those with low cooperativeness might have been reluctant to continue participating in the study.

## 5. Future directions

### 5.1 Consolidation of fear memory

Fear memory, which is the important component of peritraumatic distress, has attracted considerable attention especially preclinically. An excellent review by Ressler & Mayberg (2007) has demonstrated that memories do not immediately become permanent at the time of initial experience but exist in a labile state for at least a period of hours and possibly days, during which time they become consolidated into more permanent memory. During this consolidation, molecular, synaptic, neurotransmitter, and system-level changes occur consecutively (McGaugh, 2000). The neural circuitry implicated in fear memory likely involves complex interactions between the hippocampus, the amygdala, and the medial prefrontal cortex (Nemeroff et al., 2006). Because the hippocampus processes and temporarily stores new memory before transferring labile memory to the cortex for permanent storage (Feng et al., 2001), it may be possible to modulate the consolidation of new fear memories while they are being formed (Pitman & Delahanty, 2005).

### 5.2 Role of hippocampal neurogenesis in memory consolidation

A previous study showed that exercise on a running wheel, which promotes neurogenesis, increased the rate of loss of hippocampus-dependent contextual fear memory (Kitamura et al., 2009). The study suggested that the level of hippocampal neurogenesis could be modulated and was associated with a causal relationship between adult neurogenesis and the hippocampus-dependent period of fear memory. It is theoretically possible, therefore, that promoting adult neurogenesis early in the transition period might facilitate the clearance of fear memory from the hippocampus. Modulating memory consolidation would mean that posttraumatic stress disorder could be prevented in the aftermath of a traumatic event.

### 5.3 Omega-3 fatty acids and hippocampal neurogenesis

Fear consolidation can be blocked by an antagonist of noradrenergic activation, and the effectiveness of beta blockers for secondary prevention of posttraumatic stress disorder has been studied in clinical trials (Pitman et al., 2002; Vaiva et al., 2003). However, as traumatized individuals are not psychiatric patients, daily life-based intervention for the prevention of posttraumatic stress disorder is preferable.

Based on the animal research conducted to date, omega-3 fatty acids are the most promising candidate for dietary intervention in the aftermath of a traumatic event to facilitate adult hippocampal neurogenesis (Beltz, 2007; Calderon & Kim, 2004; Kawakita et al., 2006; Wu et al., 2004, 2008). The possible effects of omega-3 fatty acids on brain structures have also been observed clinically: a significant correlation was found between omega-3 fatty acid consumption and gray matter volume of the amygdala, hippocampus, and anterior cingulate gyrus in healthy adults (Conklin et al., 2007). Conversely, a selective deficit of docosahexaenoic acid was reported in the postmortem frontal cortex of patients with depressive disorder (McNamara et al., 2007). Following discussion of these results in the literature, Matsuoka proposed that promoting hippocampal neurogenesis by omega-3 fatty acid supplementation after trauma could reduce subsequent posttraumatic stress disorder symptoms (Matsuoka, 2011).

Support for the ability of omega-3 fatty acids to minimize subsequent posttraumatic stress disorder symptoms comes from one published but preliminary open trial (Matsuoka, Nishi, Yonemoto, Hamazaki et al., 2010). The author and colleagues recruited 15 consecutive patients admitted to the intensive care unit of a Japanese general hospital immediately following accidental injury (mostly motor vehicle accidents). Patients received omega-3 fatty acid capsules containing 1,470 mg docosahexaenoic acid and 147 mg eicosapentaenoic acid daily for 12 weeks. The primary efficacy variable was score on the Clinician-Administered Posttraumatic Stress Disorder Scale (CAPS). Omega-3 fatty acid supplementation was well tolerated and resulted in a significantly increased docosahexaenoic acid concentration in erythrocytes. Compared with the hypothetical mean calculated in our previous cohort study (Matsuoka et al., 2009), omega-3 fatty acid supplementation resulted in a significantly reduced mean total score on the Clinician-Administered PTSD Scale (11 vs. 25,  $p = 0.03$ ). This pilot study provided promising support for our hypothesis that omega-3 fatty acid supplementation started shortly after accidental injury may be efficacious in attenuating the symptoms of posttraumatic stress disorder. However, because of the open-label design and the lack of controls, no definitive conclusion could be drawn from the trial and we must wait for the results of an adequately powered randomized controlled trial (ClinicalTrials.gov Identifier: NCT00671099).

## 6. Conclusion

Peritraumatic distress can be assessed quickly and efficiently by using the Peritraumatic Distress Inventory and is an indicator for posttraumatic stress, depressive and anxiety symptoms, and posttraumatic growth in motor vehicle accident survivors. The Peritraumatic Distress Inventory can be used in the emergency department for early identification of motor vehicle accident survivors who are unlikely to develop posttraumatic stress disorder, and the combination of screening with the Peritraumatic Distress Inventory and supplementation with omega-3 fatty acids might be an effective preventive strategy for posttraumatic stress disorder in motor vehicle accident survivors.

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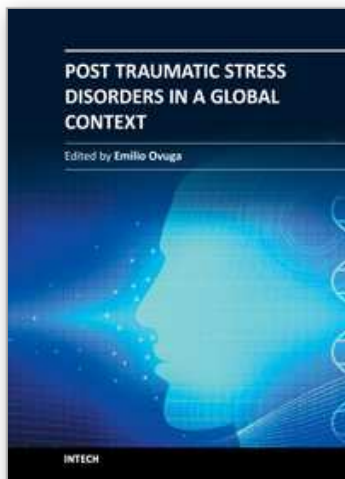
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## **Post Traumatic Stress Disorders in a Global Context**

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If, as a health care or social service provider, one was called upon to help someone who has experienced terror in the hands of a hostage taker, an irate and chronically abusive spouse or parent, or a has survived a motor vehicle accident, landslide, earthquake, hurricane or even a massive flood, what would be one's priority response? What would be considered as the most pressing need of the individual requiring care? Whatever the answer to each of these questions, people who have experienced terror, suffer considerable psychological injury. Post-Traumatic Stress Disorder in a Global Context offers some answers to meet the needs of health care and social service providers in all settings, whether in a hospital emergency room, at the war front, or natural disaster site. The take home message is, after providing emergency care, there is always a pressing need to provide mental health care to all victims of traumatic stress.

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