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Posttraumatic stress symptom clusters associations with psychopathology and functional impairment

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ABSTRACT

We examined posttraumatic stress symptom clusters associations with psychopathology and functional impairment in 899 Norwegian survivors of the 2004 South-East Asia tsunami six months post-disaster. Posttraumatic stress symptoms were assessed with the Impact of Event Scale-Revised (IES-R) with intrusion, avoidance, and hyper-arousal subscales. For criterion variables, we used 10 indicators of psychopathology and functional impairment, e.g. having mental health problems, seeing mental health professionals, and use of medication or sick leave. Hyper-arousal had stronger correlations than avoidance with all criterion variables (p values < 0.001) and stronger correlations than intrusion with seven of the 10 criterion variables (p values < 0.01). Also, intrusion had stronger correlations than avoidance with seven of 10 criterion variables (p values < 0.05). Thus, our findings indicate that symptoms of hyper-arousal may be more closely linked to psychopathology and functional impairment than other symptoms of posttraumatic stress following a sudden onset, short duration, natural disaster event.

1. Introduction

Fueled by the pending publication of the Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (DSM-V, http://www.dsm5.org/), there is considerable controversy about how to define the diagnostic criteria of posttraumatic stress disorder (PTSD). Presently, the DSM-IV-TR organizes PTSD symptoms into three clusters: intrusion, avoidance/numbing, and hyper-arousal. Criteria for PTSD require ≥one of five intrusion symptoms (Criterion B), ≥three of seven avoidance/numbing symptoms (Criterion C), and ≥two of five hyper-arousal symptoms (Criterion D). Yet it remains unclear whether these relative contributions of symptoms to the PTSD diagnosis accurately reflects the core features of traumatic stress (Ehlers, Mayou, & Bryant, 1998; Maes et al., 1998; North, Suris, Davis, & Smith, 2009; Rosen & Lilienfeld, 2008; Spitzer, First, & Wakefield, 2007).

Following a trauma, individuals cross the diagnostic threshold for PTSD Criterion C less often than they cross the thresholds for Criteria B and D (Catapano et al., 2001; Ehlers et al., 1998; Maes et al., 1998; McMillen, North, & Smith, 2000; North et al., 1999; North et al., 2005). This has led several authors to assert that the avoidance/numbing symptom cluster drives the diagnosis of PTSD (Breslau, 2001; Norris et al., 2002; North et al., 2009). The relatively crucial importance of Criterion C may be due to at least two reasons, Criterion C symptoms being less prevalent than Criteria B and D symptoms in traumatized populations (Ehlers et al., 1998; Foa, Riggs, & Gershuny, 1995; North et al., 1999; Solomon & Canino, 1990), and\or it may be due to the higher number of Criterion C symptoms required. Thus, the findings that Criterion C predicts PTSD (Maes et al., 1998; North et al., 1999; North et al., 2005) as well as the conclusion that "group C is a marker for PTSD" (North et al., 2009, p. 38) may be a consequence of the current conceptualization of PTSD rather than the importance of the avoidance/numbing symptoms themselves.

This debate calls for empirical investigations of which symptoms are linked to psychopathology and functional impairment (North et al., 2009). Surprisingly, few studies have explored these associations. In their study of Oklahoma City bombing survivors, North et al. (1999) found that surpassing the Criterion C threshold was associated with difficulties in functioning and treatment received. In the absence of Criterion C symptoms, however, surpassing Criterion B or D thresholds was not associated with psychopathology or functional impairment. In contrast, Ehlers et al. (1998) observed that among motor vehicle accident patients, "a substantial proportion of those who did not meet the avoidance criterion reported disability. These patients may require treatment, and it may not be sensible to assign them non-patient status just because they do not meet an arbitrary score for avoidance and numbing criteria" (p. 516).

Our sample of Norwegian tourists who were repatriated from South-East Asia shortly after the 2004 tsunami offers a unique

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opportunity to study the relative burden of posttraumatic symptoms in a community sample exposed to a well-defined, sudden onset, short duration event. Geographic differences in disaster severity resulted in a wide range of exposure and of posttraumatic stress reactions accordingly (Heir et al., 2010; Heir & Weisæth, 2008; Kraemer, Wittmann, Jenewein, & Schnyder, 2009). Previous analyses showed that symptoms of hyper-arousal were more closely linked to disaster exposure than other symptoms of posttraumatic stress (Heir, Sandvik, & Weisæth, 2009). Our present study expands on this previous finding by investigating the relationship between PTSD symptom clusters and psychopathology and associated functional impairment.

2. Method

2.1. Participants

Our study population consisted of Norwegian nationals over the age of 18 years who had been in disaster-stricken areas during the 2004 tsunami. A total of 2468 Norwegian nationals was eligible for our study. Of these, 899 individuals (36%) returned our questionnaire. From this sample, 55 respondents were excluded due to missing data. Compared to the 1624 individuals who were excluded, the remaining 844 participants – our final sample – had similar age to the excluded individuals (mean 43.4 years), and a higher proportion of women (53%) (Heir et al., 2009). Non-responders were less likely to have been exposed to the tsunami than responders, and they had lower levels of posttraumatic stress symptoms (Hussain, Weisæth, & Heir, 2009). In the final sample, 60% of the participants had more than 12 years of education, 74% were employed, and 66% were married or cohabitating with their partner. Also, 66% of participants were travelling with their spouse or live-in partner, 37% with their children under 18 years of age, and 14% with their parents. Prevalence of contact with a general medical practitioner, psychologist, or psychiatrist for mental health problems prior to the tsunami was 22%. The participants were similar to the age and sex adjusted Norwegian population with regard to employment and marital status (Statistics Norway, http://www.ssb.no/english/).

2.2. Measures

We sent a questionnaire to subjects' home addresses six months after the disaster. The questionnaire queried demographic variables, their exposure to the tsunami, current symptoms of posttraumatic stress, and indicators of psychopathology and functional impairment.

The questionnaire asked about specific details as for disaster exposure, allowing us to classify participants into three groups of exposure severity (for details, see Heir et al., 2009). The danger exposed group consisted of individuals that had life-threatening exposure to the tsunami (e.g., being caught by the wave), the non-danger exposed group included individuals that experienced the tsunami without any immediate life threat (e.g., witnessing others' deaths or suffering), and the non-exposed reference group consisted of individuals who were present in South-East Asia, but with limited exposure to the tsunami.

We used the Impact of Event Scale-Revised (IES-R) (Weiss & Marmar, 1997) to examine the presence and intensity of PTSD symptoms during the previous week. Participants responded to each item on a five-point Likert scale that ranged from 0 (not at all) to 4 (extremely) with regard to their tsunami experience. We used IES-R mean subscale scores of intrusion, avoidance/numbing, and hyper-arousal as semi-continuous measures of PTSD symptom severity.

We queried multiple variables of psychopathology and functional impairment. Participants were asked whether they had subjective mental health problems that they attributed to the tsunami (scored from (0) 'not at all' to (3) 'yes, definitely'), saw a physician (dichotomized), were referred to psychologist or psychiatrist (dichotomized), used sick leave or disability (number of days absent during last month, grouped into 0, 1–13, and 14+), and used psychotropic medication (scored from (0) 'no' to (3) 'every day'). Furthermore, we included the General Health Questionnaire (GHQ-28) (Goldberg & Hillier, 1979) as a measure of general psychological distress during the previous week (Likert scale, scored 0–1–2–3). Also, with the Post-Traumatic Symptom Scale (PTSS-10, scored from (0) 'never' to (6) 'very often') (Holen, Sund, & Weisæth, 1983), we used items to assess sleep disturbance, social withdrawal, and guilt. Finally, we used the Cantril's Ladder of Life Satisfaction (CLLS) (Cantril, 1965) to measure current life satisfaction (scored from (1) 'worst possible life' to (10) 'best possible life' imagined).

2.3. Procedure

Norwegian police registered names, personal identification numbers, and places of residence in South-East Asia during the disaster. With permission from the Norwegian Data Inspectorate and the Regional Committee for Medical Research Ethics, this information was made available for our study. One additional request for participation was mailed to non-participants. For each participant, a missing item response on a psychometric instrument was replaced with the item score on the same instrument that, on the sample level, had the highest correlation coefficient (kappa value) with the missing item. We excluded participants from analyses if their responses had ≥30% missing data within a measure or subscale.

2.4. Analysis of data

We performed chi-square tests or one-way ANOVAs (Kruskal–Wallis) to compare the three allocated exposure groups with regard to PTSD symptom clusters, psychopathology and functional impairment. We used Spearman rho to test correlations between PTSD symptom clusters and indicators of psychopathology and functional impairment. Differences between pairwise PTSD symptom cluster scores were found to be normally distributed, and thus we examined differences between paired correlations with *t*-tests of two dependent correlations from the same sample (Chen & Popovich, 2002). With x and z denoting the scores of two selected symptom clusters, and y denoting the indicator of psychopathology or functional impairment, the significance of the difference of x's and z's correlation with the indicator y was calculated with the following formula:

$$t = (r_{xy} - r_{zy}) * SQRT(((n-3)(1+r_{xz}))/ \\ (2(1 - r_{xy}^2 - r_{xz}^2 - r_{zy}^2 + 2r_{xy} * r_{xz} * r_{zy})))$$

where r is the absolute value of a correlation coefficient and n is the sample size. All tests were two-tailed and differences were considered significant if $p < 0.05$. We performed statistical analyses with the software package SPSS, version 16.0.

3. Results

Table 1 presents IES-R subscales and other indicators of psychopathology and functional impairment in two groups of exposed participants and a non-exposed reference group. Significant outcome differences were found between the groups, regardless of which of the indicators were applied. In general, the more the exposure, the more psychopathology or functional impairment. The