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Social organizational stressors and post-disaster mental health disturbances: A longitudinal study

Peter G. van der Velden [a,b,*], Mark W.G. Bosmans [a], Stefan Bogaerts [c], Marc J.P.M. van Veldhoven [d]

[a] INTERVICT, Tilburg University, Tilburg, The Netherlands
[b] Institute for Psychotrauma, Diemen, The Netherlands
[c] Tilburg School of Social and Behavioral Sciences, Tilburg University, Tilburg, The Netherlands
[d] Tilburg School of Social and Behavioral Sciences, Department of Human Resource Studies, Tilburg University, Tilburg, The Netherlands

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ABSTRACT

Social organizational stressors are well-known predictors of mental health disturbances (MHD). However, to what extent these stressors predict post-disaster MHD among employed victims hardly received scientific attention and is clearly understudied. For this purpose we examined to what extent these stressors independently predict MHD 1.5 years post-disaster over and above well-known risk factors such as disaster exposure, initial MHD and lack of general social support, life-events in the past 12 months and demographics ($N=423$). Exposure, social organizational stressors and support were significantly associated with almost all examined mental health disturbances on a bi-variate level. Multivariate logistic regression analyses showed that these stressors, i.e. problems with colleagues, independently predicted anxiety (*Adj. OR*=5.93), depression (*Adj. OR*=4.21), hostility (*Adj. OR*=2.85) and having two or more mental health disturbances (*Adj. OR*=3.39) in contrast to disaster exposure. Disaster exposure independently predicted symptoms of PTSD symptoms (*Adj. OR*=2.47) and agoraphobia (*Adj. OR*=2.15) in contrast to social organizational stressors. Importantly, levels of disaster exposure were not associated nor correlated with (levels of) social organizational stressors. Findings suggest that post-disaster mental health care programs aimed at employed affected residents, should target social organizational stressors besides disaster-related stressors and lack of general social support.

1. Introduction

Numerous studies on traumatic stress have assessed potential risk factors for post-event PTSD-symptomatology. Risk factors for (symptoms of) major depression, generalized anxiety, adjustment disorder and substance abuse following potentially traumatic events, were less often examined: current meta-analyses on risk-factors for post-trauma mental health problems are primarily focused on PTSD or PTSD-symptomatology (Brewin et al., 2000; Ozer et al., 2003). With regard to disasters, a large series of potential risk factors for posttraumatic stress symptoms among adult affected residents after disasters have been evaluated and identified (Neria et al., 2009). They vary from pre-event functioning (Dirkzwager et al., 2006), and disaster exposure to post-disaster social support (Kaniasty and Norris, 1995; Guay et al., 2006; Kaniasty and Norris, 2008). More recently, factors related to the collective nature of disasters have also been explored, such as community social capital (Kawachi and Subramanian, 2006; Wind and Komproe, 2012).

Stressors related to the work setting of employed affected residents, in contrast to stressors related to post-event life-events, hardly received attention in empirical disaster research. This is remarkable since the influence of such stressors on mental health such as burnout and fatigue is very well documented (cf. House, 1981; Karasek and Theorell, 1990; Beehr and McGrath, 1992; Frese, 1999; Viswesvaran et al., 1999; Halbesleben, 2006) and many affected residents are employed. The few disaster studies that examined risk factors related to work were primarily focused on job loss but not on work and organizational factors. In this study we are particularly interested in the possible influence of social organizational stressors, for instance, conflicts at work, lack of appreciation and recognition and negative atmosphere. These are generally recognized as important for mental health in workers (House, 1981; Kahn and Byosiere, 1992; Cooper et al., 2001) but have, to the best of our knowledge, never been examined in the perspective of post-disaster posttraumatic stress symptoms and recovery among employed affected residents. Nandi et al. (2004)

* Correspondence to: INTERVICT, Tilburg University, Room M634, PO Box 90153, 5000 LE Tilburg, The Netherlands. Tel.: +31 13 466 3526; fax: +31 13 466 3546.
E-mail address: pg.vandervelden@tilburguniversity.edu (P.G. van der Velden).

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assessed the independent predictive value of general work stress and (changes in) job satisfaction, for PTSD following the 9/11 terrorists attacks, besides other factors related to work such as income. Findings among employed residents showed that work stress assessed by one item was very strongly predictive (adjusted $OR=9.78$) for PTSD one year post-event, while job satisfaction, also assessed by a single item, was not related to PTSD. Factors that are also related to post-event mental health problems, such as severity of disaster exposure and general social support were not included in this study. Therefore the question remains to what extent social organizational stressors are independent predictors over and above exposure and general support.

The influence of social organizational stressors on mental health besides the influence of potentially traumatic stressors is clearly demonstrated in several police studies (Violanti and Aron, 1993; Hart et al., 1995; Collins and Gibbs, 2003; Huddleston et al., 2007; Maguen et al., 2009; Van der Velden et al., 2010). These studies have shown that the predictive value of social organizational stressors is at least as strong as the predictive values of potentially traumatic stressors (violence, accidents, etc.), for mental health problems among police officers.

In sum, there are good empirical reasons to hypothesize that social organizational stressors independently predict post-event mental health disturbances among employed adults affected by disasters, over and above disaster exposure, life-events, lack of general social support and demographics such as age and gender. Moreover, this hypothesis is in line with the Conservation of Resources Theory (Hobfoll, 1989, 2002), used in disaster research as well as in organizational research on stress (cf. Westman et al., 2004; Hobfoll et al., 2012; Schat and Frone, 2011). This theory predicts that mental health problems are caused by the (threat of) loss of important resources (i.e. stressors), such as disaster exposure (loss of safety), lack of general social support and relational problems with colleagues and superiors.

Aim of the present study is to test this hypothesis and to examine if social organizational stressors should be included and targeted in post-disaster mental health care programs. We focused on a broad category of mental health disturbances as dependent variables: severe symptoms of anxiety, depression, hostility, disaster-related PTSD (intrusions and avoidance) and agoraphobia.

2. Materials and methods

2.1. Background and participants

On May 13, 2000, a massive explosion in a fireworks storage occurred in a residential area in the city of Enschede, the Netherlands. The disaster severely damaged or destroyed about 500 houses, killed 23 people and injured over 900 victims (for details see Kleber and Van der Velden, 2009). The Dutch Government declared it a national disaster and decided to launch the comprehensive Enschede Fireworks Disaster Study. The Medical Ethical Committee of the Netherlands Organization for Applied Scientific Research (TNO, Zeist) approved the study protocols and all participants gave their written informed consent.

Participants in the present study were adult residents of the affected area in Enschede of Dutch origin. The research procedures (information, written informed consent, approval Medical Ethical Testing Committee) and the characteristics of all participants as well as the psychometric properties of our measures were described elsewhere in detail (Van der Velden et al., 2006, 2007, 2009).

In brief, for the first survey 2–3 weeks post-disaster all approximately 4500 affected adult residents were asked to participate. The second survey took place 18 months post-disaster (November–December 2001; estimated response 2–3 weeks post-disaster, response=33%; 18 months post-disaster, response=80% of participants at T1). Non-response analyses with respect to the first wave showed that prevalence estimates of mental health problems were not biased, i.e. although there was selective participation, multiple imputation techniques (also) using the data of the electronic medical records of the General Practitioners, barely affected prevalence estimates of health problems in the survey 3 weeks post-disaster (Grievink et al., 2006). For the present study we selected Dutch native respondents who worked at T2 for 19 h per week or more ($N=423$).

2.2. Measures

All respondents filled in a paper-and-pencil questionnaire at both waves.

2.2.1. Disaster exposure

Disaster exposure was examined 2–3 weeks post-disaster. We used the total scores on a screening list of 21 items (0=no, 1=yes) about what participants had seen, felt, heard, or smelled during or immediately after the disaster such as "Had they felt air pressure from the fatal explosion" and "Had they experienced intense fear or had they seen any injured or dead people" (cf. Van der Velden et al., 2007). For the present study, four levels of disaster exposure were distinguished to obtain four subgroups with more or less the same sample size: (1) low (scores <7), (2) medium ($8 \leq$ scores ≤ 11), (3) high ($12 \leq$ scores ≤ 14), and very high (scores ≥ 15).

2.2.2. Life events

We assessed stressful life events (for example death of a significant other, divorce, victim of crime) 18 months post-disaster (cf. Van der Velden et al., 2007). For the present study we made a distinction between participants who reported one of more life events in the past year and respondents who did not.

2.2.3. Social organizational stressors

Social organizational stressors among all respondents were assessed using a 4-point response scale (0=always, 3=never) with nine items for problems with colleagues and nine items for problems with superiors taken from the Questionnaire on the Experience and Evaluation of Work (QEEW, VVBA in Dutch; Van Veldhoven et al., 1997, 2002). Items of both scales cover topics such as conflicts, aggression, lack of support in case of work problems, negative atmosphere, and absence of appreciation (Cronbach's alpha: colleagues=0.97, superiors=0.98). We distinguished three levels of severity of problems with colleagues (for this purpose scores of the total study group on both scales were divided in three sub-groups with more or less the same numbers of respondents or proportions): low levels (scores ≤ 3), medium levels ($4 \leq$ scores ≤ 7), and high levels of problems (scores ≥ 8), and three levels of severity of problems with superiors: low levels (scores ≤ 2), medium levels ($3 \leq$ scores ≤ 6), and high levels of conflicts (scores ≥ 7).

2.2.4. General social support

General lack of social support was examined using the total score of the 34-item Social Support List Discrepancy (SSL-D) questionnaire (34 items; Van Sonderen, 1993; Bridges et al., 2002). Items have 4-point scales and cover (lack of) everyday emotional support, emotional support in response to problems, appreciation of support, instrumental support, social companionship and informative support (1=I miss it, I would like it to happen more often to 4=it happens too often, it would be nice if it happened less often; Cronbach's alpha=0.95). For the present study three levels of lack of social among all respondents were distinguished (for this purpose the lack of social support scores of the total study group was divided into three subgroups with more or less the same numbers of respondents or proportions): low levels (scores ≤ 37), medium levels ($38 \leq$ scores ≤ 47), and high levels of lack of social support (scores ≥ 48).

2.2.5. Mental health disturbances

Mental health at T1 and T2 was examined using the 5-point response scales (1=not at all, 5=extremely) of the subscales anxiety (10 items), depression (16 items), hostility (6 items) and agoraphobia (7 items) of the Symptom Checklist 90-Revised (SCL-90-R; Derogatis, 1983; Arrindell and Ettema, 1986). The SCL-90-R refers to symptoms during the past 7 days.

For anxiety, depression and hostility, the Dutch SCL-90-R cut-off scores (Arrindell and Ettema, 1986) for males and females of a normal population were used to identify respondents with severe health problems (high or very high scores: scales males: anxiety ≥ 15, depression ≥ 23, hostility ≥ 9; agoraphobia8 $\geq$; scales females: anxiety ≥ 18, depression ≥ 28, hostility ≥ 17; agoraphobia ≥ 10). Cronbach's alpha values for all subscales proved to be good (all alpha's >0.91; Van der Velden et al., 2006, 2007).

2.2.6. Disaster-related PTSD symptoms: intrusions and avoidance

Disaster-related intrusions and avoidance reactions at T1 and T2 were assessed using the Dutch version of the Impact of Event Scale (IES; Horowitz et al., 1979). Scores on the 15 items were rated on a 4-point Likert scale (0=not at all, 5=often) and assessed the degree of disaster-related intrusions and avoidance reactions during the past 7 days, with total scores ranging from 0 to 75. The reliability and structure of the Dutch IES has proven to be adequate across various traumatic stressors. It has a robust structure, supporting the composition (Intrusions and Avoidance scale) of the original IES (see van der Ploeg et al., 2004). At all measurement points, the internal consistency was excellent, Cronbach's alpha's ≥ 0.94). A cut-off score of 25 (>25) was used to identify survivors with relatively severe intrusions and avoidance reactions (Van der Velden et al., 2006).

2.3. Statistical analysis

We selected respondents who were currently employed for 19 h a week or more (N=423). Control analyses showed that among the employed affected residents 2–3 weeks post-event (who worked for 19 h or more), 59 did no longer work for 19 h or more 18 months post-event. In addition, 33 did not work for 19 h of more 2–3 weeks post-event while they did 18 months post-event. We have no information available on how many affected residents in the present study lost their job as a direct consequence of the disaster (and could work or did not find work in time between T1 and T2).

Furthermore, we counted the number of mental health disturbances of each respondent at T1 and T2 separately (ranging from 0 to 5), and made a distinction between respondents with (a) no or just one mental health disturbance, and (b) two or more different mental health disturbances at T1 and T2. We choose to assess to what extent having two or more mental health problems is (independently) associated with the predictors since all other analyses are aimed at predicting having a specific mental health problem (or not). These analyses do not provide insight into what extent the predictors are associated with having more (two or more) mental health problems.

We first examined the bi-variate associations between levels of disaster exposure, initial mental health disturbances, the two social organizational stressors and general social support on the one hand, and mental health disturbances on the other hand, using chi square tests. Anxiety, depression, hostility and agoraphobia symptoms, disaster-related PTSD symptoms and the number of mental health disturbances (0 or 1 versus 2 or more) were the dependent variables.

To assess the independent predictive values of the predictors, multivariate logistic regression (MLR) analysis were performed. In the MLR, age, gender and educational level were entered simultaneously with disaster exposure, initial symptoms (same symptoms at 2–3 weeks post-disaster than predicted symptoms: thus for predicting anxiety at 1.5 years, anxiety at 2–3 weeks was entered), social organizational stressor and lack of general social support in the analyses as predictors, to control for the possible effects of these variables (results not shown in tables but available on request).

3. Results

Of the respondents, 59.6% were male and 34.5% experienced one or more life-events in the past year. In total, 38.6% was 18–35 years old, 45.7% was 36–50 years old, and 15.6% was older than 51 years at T2. With respect to educational level, 31.9% had junior high/middle school level, 38.5% had high school level and 29.1% a college degree/university level at T2. At T2, 17.5% had severe anxiety symptoms (T1=35.6%), 24.8% depression symptoms (T1=40.4%), 23.4% severe hostility symptoms (T1=40.1%), 26.4% severe PTSD symptoms (T1=62.2%), 22% severe agoraphobic symptoms (T1=32.1%), 27.2% had 2 or more different mental health problems (T1=51.5%), and 12.5% used MHS (no data on T1 available).

Descriptive statistics of the study variables and subgroups as well as the results of the chi-square tests and multivariate logistic regression analyses with respect to anxiety, depression, hostility, PTSD-symptoms, agoraphobia and having two or more mental health problems are presented in Table 1. Preliminary analyses showed that levels of disaster exposure was not associated with the level of social organizational stressors: mean scores of stressors did not differ significantly across the 4 levels of disaster exposure [$F^{colleagues}(3,409)=0.79$, $p=0.50$; $F^{superiors}(3,409)=0.53$, $p=0.66$] nor was disaster exposure significantly correlated with these stressors ($r^{colleagues}=0.01$, $p=0.92$; $r^{superiors}=-0.03$, $p=0.41$).

Table 1 shows that on a bi-variate level, all five predictors were significantly associated with all six examined mental health disturbances at T2, except that disaster exposure did not significantly predict hostility at T2 ($p<0.10$) and that problems with colleagues were not associated with PTSD symptoms (p=ns).

However, the MLR analyses levels of disaster exposure were not significantly predictive of severe anxiety, depression and hostility symptoms, and having two or more mental health disturbances, in contrast to social organizational stressors, more specifically problems with colleagues. With respect to PTSD and agoraphobic symptoms a reverse pattern was found: disaster exposure was predictive of these symptoms, but social organizational stressors were not. Problems with superiors were not independently predictive of the mental health disturbances presented in Table 1. Table 1 further shows that severe symptoms at T1 and lack of general social support were the strongest independent predictors of severe symptoms at T2. Unfortunately, we were not able to examine possible interaction effects between disaster exposure and social organizational stressors (preliminary analyses showed that the interaction term caused very low cell counts and/or empty cells resulting in extremely large confidence intervals).

4. Discussion

The main purpose of the present study was to examine the predictive value of post-disaster social organizational stressors on post-disaster MHD: stressors that are well known risk factors for mental health among employed residents in non-disaster settings (see House, 1981; Karasek and Theorell, 1990; Beehr and McGrath, 1992; Frese, 1999; Viswesvaran et al., 1999; Halbesleben, 2006). These factors received, as far as we know, very little attention in disaster studies on mental health and recovery hitherto.

Our findings clearly demonstrate that respondents with high levels of social organizational stressors, i.e., problems with colleagues (such as conflicts, aggression, lack of support in case of work problems, negative atmosphere, and absence of appreciation), were much more at risk for anxiety, depression, hostility and having two or more mental health disturbances than those with low levels, in contrast to symptoms of PTSD and agoraphobia 1.5 years post-event. Although significantly associated on a bi-variate level, disaster exposure was no longer a significant predictor for depression, hostility and having two of more mental health disturbances at T2. There was a statistical trend ($p=0.06$) that exposure (very high) was independently associated with anxiety at T2.

In other words: severe post-disaster problems with colleagues were at least as or even more important for understanding post-disaster mental health 1.5 years post-event as disaster experiences. Preliminary analyses showed that the level of disaster exposure was not associated or correlated with the levels or social organizational stressors, indicating that results cannot be attributed to differences in social organizational stressors between affected and non-affected employed residents. These results are remarkable, given the fact that we also entered lack of general social support and demographics into the equations, since lack of general social support was very strongly associated with post-disaster mental health. Although Nandi et al. (2004) examined a somewhat different type of organizational stressors and controlled for other variables in the multivariate analyses, our findings appear to be in line with their conclusions that organizational stress was strongly associated with post-disaster mental health.

Thus, our findings confirm COR theory in general that the loss of resources either related to the disaster (loss of safety), related to work (problems with colleagues) or in general (lack of social support), is independently related to mental health problems 1.5-year post-disaster. However, although lack of social support was very strongly associated with all assessed mental health problems, disaster exposure and problems with colleagues were independently associated at a $p<0.05$ level with different specific mental health problems. For instance: problems with colleagues were not independently associated with PTSD-symptomatology while with respect to depression the opposite was found.

The strengths of the present study are the large sample size, prospective design and relevant measures on mental health. Nevertheless, some limitations need to be addressed here. Our findings are based on well-validated self-report instruments (health, organizational stressors) but not (regarding mental health) on clinical interviews. Unfortunately we have no data on clinician diagnosed mental

Table 1
Outcomes multivariate logistic regression analyses predicting mental health disturbances 1.5 years post-disaster.[a]

	Anxiety							Depression						
	N^{total}	N	(%)	Chi	Adj. OR	(95% CI)	p	N^{total}	N	(%)	Chi	Adj. OR	(95% CI)	p
Disaster exposure														
Low (Ref.)	103	11	(10.7)					101	20	(19.8)				
Medium	117	15	(12.8)		0.96	(0.36–2.55)	0.941	117	19	(16.2)		0.50	(0.22–1.16)	0.107
High	80	14	(17.5)		1.49	(0.53–4.22)	0.451	78	23	(29.5)		1.20	(0.49–2.93)	0.695
Very high	105	29	(27.6)	12.75**	2.43	(0.96–6.17)	0.061	105	34	(32.4)	10.19*	1.13	(0.50–2.54)	0.771
Symptoms 2–3 weeks post-disaster[b]														
Not severe (Ref.)	264	18	(6.8)					242	22	(9.1)				
Severe	141	51	(36.2)	56.02***	6.30	(3.16–12.57)	0.000	159	74	(46.5)	73.91***	7.02	(3.69–13.36)	0.000
Social organizational stressors: problems with colleagues														
Low (Ref.)	130	8	(6.2)					128	14	(10.9)				
Medium	129	18	(14.0)		2.43	(0.87–6.82)	0.092	128	28	(21.9)		2.67	(1.07–6.62)	0.035
High	146	43	(29.5)	27.68***	5.93	(1.98–17.75)	0.001	145	54	(37.2)	26.27***	4.21	(1.58–11.21)	0.004
Social organizational stressors: problems with superiors														
Low (Ref.)	115	10	(8.7)					114	18	(15.8)				
Medium	136	20	(14.7)		0.81	(0.30–2.16)	0.672	134	25	(18.7)		0.44	(0.18–1.08)	0.072
High	154	39	(25.3)	13.67**	0.80	(0.28–2.26)	0.668	153	53	(34.6)	15.83***	0.58	(0.22–1.51)	0.265
Lack of general social support														
Low (Ref.)	148	8	(5.4)					148	7	(4.7)				
Medium	124	15	(12.1)		2.10	(0.77–5.75)	0.149	123	25	(20.3)		4.26	(1.62–11.18)	0.003
High	133	46	(34.6)	45.29***	6.45	(2.58–16.10)	0.000	130	64	(49.2)	76.54***	15.27	(6.04–38.62)	0.000

	Hostility							PTSD symptoms: Intrusions and avoidance						
	N^{total}	N	(%)	Chi	Adj. OR	(95% CI)	P	N^{total}	N	(%)	Chi	Adj. OR	(95% CI)	P
Disaster exposure														
Low (Ref.)	105	20	(19.0)					99	15	(15.2)				
Medium	119	22	(18.5)		0.67	(0.30–1.50)	0.330	115	23	(20.0)		0.79	(0.36–1.73)	0.550
High	82	18	(22.0)		0.52	(0.24–1.15)	0.107	76	23	(30.3)		1.83	(0.87–3.87)	0.112
Very high	106	33	(31.1)	6.34+	0.69	(0.30–1.61)	0.394	102	38	(27.3)	15.83***	2.47	(1.24–4.90)	0.010
Symptoms 2–3 weeks post-disaster[b]														
Not severe (Ref.)	250	29	(11.6)					148	15	(10.1)				
Severe	162	64	(39.5)	43.80***	4.95	(2.66–9.20)	0.000	244	84	(24.4)	28.80***	3.36	(1.73–6.54)	0.000
Social organizational stressors: problems with colleagues														
Low (Ref.)	133	15	(11.3)					122	24	(19.7)				
Medium	132	24	(18.2)		1.30	(0.54–3.14)	0.556	128	32	(25.0)		1.26	(0.61–2.60)	0.527
High	147	54	(36.7)	28.03***	2.85	(1.14–7.13)	0.026	142	43	(30.3)	3.92	0.91	(0.41–2.02)	0.810
Social organizational stressors: problems with superiors														
Low (Ref.)	117	16	(13.7)					107	22	(20.6)				
Medium	138	23	(16.7)		0.66	(0.27–1.60)	0.356	132	27	(20.5)		0.67	(0.31–1.45)	0.312
High	157	54	(34.4)	20.61***	0.93	(0.37–2.37)	0.886	153	50	(32.7)	7.33*	1.42	(0.63–3.20)	0.395
Lack of general social support														
Low (Ref.)	149	10	(6.7)					139	16	(11.5)				
Medium	126	19	(15.1)		2.26	(0.92–5.55)	0.076	121	30	(24.8)		3.12	(1.49–6.55)	0.003
High	137	64	(26.7)	71.19***	11.78	(5.16–26.91)	0.000	132	53	(40.2)	29.44***	5.00	(2.45–10.21)	0.000

	Agoraphobia							Two or more mental health disturbances						
	N^{total}	N	%	Chi	Adj. OR	(95% CI)	p	N^{total}	N	%	Chi	Adj. OR	(95% CI)	p
Disaster exposure														
Low (Ref.)	105	14	(13.3)					96	18	(18.8)				
Medium	119	22	(18.5)		1.05	(0.44–2.52)	0.914	113	25	(22.1)		1.05	(0.45–2.48)	0.907
High	81	18	(22.2)		1.52	(0.65–3.55)	0.334	71	24	(33.8)		2.11	(0.88–5.03)	0.094
Very high	106	36	(34.0)	14.34**	2.15	(1.01–4.55)	0.046	101	35	(34.7)	9.39*	1.65	(0.75–3.61)	0.210
Symptoms 2–3 weeks post-disaster[b]														
Not severe (Ref.)	281	25	(8.9)					183	12	(6.6)				
Severe	130	65	(50.0)	87.80***	7.43	(4.09–13.49)	0.000	198	90	(45.5)	73.40***	12.83	(5.84–28.18)	0.000
Social organizational stressors: problems with colleagues														
Low (Ref.)	113	19	(14.3)					118	17	(14.4)				
Medium	131	23	(17.6)		0.86	(0.37–2.01)	0.732	123	26	(21.0)		1.25	(0.52–2.99)	0.622
High	147	48	(32.7)	15.89***	1.36	(0.56–3.28)	0.494	140	59	(42.1)	28.07***	3.39	(1.32–8.73)	0.011
Social organizational stressors: problems with superiors														
Low (Ref.)	117	16	(13.7)					104	20	(19.2)				
Medium	137	26	(19.0)		0.98	(0.41–2.32)	0.957	128	27	(21.1)		0.62	(0.26–1.48)	0.281
High	157	48	(30.6)	12.22**	1.20	(0.47–3.07)	0.698	149	55	(36.9)	12.94**	0.60	(0.23–1.56)	0.295
Lack of general social support														
Low (Ref.)	149	13	(8.7)					137	10	(7.3)				
Medium	125	21	(16.8)		1.98	(0.86–4.57)	0.109	117	28	(23.9)		4.23	(1.71–10.44)	0.002
High	137	56	(40.9)	45.87***	4.73	(2.18–10.23)	0.000	127	64	(50.4)	63.13***	10.22	(4.31–24.26)	0.000

Ref. = reference category. *Adj. OR* = Odd ratio adjusted for all study variables, including age, gender, education and life-events (not shown in table and available on request). *95% CI* = 95% confidence interval. Chi = chi-square statistic. *p* = *p*-value of adjusted OR.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

\+ $p < 0.10$.

[a] The total numbers across column of N^{total} differs a little due to missing values.

[b] Same symptoms at 2–3 weeks post-disaster (thus for predicting anxiety at 1.5 years, anxiety at 2–3 weeks was entered).

disorders. In addition, we were not able to examine the independent predictive value of other types of organizational stressors such as workload, job content, employment practices, and working conditions or pre-event mental health of the respondents. Due to time constraints we were unable to examine social organizational stressors 2–3 weeks post-event although such data would have enriched our study. Respondents in the present study were Dutch natives and not affected ethnic minorities. We had no data available on the loss of jobs due to the disaster.

Importantly, no differences in reported social organizational stressors were found between respondents with no, low, medium, and high disaster exposure indicating that the disaster did not affect these stressors (at least some time after the disaster). In addition, the inter-correlations were not significant. However, we have no data, like most other disaster studies, on pre-event stressors. It was outside the aim of this study to further examine in depth to what extent the associations between organizational stressors and mental health problems are bi-directional, i.e. that mental health problems are independent predictors of social organizational stressors on the longer term. Future longitudinal disaster research on this topic is warranted.

Nevertheless, the outcomes of our and other studies examining the role of social organizational stressors in post-trauma mental health and recovery may be relevant for specific post-disaster mental health care initiatives, and perhaps these findings are also relevant for mental health programs targeted at employed victims of other potentially traumatic events. Of course, mental health programs cannot change what has happened during or immediately after sudden drastic and collective events. However, the social relationships in organizations are conducive to change and influence by management and workers alike (Karasek and Theorell, 1990). Our results suggest that it is especially the horizontal relationships with colleagues that appear to be promising venues for reducing post-disaster mental health problems. Interestingly, similar results were found in a prospective study among police-officers (Van der Velden et al., 2010) demonstrating that problems with colleagues and not problems with superiors independently predicted severe mental health disturbances.

We therefore assume that, although more research is needed, it is worthwhile to monitor social organizational stressors among employed victims during the first 18 months following disasters and perhaps after other more or less collective and drastic events. It may help to diminish or solve these stressors, besides the question who exactly has to develop and provide related interventions. In either way, information on this issue may help employers, managers and directors of organizations who are often searching for ways to support and help their victimized employees. Results suggest that providing general social support may decrease the risk for mental health problems, but that problems with colleagues (such as conflicts, negative atmosphere, absence of appreciation) need to be targeted as well since it is an independent predictor.

Many victims with severe and ongoing symptomatology or mental disorders do not or wait to seek treatment (Van der Velden et al., 2007; Rodrigues and Kohn, 2008). In this perspective and because of relatively low costs, online self-screening for posttraumatic stress symptoms is becoming popular (Donker et al., 2009; Winwood et al., 2009; Vetter et al., 2011). By providing online feedback on the severity of self-reported stress symptoms, victims are encouraged to contact their GP or mental health care professional given the severity and duration of symptoms. Our findings suggest that such screening tools should (also) include questions related to social organizational stressors. It may prevent that possible prominent social organizational stressors are neglected and that presented symptoms are solely attributed to the event and its consequences: in our study four out of six mental health problems were significantly but not independent significantly

associated with disaster exposure 18 months post-event. On the other hand, post-disaster interventions in the workplace need to address both the disaster impact in terms of disaster specific mental health consequences and resources.

There is a need to manage both the disaster reactions and the possible exacerbation of organization stress. Addressing sources of stress that prolong or intensify posttraumatic stress symptoms may be as important as directly addressing posttraumatic stress symptoms (i.e. treatment), and perhaps more crucial because it may simply diminish or even prevent stress symptoms (Hobfoll, 1989, 2002; Kleber and van der Velden, 2009). Targeting such stressors may be much more effective in preventing or reducing stress symptoms than referral to some kind of mental health care.

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