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Correlates of Mental Health Services Utilization 18 Months and Almost 4 Years Postdisaster Among Adults With Mental Health Problems

PETER G. VAN DER VELDEN C[A], JORIS YZERMANS[B], ROLF J. KLEBER[C], B. P. R. GERSONS[D]

[A] Institute for Psychotrauma (IvP), Zaltbommel, The Netherlands
[B] Institute for Health Services Research Netherlands (NIVEL), Utrecht, The Netherlands
[C] Institute for Psychotrauma (IvP), Zaltbommel and Department of Clinical & Health Psychology, Utrecht University, Utrecht, The Netherlands
[D] Department of Psychiatry, Academic Medical Center/De Meren, University of Amsterdam, The Netherlands

ABSTRACT

The authors assess the correlates of mental health services utilization (MHS) After a disaster among adults with mental health problems. Data of a three-wave longitudinal study among adult survivors of a fireworks disaster (T1: 2–3 weeks, T2: 18 months, T3: almost 4 years postdisaster) were linked with their electronic medical records (N =649). Multivariate logistic regression analyses showed that triple comorbidity of PTSD and high levels of anxiety and depression symptoms were positively associated with self-reported MHS utilization at T2 (n =270) and T3 (n =216). Private insurance, predisaster psychological problems, and relocation were associated with MHS utilization at T2 while female gender, being single, and migrant status was associated with MHS utilization at T3. Receiving treatment at T2 was positively associated with receiving treatment at T3, as opposed to medium optimism at T2.

After disasters, a minority of the victims will be confronted with mental health problems such as anxiety and depression, reexperiencing the event, fatigue, and posttraumatic stress disorder (PTSD; Galea, Nandi, & Vlahov, 2005). Accurate estimates of psychological disturbances after disasters are crucial in assessing the need for mental health services (MHS; Cao, McFarlane, & Klimidis, 2003). Furthermore, information is required about which pre-, peri-, and postdisaster factors are associated with MHS utilization to reach survivors who will develop mental health problems (Jankovic-Gavrilovic, Sch¨utzwohl, Fazal, & Priebe, 2005). Two reviews (Elhai, North, & Frueh, 2005; Jankovic- Gavrilovic et al., 2005) demonstrated thatMHSutilization after various traumatic events is, in most cases,

strongly associated with postevent psychological disturbances, related to having a history of previous trauma, a higher exposure level, and being female. Other factors such as age and marital status produced mixed results. What is known about correlates of MHS utilization after disasters? To date, the terrorist attacks of September 11, 2001 were one of the very few disasters where correlates of MHS utilization were examined systematically. For example, in the study by Adams, Ford, and Dailey (2004), among Connecticut adults 1–3 months after the attacks, victim status, sleeping problems, increased substance use, and having received alternate forms of help were positively and independently associated with receiving formal help since the attacks. In Connecticut adults assessed in the period 5–15 months postattacks (Ford, Adams, & Dailey, 2006) only the number of poor mental health days during the past 30 days was independently and positively associated with receiving formal help. Boscarino, Adams, and Figley, (2004) assessedMHS utilization related to the attacks amongNew York citizens during the first year postevent.Multivariate logistic regression analyses revealed that victims younger than 65 years, victims with both moderate and high disaster exposure, with perievent panic attacks, with two or more traumatic life events, with low social support and self-esteem, with current anxiety, and with PTSD in the past 12 months more often used MHS. African Americans and respondents with lower education were less likely to use these services (Boscarino et al., 2004). Of the victims with postdisaster PTSD or depression in the first year, 33% had used MHS related to the attack (Boscarino, Adams, Stuber, & Galea, 2005). Multivariate logistic regression analyses among this sample showed that African Americans and those without a regular physician used these services less often, and respondents withmoderate to high exposure and peri-event panic attacks used these services more often in relation to attacks in the past year. According to Andersen's (1995) behavioral model of care utilization, MHS utilization is associated with preevent MHSutilization, in addition to access (such as insurance or readily available healthcare providers) and need factors (both perceived need and severity of distress or dysfunction). A study 6 months after the terrorist attacks (Stuber,Galea, Boscarino,&Schlesinger, 2006) among residents of the Greater New York Metropolitan area showed that indeed the large majority of respondents who received counseling before the attack received counseling after the attack, as opposed to the very small minority among those who had not. To our knowledge, no disaster studies are available that investigated correlates of MHS utilization in the intermediate and long term. Although predisaster psychological problems are important determinants for postdisaster mental health disturbances (Dirkzwager, Grievink, Van der Velden, & Yzermans, 2006), it is unknown whether these problems are determinants of postdisaster MHS utilization in the intermediate and long term. The aim of the present study was to fill this information gap. Participants in the study were adult residents affected by a fireworks disaster in the city of Enschede, the Netherlands (May 13, 2000). A massive explosion in a central storage facility full of fireworks, which was situated in the middle of a residential area severely damaged or destroyed about 500 houses. Twenty-three people died and about 1,000 people were injured. Approximately 4,500 adult residents were directly affected. The Dutch government declared it a national disaster. A special mental health program and After Care Unit were set up to provide MHS and trauma-related treatment for the affected residents. Considerable public attention was given to the existence of this unit; through public campaigns and other supportive activities, victims with mental health problems were encouraged to seek treatment. In the present study, we assessed which factorswere associated with MHS utilization 18 months and almost 4 years postdisaster among adults with mental health problems. We assessed predisaster factors (demographical characteristics and predisaster psychological problems), peridisaster factors (disaster experiences), and postdisaster factors (number of postdisaster mental health disturbances, i.e., possible need factor, dispositional optimism, and previous MHS utilization). Research has shown that risk factors for posttrauma psychological problems in the shorter term partly differ from risk factors for problems in the longer term (Dirkzwager et al., 2006; Ozer, Best, Lipsey, & Weiss, 2003).

Therefore, we expected that correlates of MHS utilization in the intermediate term differed from correlates of utilization in the long term.

METHOD

Participants and Procedures

We conducted a longitudinal study among affected residents of 18 years and older living in the area where the disaster took place that consisted of three waves (T1, 2–3 weeks postdisaster; T2, 18 months postdisaster; T3, almost 4 years postdisaster). All participants gave their written informed consent. A Medical Ethics Committee (TNO, Zeist, The Netherlands) approved the study protocols (for details, see Van der Velden et al., 2006). At T1, T2, and T3, respectively, 1567, 1116, and 995 affected residents participated (estimated response at T1=30%, response T1–T2=71% and response T1– T3=65%). At T1, affected residents were asked by mail to participate. At T2 and T3, residents who had agreed on the informed consent form to be contacted for a future study, were contacted again and received the questionnaires. At T3, those who participated at T1, but not at T2 were asked to participate at T3. In total, 813 residents participated in all three surveys. Nonresponse analyses were reported in detail in two separate articles and will be described here briefly (Grievink, Van der Velden, Yzermans, Roorda, & Stellato, 2006; van den Berg, Van der Velden, Stellato, & Grievink, 2007). It is estimated that the group of respondents at T1 consisted of more immigrants, women, and older residents than the overall population of affected residents.However,we found no indications that prevalence rates of mental health problems at T1 were affected by the nonresponse (Grievink et al., 2006). Among both native Dutch and immigrant survivors, female survivors and survivors in the age categories 25–44 and 45–64 years old were more likely to respond to the follow-up surveys. In general, disaster exposure did not differ between respondents and nonrespondents at follow-up. Response at follow-up differed between native Dutch and non-Western immigrant survivors. Results of the nonresponse analyses indicate that despite selective response, the complete case prevalence estimates of mental health problems were only slightly biased (van den Berg et al., 2007). For the present study, data of the three surveys were linked to the electronic medical records of their general practitioners (GPs; Dirkzwager et al., 2006; Drogendijk et al., 2006; Yzermans et al., 2005). In the Dutch health care system, each citizen is registered with one GP who keeps a medical record of his or her patient documenting symptoms and diagnoses in accordance with the International Classification of Primary Care (compatible with the International Classification of Diseases [ICD- 10; World Health Organization, 1992] and the Diagnostic and Statistical Manual of Mental Disorders, Third Edition-Revised [DSM-III-R; American Psychiatric Association, 1987]; Lamberts & Wood, 1987). Of the 60 GPs in Enschede, 44 (73%) participated. Of the 16 GPs who did not participate, 9 had no survivors in their practice. Patients were informed about the study and none refused the use of his or her medical record (for details, see Yzermans et al., 2005). In agreement with the Dutch Data Protection Authority, an external party using numerical identification codes linked the data of the two studies. An electronic medical record was available for 649 out of the 813 participants who participated at T1, T2, and T3. Participants in the present study (N =649) differed on some aspects from the group of 164 respondents (813– 649) who participated at all three surveys, but for whom no electronic medical record was available (their GP did not participate or they had a GP outside Enschede). The group of participants in the present study was older (M=43.9, SD=12.9 vs. M=40.1, SD=14.6), t (810)=−3.07, p <.01, reported less injuries/death of a significant other (11.4% vs. 23.2%), $\chi 2$(1, N =813)=15.3, p <.001, and consisted of fewer single individuals (15.0% vs. 27.4%), $\chi 2$(1, N =812)=14.1, p <.001. The groups did not differ in gender, migrant status, disaster exposure, relocated victims, educational level, anxiety and depression symptoms at T1, and intrusions

and avoidance reactions (Impact of Events Scale[IES] total score) (Horowitz, Wilner, & Alvarez, 1979; Van der Ploeg et al., 2004) at T1, and MHS utilization at T2 and T3.

Measures

At T1, participants answered questions about their gender, age marital status, migrant status, and educational level (see Table 1). Disaster exposure was investigated at T1 by using a list of 21 experiences1 (0=no, 1=yes) specifying what participants had seen, felt, heard, or smelled during or immediately after the disaster (for example, saw the explosion, felt the air pressure due to the explosion, seen injured victims, felt intense fear). Degree of exposure was based on the total score, which was divided into low (1=0–7 experiences), medium (2=8–13 experiences), and high exposure (3=14 or more experiences) to obtain subgroups with almost equal numbers among the total group. Previous research has shown that disaster exposure as measured with this list is independently associated with mental health problems in the short, intermediate, and long term (Dirkzwager et al., 2006; Van der Velden et al., 2006). Furthermore, sustained injuries and death of a significant other were assessed (1=no self-sustained injuries or injuries for which no medical treatment was necessary and no loss of a significant other; 2=injuries which were treated by a general practitioner or hospital, and/or loss of a significant other). The Posttraumatic Stress Disorder Self-Rating-Scale (SRS-PTSD; Carlier, Lamberts, Van Uchelen, & Gersons, 1998) was administered to assess disaster-related PTSD (based on DSM-IV criteria; APA, 1994) during the 4 weeks preceding T2 and T3. Items were rated on several 3-point Likert scales (e.g., 1=not at all to 3=extremely). According to the SRS-PTSD, there is an indication of PTSD if a person meets the criteria of persistent reexperiencing of the traumatic event, persistent avoidance of stimuli associated with the trauma, and numbing of general responsiveness and increased arousal (all alphas >.89). The SRS-PTSD has demonstrated a good balance between sensitivity and specificity, with high levels of both (Brewin, 2005). Anxiety and depression symptoms weremeasured at T1, T2, and T3 using the subscales of the well-validated Symptom Checklist (SCL-90-R, Arrindell & Ettema, 1986; Derogatis, 1977). The items were scored on a 5-point Likert scale (1=not at all to 5=extremely) measuring anxiety and depression symptoms over the past 7 days. The Dutch cut-off scores for men and women (high and very high scores according to Dutch norm tables for a normal population; Arrindell & Ettema, 1986) were used to identify participants with high levels of symptoms (all alphas >.93). Dispositional optimism was measured by the 8-item Life Orientation Test (LOT, Scheier & Carver, 1985) at T2 and T3. Items were scored on a 4-point Likert scale (1=strongly disagree to 4=strongly agree); 4 are positively formulated and 4 negatively formulated. Cronbach's alphas were good (all alphas >.75). The total score was divided into low (1=1–20, labeled pessimists), medium (2=20.1– 23.0), and high scores (3=23.1–32.0, labeled optimists) to obtain subgroups with almost equal numbers among the total group of respondents. At T2 and T3, participants were asked whether they had contact with more specialized MHS services, i.e., the aforementioned After Care Unit, local mental health organizations, a private psychiatrist, a psychologist, or a psychotherapist at the time of the survey. Furthermore, we asked whether they had taken psychiatric medication that was prescribed by their GP (or medical specialist), such as antidepressants, sleeping pills, or medications for emotional problems, in the preceding 2 weeks. For the present study, MHS users were defined as using any of these services and/or using any of these psychiatric medications at T2 and T3, respectively.

Electronic Medical Records

With respect to the following variables, we extracted data from the linked electronic medical records (Dirkzwager et al., 2006; Drogendijk et al., 2006; Yzermans et al., 2005). Predisaster psychological problems were defined as whether or not a person had presented one or more psychological problems to his or her GP in the period January 1, 1999 to May

13, 2000 (16.5 months predisaster). Psychological problems as assessed by the GP, consisted of International Classification of Primary Care (ICPC) codes (Lamberts &Wood, 1987) such as (symptoms of) depression (P.76, P76.1, P76.2, P03.0), (symptoms of) anxiety (P01.0, P74.0), insomnia or other sleep disorder (P.06.0), and psychological crisis/ temporary stress reactions (P02). Those who did not visit the GP in this period (15.9% in present sample) received a score of zero. The type of health insurance was extracted from the electronic medical records and was used as an indication of social economic status (SES). In the Netherlands, people (until January 1, 2006) have private health insurance when their income is above a certain level (approximately 29,500 euro=US $39,000). In principle, people with private insurance do not have greater access to MHS than do those with public health insurance. The City Council of Enschede designated a geographical area as the official disaster area. Survivors living in this area were relocated due to the destruction of their homes.

[TABLE 1]

Data Analyses

We defined victims as havingmental health problems at T2 or T3, when they fulfilled the criteria of PTSD, reported anxiety, or reported depression symptoms at T2 or T3. To examine determinants of MHS utilization 18 months and almost 4 years postdisaster among the symptomatic samples, we began with separate bivariate logistic regression analyses and examined odds ratios (ORs) and their 95% confidence intervals (CI) in relation to each predisaster, peridisaster, and postdisaster factor. Multivariate logistic regression analyses were conducted to examine the unique association between each determinant and MHS utilization (adjusted ORs).

RESULTS

Correlates of Mental Health Services' Utilization 18 Months Postdisaster

At T2, 41.6% (n =270) of all participants fulfilled the criteria of PTSD, reported anxiety symptoms, or reported depressive symptoms (18.9%, 32.1%, and 35.6%, respectively). Of this symptomatic sample, 43.6% (n =115) received treatment at T2, 53.9% (n =62) used psychiatric medications, 73% (n =84) had contact with specialized MHS services, and 27% (n =31) used both. The percentage of MHS users at T2 for participants with particular characteristics are presented in Table 1. Bivariate analyses showed that only adults with higher education (OR=0.48, 95% CI=0.23–0.98, p <.05) and with medium and high levels of optimism were less likely to use MHS at T2 than their reference categories (ORmedium =0.55, 95% CI=0.33–0,93, p <.05; ORhigh =.34, 95% CI=0.14–0.83, p <.05). Immigrants (OR=2.29, 95% CI=1.31–4.00, p <.01), adults with predisaster psychological problems (OR=1.80, 95% CI=1.04–3.13, p <.05), and with three mental health problems were more likely to receive treatment (OR=1.95, 95% CI=1.12–3.39, p <.05). In the multivariate logistic regression analyses (see Table 1, Model A) the adjusted ORs for relocation, migrant status, education, and optimism were not significant on a .05 level.

Correlates of Mental Health Services' Utilization Four Years Postdisaster

At T3, 33.6% (n =216) had PTSD, reported anxiety symptoms, and/or reported depression symptoms (McNemar Test T2–T3=178.9 , p <.001; 14.5%, 25.4% and 31.2%, respectively).Of the symptomatic sample at T3, 40.8% (n =87) received treatment at T3; 71.3% (n =62) used psychiatric medications, 60% (n =52) had contact with specialized mental health services, and 31% (n =27) used medications and specialized mental health

services. Table 1 presents the percentages of MHS users at T3 for participants with particular characteristics (see Model B). Bivariate analyses showed that only women (OR=1.84, 95% CI=1.03–3.26, p <.05), immigrants (OR=2.85, 95% CI=1.55–5.22, p <.05), and adults with three mental health problems at T3 (OR=3.56, 95% CI=1.72–7.38, p <.01) were more likely to receive treatment at T3 than their reference categories. The adjusted OR (see Table 1, Model B) indicated that the association between these variables and MHS utilization was hardly affected by the other variables in the model. In the multivariate analyses theORof being single was significant. In addition, we assessed the association between MHS utilization at T3 and all pre-, peri-, and postdisaster factors reported at T2 (including MHS utilization at T2 (see Table 1, Model C)). Bivariate analyses showed that only women (OR=1.76, 95% CI=1.05–2.96, p <.05), immigrants (OR=1.98, 95% CI=1.14–3.46, p <.05), adults with three mental health problems (OR=2.51, 95% CI=1.30–4.83, p <.01), and adults who received treatment at T2 (OR=4.69, 95% CI=2.72–8.08, p <.001) were more likely to receive treatment at T3 than their reference categories. Respondents with medium levels of optimism at T2 were less likely to receive treatment at T3 (OR=0.27, 95% CI=0.15–0.48, p <.001). In the multivariate analyses (seeModel C) migrant status and the number of mental health problems were not significant predictors. Respondents reporting medium disaster exposure were more likely to use MHS at T3.

DISCUSSION

We focused on correlates of MHS utilization among adults with mental health problems 18 months and almost 4 years postdisaster. With respect to predisaster factors, predisaster psychological problems were only associated with MHS utilization 18 months postdisaster. These findings partly differ from the results of the study of Stuber et al. (2006) and the study of Jaycox, Marschall, and Schell (2004) among victims of community violence, although these studies did not assess associations on the long term. Jaycox et al. (2004) found that previous utilization of MHS (which may serve as an indication for predisaster problems) was not positively associated with postevent utilization among the symptomatic sample. Furthermore, we found no indications that age and education were independent determinants for MHS utilization, in contrast to being female (MHS utilization at T3). However, the findings of trauma studies with respect to the association between age, education, and MHS utilization, as opposed to being female, have been inconsistent (Elhai et al, 2005; Jankovic-Gavrilovic et al., 2005). Immigrants were, in contrast to our expectations (Boscarino et al., 2005; Jaycox et al., 2004; Koenen, Goodwin, Struening, Hellman, & Guardino, 2003) not less likely to receive treatment than Dutch natives. Singles were more likely to receive treatment at T3, but not at T2, suggesting possible insufficient social resources at earlier stages after the disaster. It is unclear why adults with private insurance were more likely to receive treatment at T2. Although this finding is in accordance with Andersen's model (1995), the special After Care Unit was available for all affected residents. Peridisaster factors such as disaster experiences were, in accordance with other studies, significantly associated with MHS utilization at T2 (relocation) and with MHS utilization (medium disaster exposure) at T3 (Boscarino et al., 2004; Elhai et al, 2005; Jankovic-Gavrilovic et al., 2005). A previous study (Drogendijk et al., 2006) demonstrated that in the first 18 months GPs were more likely to detect persistent psychological problems among survivors who were forced to relocate than among other survivors. It is possible therefore that they were more often referred by their GP to more specialized MHS in the intermediate term than in the long term, assuming that in the long term GPs and/or victims were less inclined to link mental health problems to the disaster. With respect to postdisaster factors, the number of mental health problems at T2 and T3 were, as expected, strongly related to MHS utilization at T2 and T3, respectively (Elhai et al, 2005; Jankovic-Gavrilovic et al., 2005).However, the number of health problems at T2 was not independently associated with MHS at T3, in

contrast to MHS utilization at T2 (cf. Stuber et al., 2006), which may partly reflect positive results of treatment. Earlier, Boscarino et al. (2005) demonstrated that 14% of the disaster victims with PTSD or depression waited to seek treatment because they first tried to solve their problems on their own. Our results with respect to medium optimism at T2 and the results of Boscarino et al. (2005) suggest that people with moderate levels of optimism may attempt to solve mental health problems on their own, although this possibility was not directly tested in the present study.

Study Limitations

Despite the strengths of our study, some limitations should be noted. The estimated response at T1 was relatively low (30%) with an overrepresentation of women and immigrants. However, we have no indication that this selection biased the prevalence estimates of mental health problems at T1 (Grievink et al., 2006). Affected residents who participated at T1, T2, and T3 and from whom an electronic medical record was available, differed from the other participants in the three surveys in age, proportion of single individuals, and reported injuries/death of a significant other, but not in all other characteristics such asMHS utilization. We obtained data about predisaster psychological problems from the electronic medical records of the GPs in the 16 months prior to the disaster. However, classification of problems is the result of patient–doctor interaction and this may lead to an under-estimation of psychological problems (Drogendijk et al., 2006; Kessler, Lloyd, Lewis, & Gray, 1999) and may cause lower ORs for this variable. Some respondents, who did not visit their GP in the $1_{1/2}$ years before the disaster, may have suffered from psychological problems (cf. Drogendijk et al., 2006). No clinical interviews were administered and the results of the SRS-PTSD were estimates of the true prevalence rates of PTSD.Dispositional optimism was not assessed 2–3 weeks postdisaster.

Future Mental Health Services Policies

In accordance with other studies (Galea et al., 2005), we found that mental health problems decreased slowly (42% at T2, 33% at T3), and that a large group of adults with mental health problems did not receive treatment at T2 and T3, respectively (Boscarino et al., 2005; Ford et al., 2006; Stuber et al., 2006). Thirty-three percent of the victims at T2 and 42% of the victims at T3 with three mental health problems did not receive treatment. Although it is unclear why the number of victims with these problems not receiving treatment increased (9%), our findings and the results of previous studies emphasize the necessity for MHS policies in the long term. Part of themental health program after the disaster consisted of special campaigns aimed at immigrants. We assume that due to this policy, immigrantswithmental health problems were, in contrast to our expectations (Boscarino et al., 2005; Jaycox et al., 2004; Koenen et al., 2003) as likely to receive treatment as were Dutch natives. At T3, immigrants were more likely to receive treatment. In addition, results suggest that in the intermediate term victims with public health insurance (which serves as an indication of lower income), without predisaster psychological problems (or never had contact with MHS; Stuber et al., 2006), and who were not relocated may need special attention. In addition, findings suggest that victims may be informed about the risk of being too optimistic when suffering from mental health problems, i.e., expecting that current problems will decline rapidly without professional help (cf. Van der Velden et al., 2007). In the long term, MHS policies may be targeted especially on men, nonsingle individuals, and natives suffering from mental health problems. In a previous study of native Dutch adult victims of this fireworks disaster, we found that victims used MHS more often than a matched control group, whose members also suffered frommental health problems.We hope that future mental health policies succeed in reaching the identified subgroups who were less likely to receive treatment (see results regression). Nevertheless, the question remains as to how to reach the considerable group of adults who do not receive treatment while suffering

from mental health problems and to reduce their barriers to care. Importantly, this problem is not restricted to disaster victims or victims of other traumatic events with mental health disturbances (cf. Bijl et al., 2003).

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TABLE

Table 1. Results of Multivariate Logistic Regression Analyses Among Symptomatic Samples 18 Months and 4 Years Postdisaster

	Model A Mental health services utilization at T2 among symptomatic sample at T2 (n = 270)					Model B Mental health services utilization at T3 among symptomatic sample at T3 (n = 216)					Model C Mental health services utilization at T3 among symptomatic sample at T2 (n = 270)				
		% of	Users	Adjusted			% of	Users	Adjusted			% of	Users	Adjusted	
	n	Total	%	OR	95% CI	n	Total	%	OR	95% CI	n	Total	%	OR	95% CI
Gender															
Men (Ref)	116	43.0	40.7	1		85	39.4	32.1	1		116	43.0	27.6	1	
Women	154	57.0	45.7	1.49	0.80–2.80	131	60.6	46.5	2.27*	1.12–4.60	152	57.0	40.1	2.06*	1.03–4.11
Age in years															
18–35 (Ref)	85	31.5	41.7	1		74	34.3	41.1	1		84	31.5	35.7	1	
36–50	106	39.3	53.3	1.95	0.97–3.91	79	36.6	41.8	0.97	0.44–2.13	106	39.3	34.9	0.85	0.40–1.78
51 or older	79	29.3	32.0	0.85	0.37–1.98	63	29.2	39.3	1.03	0.41–2.59	78	29.3	33.3	2.03	0.83–4.98
Marital status															
Not living as being single (Ref)	223	82.6	46.1	1		174	80.6	38.0	1		221	82.6	33.5	1	
Living as being single	47	17.4	31.1	0.66	0.29–1.49	42	19.4	52.4	2.40*	1.05–5.47	47	17.4	40.4	1.90	0.81–4.46
Education															
Primary/junior high school (Ref)	140	54.1	48.5	1		110	53.1	44.4	1		139	54.1	36.0	1	
Senior high/vocational education	73	28.2	44.4	0.72	0.35–1.49	62	30.0	36.1	0.70	0.31–1.58	72	28.2	33.3	1.35	0.60–3.02
High vocational/university	46	17.8	31.1	0.46	0.19–1.11	35	16.9	40.0	0.95	0.37–2.42	46	17.8	34.8	2.11	0.85–5.24
Migrant status															
Natives (Ref)	197	73.0	38.1	1		151	69.9	33.3	1		197	73.0	30.5	1	
Immigrants	73	27.0	58.6	1.57	0.78–3.16	65	30.1	58.7	2.74*	1.25–5.99	71	27.0	46.5	1.64	0.76–3.53
Insurance type															
Public (Ref)	229	84.8	42.9	1		180	83.3	43.5	1		227	84.8	37.0	1	
Private	41	15.2	47.5	2.89*	1.24–6.78	36	16.7	27.8	0.82	0.32–2.08	41	15.2	22.0	0.43	0.16–1.10
Predisaster psychological problems															
No (Ref)	199	73.7	39.7	1		157	72.7	38.3	1		197	73.7	32.0	1	
Yes	71	26.3	54.3	2.00*	1.07–3.76	59	27.3	47.5	1.80	0.89–3.63	71	26.3	42.3	1.54	0.78–3.04
Relocation after disaster															
No (Ref)	197	73.0	39.2	1		165	76.4	41.1	1		196	73.0	34.2	1	
Yes	73	27.0	55.7	1.96*	1.02–3.78	51	23.6	40.0	0.63	0.28–1.40	72	27.0	36.1	0.99	0.49–2.01

Table 1. Continued

	Model A Mental health services utilization at T2 among symptomatic sample at T2 (n = 270)					Model B Mental health services utilization at T3 among symptomatic sample at T3 (n = 216)					Model C Mental health services utilization at T3 among symptomatic sample at T2 (n = 270)				
		% of Users		Adjusted			% of Users		Adjusted			% of Users		Adjusted	
	n	Total	%	OR	95% CI	n	Total	%	OR	95% CI	n	Total	%	OR	95% CI
Disaster exposure															
Low (Ref)	53	19.6	43.4	1		35	16.2	34.3	1		53	19.6	28.3	1	
Medium	93	34.4	37.8	0.76	0.34–1.72	83	38.4	42.7	1.85	0.71–4.81	93	34.4	38.7	3.40**	1.38–8.39
High	124	45.9	47.9	0.94	0.43–2.05	98	45.4	41.7	1.26	0.50–3.20	122	45.9	34.4	2.11	0.87–5.13
Injuries/death significant other															
No (Ref)	231	85.6	43.1	1		186	86.1	39.3	1		229	85.6	33.6	1	
Yes	39	14.4	46.2	1.11	0.48–2.55	30	13.9	50.0	1.77	0.69–4.58	39	14.4	41.0	1.56	0.63–3.85
Severe psychological problems at T2/T3															
One mental health problem (Ref)	84	31.1	35.4	1		64	29.6	28.1	1		83	31.1	26.5	1	
Two mental health problems	106	39.3	32.7	0.83	0.42–1.66	84	38.9	36.6	1.58	0.71–3.54	105	39.3	31.4	1.26	0.58–2.73
Three mental health problems	80	29.6	66.7	2.96**	1.34–6.55	68	31.5	58.2	3.92**	1.59–9.64	80	29.6	47.5	1.30	0.54–3.12
Dispositional optimism															
Low (pessimists, Ref)	127	47.0	52.8	1		114	53.5	45.1	1		126	47.0	47.6	1	
Medium	109	40.4	38.1	0.67	0.35–1.25	62	29.1	34.4	0.59	0.27–1.29	108	40.4	19.4	0.32**	0.15–0.66
High (optimists)	30	11.1	27.6	0.41	0.14–1.17	37	17.4	33.3	0.84	0.32–2.20	30	11.1	36.7	1.28	0.45–3.63
MHS utilization at T2															
No											148	56.4	20.3	1	
Yes											114	43.6	54.4	6.22***	3.07–12.61
Users' total			43.6					40.8					34.7		

Note. Ref = Reference category; T2 = 18 months postdisaster; T3 = almost 4 years postdisaster. MHS = mental health services. Numbers in Models A and B differ slightly due to missing values.
$*p < .05. **p < .01. ***p < .001.$