

# The Mental Health Impact of Volunteering in a Disaster Setting

## A Review

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**Abstract:** This article reviews the literature on mental health of volunteers after working in disasters. When mobilized they often are a community's major source for rescue and recovery. PsychINFO, PubMed, and Web of Science were searched for relevant articles published until October 2009. Of 448 articles screened, only 9 articles fulfilled our inclusion criteria. They examined the aftermath of earthquakes (4 articles), terrorist bombings (1), explosions (1), aviation disasters (1), tsunami (1), and a bus accident (1).

Findings showed that, compared with professional workers, volunteers tend to have higher complaint levels. The following factors were found to contribute to mental health complaints of volunteers: Identification with victims as a friend, severity of exposure to gruesome events during disaster work, anxiety sensitivity, and lack of postdisaster social support. The review reveals the need for more research regarding predictors of stress in volunteers.

**Key Words:** Disaster, volunteer, mental health, psychological, emergency. (*J Nerv Ment Dis* 2010;198: 529–538)

In the last 40 years the number of disasters has increased more than 4-fold (International Federation Red Cross and Red Crescent societies (World Disaster Report, 2002). A disaster has been defined as a situation or event that overwhelms local capacity, necessitating a request to a national or international level for external assistance (em-dat.net EM-DAT, 2007). In 2006, there were 426 reported natural disasters worldwide with 23,000 people killed and 143 million people affected (CRED). One of the main resources for external assistance are community volunteers. They can be everything from walk-in volunteers that respond to the declared need and/or volunteers from humanitarian organization like the Red Cross/Red Crescent, UNICEF (United Nations Children's Fund), MSF (Médecins Sans Frontières), or others. Using volunteers in disasters cannot be avoided due to the large-scale impact of such events. Worldwide volunteers respond to the needs of about 200 million people yearly (ifrc.org, 2006).

However, while the number of disasters is increasing the number of volunteers is decreasing. From 1988 to 1998 in the Red Cross and Red Crescent Movement alone the numbers declined from approximately 250 million to 105 million. The United Kingdom based organization Volunteer Services Overseas has also announced

that their volunteers have decreased by 31% in the last 6 years (worldvolunteerweb.org, 2006).

Disaster settings are full of potentially traumatic stressors, extreme or severe events that are so powerful, harmful, and threatening that they may demand extraordinary coping efforts (Michenbaum, 1997). Many individuals who have been exposed to traumatic stressors suffer negative psychological consequences ranging from mild anxiety to clinical disorders such as panic disorder, major depression, and substance addiction (Duncan et al., 1996; Green et al., 2000; Polusny and Follette, 1995). Some develop posttraumatic stress disorder (PTSD) that is characterized by symptoms of re-experiencing, avoidance, and hyperarousal. Lifetime prevalence of PTSD in the general population is around 6% to 8% (Frans, 2003; Kessler et al., 1995; De Vries and Olf, 2009; Who.org, 2007) with women twice as likely as men to have PTSD at some point in their lives (Olf et al., 2007).

Although the aim of this review is to look at community volunteers, looking at them in isolation will give limited information. Therefore, we include a summary of the main findings for direct victims of disaster as well as the main findings for professional workers.

### EFFECTS OF A DISASTER ON DIRECT VICTIMS

When experiencing a disaster, a person is often filled with a feeling of helplessness, horror and unsafety, and is exposed to multiple stress factors, including loss of relatives and friends, exposure to dead bodies even of children, properties in ruins, release of hazardous chemicals, physical injuries, and deformations of people. People can be separated from their loved ones, even their children, sometimes for weeks. Relocation to a mass care center or camps for internally displaced people can be necessary where sharing of facilities with multiple strangers results in ultimate lack of privacy. Collapse of infrastructure such as health care, schools, supermarkets, or government agencies can also become a reality where looters may violate a person's safety even further. Traumatic events that affect various domains are more likely to generate a negative adaptive spiral than events with more limited effects (Schnurr et al., 1998).

The mental and physical health consequences of disasters on direct survivors of the event have been documented through the years (Armenian et al., 1998; Basoglu et al., 2004; Böðvarsdóttir and Elklit, 2004; Lai et al., 2004; McFarlane et al., 1997; Montazeri et al., 2005; North et al., 1999; Van der Velden et al., 2006; Wang et al., 2000). PTSD is the most frequently reported mental health disorder with levels ranging from 10.3% (Lai et al., 2004) to 34.3% (North et al., 1999) between 6 to 18 months post-disaster. Focusing on earthquakes specifically, similarities in PTSD outcomes across various cultures are striking with China reporting 23% (Cao et al., 2003), Turkey 23% (Altindag et al., 2005), and Iceland 24% (Böðvarsdóttir and Elklit, 2004). The main predictors for civilian complaints after a disaster have been listed as: loss of a loved one (Basoglu et al., 2004; Carlier and Gersons, 1997; DeSalvo et al., 2007; Favaro et al., 2004; Montazeri et al., 2005; Tural et al., 2004), damage to property (Armenian et al., 1998; Basoglu et al., 2004;

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Carlier and Gersons, 1997; De Salvo et al., 2007; Tural et al., 2004), predisaster mental health problems (Basoglu et al., 2004; Kohn et al., 2005b; Lewin et al., 1998; North et al., 1999, 2005; Tural et al., 2004), feelings of guilt (Alexander and Wells, 1991; Kuo et al., 2007), life events postdisaster (Carr et al., 1997; Hull et al., 2002; Lewin et al., 1998), female gender (DeSalvo et al., 2007; Favaro et al., 2004; Kohn et al., 2005b; Kuo et al., 2003, 2007; Lai et al., 2004; Maes et al., 2001; McFarlane et al., 1997; Montazeri et al., 2005; North et al., 1999, 2005; Tural et al., 2004), old age (Favaro et al., 2004; Toyabe et al., 2006; Varela et al., 2008; Yang et al., 2003), physical injury (Altindag et al., 2005; Hull et al., 2002; Kuo et al., 2007), lack of social support (Altindag et al., 2005; Armenian et al., 2002; Carr et al., 1997; Favaro et al., 2004; Feng et al., 2007; Wang et al., 2000), exposure to gruesome things (Armenian et al., 1998; Basoglu et al., 2004; Carlier et al., 1997; Carr et al., 1997; Dirkzwager et al., 2006; Escobar et al., 1992; Hull et al., 2002; Kohn et al., 2005b; Lai et al., 2004; Lazaratou et al., 2008; Lewin et al., 1998; Polusny et al., 2008), low level of government support or dissatisfaction with postdisaster aid and/or insurance (Dirkzwager et al., 2006; Wang et al., 2000).

### EFFECTS OF A DISASTER ON PROFESSIONAL RESCUE PERSONNEL

Recently the interest in the well-being of professional rescuers has increased. They undertake stressful tasks during recovery operations, including evacuation of bodies and body parts that may have been decomposing for days, rescuing persons from rubble where amputation can be the only possibility for rescue. Body recovery has been shown to increase somatic complaints 3-fold (Labbate et al., 1998) and levels of PTSD (Ursano and McCarroll, 1990). The rescuers come across displaced children and people crying out for food, shelter, and/or medical assistance. Although it has been shown that professionals may experience low levels of complaints (Alexander et al., 1991; Carlier et al., 1998; Marmar et al., 1996; Shih et al., 2002), exposure to a disaster setting can also have both short- and long-term mental and physical consequences on a portion of the professionals (Chang et al., 2003; Fullerton et al., 2004; Morren et al., 2005; Tak et al., 2007; Witteveen et al., 2007). Most commonly reported complaints are as follows: PTSD (Chang et al., 2003; Fullerton et al., 2004; North et al., 2002; Tak et al., 2007), depression (Cardozo et al., 2005; Fullerton et al., 2004; Tak et al., 2007), somatic complaints (Morren et al., 2005; Witteveen et al., 2007), and chronic fatigue (Morren et al., 2005; Spinhoven and Verschuur, 2006; Witteveen et al., 2007).

From the published data there seems to be a difference in PTSD complaints between professions. Police officers seem to show considerably lower levels of complaints compared with civilians (Carlier et al., 1998; Marmar et al., 1996; Renck et al., 2002), but in fire-fighters the PTSD is often similar to those in civilians (Chang et al., 2003; North et al., 2002; Tak et al., 2007). The main predictors for the complaints in police officers are the following: postdisaster life events (Epstein et al., 1998; Witteveen et al., 2007), level of preparation and/or training (Marmar et al., 1996; Perrin et al., 2007), and level of exposure to gruesome things (Epstein et al., 1998; Marmar et al., 1996).

Following are the main predictors for complaints in fire-fighters: Job experience (Chang et al., 2003), low supervisor support (Tak et al., 2007), low job satisfaction (North et al., 2002), younger age, and single status (Witteveen et al., 2007).

The psychological symptoms that survivors and rescuers report are often accompanied by physical symptoms (Dorn et al., 2006; Dyregrov et al., 1996; Escobar et al., 1992; Näätänen et al., 2002; Wang et al., 2000), such as fatigue (Morren et al., 2005; Spinhoven and Verschuur, 2006; Witteveen et al., 2007), musculo-

skeletal complaints (Bland et al., 1997; Morren et al., 2005), neurological complaints (Escobar et al., 1992; Morren et al., 2005), and gastric troubles (Escobar et al., 1992; Shalev et al., 1990) that are often stress related, so called 'medically unexplained symptoms'. Because of the effects on various domains it has been shown that combined psychological trauma can escalate the rate of physical symptoms (Schnurr et al., 1998).

PTSD is associated with increased smoking, alcohol, and drug abuse as well as increased physical morbidity and mortality e.g., ischemic heart disease (Boscarino and Chang, 1999; Boscarino, 2006; Kubzansky and Thurston, 2007; Kubzansky et al., 2007), chronic obstructive pulmonary disease, obesity, diabetes mellitus, hypertension, fractures, and sexually transmitted disease (Anda et al., 2007; Felitti et al., 1998); this anxiety disorder belongs to one with the highest disease burden. Studies show that civilians and professionals who have been exposed to a disaster setting not only report medically unexplained symptoms but are more likely to be diagnosed with organic diseases (Armenian et al., 1998; Morren et al., 2005; Trichopoulos et al., 1983) and to use health care significantly more than the general population (Den Ouden et al., 2007; Dorn et al., 2006, 2008; Morren et al., 2007; Polusny et al., 2008; Slotje et al., 2008).

### EFFECTS OF A DISASTER ON COMMUNITY VOLUNTEERS

There is a knowledge breach in the literature on the mental and/or physical health impact on volunteers. Volunteers often are survivors of the disaster themselves and can be seen as a group of active survivors. They vary in demographic characteristics, in duration, and intensity of their exposure, previous training, and experience and even in volunteer status. They are usually young, age between 18 to 30 years. Their immediate availability is largely based on the fact that many of them are students and/or unemployed. Some have become unemployed because of the disaster.

Unlike professional workers, volunteers are often quickly selected based on an urgent need caused by a disaster. This may result in volunteers lacking experience, appropriate preparedness, and training. Yet their role exposes them to the same difficult tasks professionals take on, like evacuation of bodies. They can be forced to triage as well as distribute food and water to populations under conditions where aid is limited, and the amount of goods each family gets is sometimes unsatisfactory to them.

Volunteers come from different professions and do not belong to a work place with a structured support network like those that may exist within, for example, police and fire service organizations. This implies that weeks can go by after a mission before they come into contact with each other again, if ever they do. After the disaster work they return to their families, prior workplaces (if they still exist), or their schools where people may not understand their disaster experience. Social support has been shown to be a strong predictor for recovery from traumatic experiences (Brewin et al., 2000; Flannery, 1990; Ozer et al., 2003) as well as after experiencing a disaster (Cook and Bickman, 1990).

In this article we review the literature on mental health morbidity among disaster volunteers and whether there are differences in reactions and predictors for volunteers versus professionals. We expect that volunteers will have comparative or higher levels of postdisaster psychopathology, since as a group, they fulfill most of the main predictors for PTSD in professionals by being mainly young, inexperienced, often with limited training, limited preparedness, and sometimes because of their diversity with low social or organizational support.

## MATERIALS AND METHODS

Literature search was conducted using PsychINFO, PubMed, and Web of Science. Search words included: “volunteer,” “disaster,” “emergency,” “crisis,” “indigenous worker,” and “non-professional worker.” Those reporting mental and physical variables were included.

A total of 395 articles were identified from PubMed, 63 articles from PsychINFO, and 99 articles from the Web of Science. Duplicate articles were removed leaving a total of 448 articles before looking at abstracts.

Abstracts were screened using the inclusion criteria and 25 remained after screening. Full text versions of the 25 articles were obtained for further screening. In addition, reference lists were searched for new articles and it produced 2 articles, leaving 27 articles in total. Of the 27 articles, 18 were excluded as they did not, after further screening, fulfill the inclusion criteria. Nine articles fulfilled the review criteria and were included in the final review. The included studies are described in Table 1.

## RESULTS

Nine articles met the inclusion criteria (Table 1) and most focused on PTSD prevalence postdisaster. PTSD ranged from 24% (Armagan et al., 2006) to 46% (Mitchell et al., 2004) in volunteers. All the studies that explored PTSD reported findings well above the lifetime prevalence (Armagan et al., 2006; Hagh-Shenas et al., 2005; Mitchell et al., 2004). Some studies did not use a cut-off score for their measurements on PTSD, and therefore, did not report the incidence of PTSD (Cetin et al., 2005; Long et al., 2007; Paton, 1994) (Table 1).

Sample size varied from  $N = 24$  (Dyregrov et al., 1996) to 3055 (Paton, 1994). Four studies used a control group (Cetin et al., 2005; Hagh-Shenas et al., 2005; Karanci, 2005; Paton, 1994). Seven studies were cross-sectional (Armagan et al., 2006; Cetin et al., 2005; Hagh-Shenas et al., 2005; Karanci, 2005; Long et al., 2007; Mitchell et al., 2004; Paton, 1994) and 2 were longitudinal (Dyregrov et al., 1996; Ursano et al., 1999). Types of disasters varied; earthquake (Cetin et al., 2005; Hagh-Shenas et al., 2005; Long et al., 2007; Paton, 1994), tsunami (Armagan et al., 2006), bus accident (Dyregrov et al., 1996), the 9/11 attack (Long et al., 2007), aviation disaster (Mitchell et al., 2004), and explosions (Ursano et al., 1999). Time from exposure to follow-up varied from 1 month (Armagan et al., 2006) to 4.5 years (Karanci, 2005) (Table 1).

## Main Findings and Conclusions of Each Study

Armagan et al. (2006) looked at the prevalence of PTSD in Turkish Red Crescent volunteers after working in Banda Aceh, Indonesia, in the aftermath of the Tsunami in 2004. PTSD was diagnosed in 24.2% of the participants. No differences were found on PTSD prevalence according to gender, age, profession, professional experience, previous disaster experience, and/or previous experience of traumatic events. The severity of PTSD symptoms was significantly higher in nurses (all of who were women), and participants with less than 3 previous disaster duty experiences.

Cetin et al. (2005) looked at PTSD and its relationship to identification with victims in volunteers working on a postearthquake setting of the Marmara Turkey earthquake. They found that identification with the deceased as oneself, as a friend, or as a family member, was significantly higher in the volunteer group than in the controls who were all soldiers, as were the Impact of Event Scale-Revised (IES-R) total intrusion, avoidance, and hyperarousal subscales scores. All aspects of identification correlated with all subscales and total scores of the IES-R.

Dyregrov et al. (1996) studied similarities and differences in reactions between professional and nonprofessional workers that attended to a bus accident involving children in a small community in Norway. Using the IES (Horowitz et al., 1979) to measure PTSD symptoms, the scores for all helpers taken together were high at 1 month but showed a significant decline in IES-intrusion and total scores from 1 to 13 months. The volunteers reported significantly more intrusions and avoidance at 1 month than professionals, and for avoidance volunteers still had significantly higher scores at 13 months. The General Health Questionnaire (Goldberg and Hillier, 1979) scores at 13 months reflected that the long-term negative effect of the event on general health was low. After 1 year, 66% of the volunteers reported “much” or “very much” change in their life meaning compared with 28% of the professional workers. This involved greater sense of appreciation and care for their loved ones, an increased appreciation of life itself, the intensity of life, and an increased appreciation for peoples’ strengths.

Relation between disaster experience and avoidance was stronger for volunteers than for professionals. Volunteers with little disaster experience scored highest in avoidance whereas experienced professional helpers scored the lowest. Volunteers were more doubtful on how to carry out their work, felt less prepared, and reported having greater difficulties talking about their experiences and reactions following the disaster.

Hagh-Shenas et al. (2005) studied psychological consequences of the Bam earthquake in Iran 3 months after the earthquake on professional and volunteer helpers. The professionals were divided into firefighters and trained search and rescue personnel. The volunteers came from the local university with no formal disaster training. Volunteers scored higher on PTSD using the Mississippi Scale and on General Health Questionnaire (GHQ) subscales compared with professionals. Of volunteers, 34% met criteria for PTSD whereas only 5.5% of the trained rescue personnel and 2.78% of the firefighters fulfilled the criteria. Those who scored higher on the anxiety sensitivity index showed greater adverse psychological effects. With regard to general health the mean for complaints on the physical health subscale, the anxiety subscale, and the social functioning subscale was significantly higher in volunteers. The depression subscale was higher compared with the firefighters but not with the trained rescue personnel.

In general, the results showed that volunteers are more vulnerable to rescue work than professional workers and that anxiety sensitivity might be a contributing factor.

Karanci (2005) looked at post-traumatic growth (PTG) among 200 volunteers working on the Marmara earthquake in Turkey. All were survivors of the earthquake; half of them previously belonged to a disaster preparedness volunteer organization whereas the other half did not. Data were collected 4.5 years postdisaster. Possible factors related to PTG were examined with regression analysis. Results showed that using problem solving/optimistic and fatalistic coping and previously belonging to a disaster preparedness volunteer organization are significant predictors of PTG.

Long et al. (2007) investigated psychological distress among Red Cross disaster workers 1 year after responding to the event of September 11, 2001, World Trade Center in New York. About 90% of the sample consisted of volunteers, 10% was paid staff. No significant differences on outcome measures were found between the two. The results indicated that exposure to gruesome things did not lead to more distress.

Mitchell et al. (2004) looked at the impact of the Swiss Air flight 111 disaster on volunteers. Of the volunteers 46% had PTSD 15 months post disaster. Exposure to human remains resulted in more emotional difficulties. Of the exposed group, 71% had PTSD

**TABLE 1. Overview of Methodology and Outcomes of the Studies Included in This Review**

Author/Year	Nationality	Sample (N) Volunteers	Control Group Used	Study Design	Type of Disaster	Time From Disaster Work	Method	Outcomes Measured and Reported	Findings
1 Armagan et al. (2006)	Turkey	N = 33 Red Crescent Gender not reported	No	Cross-sectional	Tsunami	1 mo	Interview, CAPS-1*	PTSD	24.2% with PTSD. Severity of symptoms higher in nurses (who all were women) and volunteers with less experience No cut-off reported for PTSD. Findings suggest that identification with deceased victims is a risk factor for PTSD Identification was higher in volunteers The magnitude of reactions is somewhat higher in volunteers Relation between disaster experience and avoidance was stronger for volunteers
2 Cetin et al. (2005)	Turkey	N = 434 100% male *Not reported	Yes, N = 154 Soldiers	Cross-sectional	Earthquake	3 mo	Questionnaire, IES-R Identification with victim scale	PTSD Identification with victims	
3 Dyregrov et al. (1996)	Norway	N = 24 Red Cross volunteers, 87% male + volunteer fire fighters, 77% male *67%	No	Longitudinal	Bus accident with children	T1 = 1 mo T2 = 13 mo	Questionnaire, IES and GHQ	PTSD General health	
4 Hagh-Shenas et al. (2005)	Iran	N = 100 Students Gender not reported *Not reported	Yes, N = 54 Trained Red Cross/Red Crescent rescue workers	Cross-sectional	Earthquake	3 mo	Questionnaire, Civilian Mississippi Scale, GHQ, Anxiety Sensitivity Index	PTSD General health Anxiety sensitivity	34% met criteria for PTSD 5.5% of the trained rescue personnel and 2.78% of the firefighters Volunteers are more vulnerable and anxiety sensitivity is a contributing factor
5 Karanci (2005)	Turkey	N = 100 66% male 34% female *Not reported	Yes, N = 100 Had previously belonged to a volunteer organization	Cross-sectional	Earthquake	4, 5 yr	Questionnaire, SCL-40 Stress Related Growth Scale	Post Traumatic Growth (PTG) General distress	Using problem solving/optimistic and fatalistic coping and previously belonging to a disaster preparedness organization predicted PTG Those directly exposed to disaster stimuli reported no more distress than those not directly exposed
6 Long et al. (2007)	USA	American Red Cross volunteers N = 3055 36% male 64% female *50.5% *91% of the sample were volunteers	No	Cross-sectional	September 11 attack in New York	1 yr	Questionnaire, IES-R State-Trait Personality Inventory-form Y; Spielberger 1995	PTSD Anxiety Depression Anger Curiosity	
7 Mitchell et al. (2004)	Canada	N = 13 47% male 53% female *Not reported	No	Cross-sectional	Aviation disaster	15 mo	Interviews, developed questions Questionnaire, Modified PTSD Symptoms Scale (MPSS); Falsetti, Resnick, Resick, & Kilpatrick, 1993) COPE, Anxiety Sensitivity Index	PTSD Coping Anxiety sensitivity	46% of volunteers with PTSD Those directly exposed to human remains 71% had PTSD Strongly correlated to duration of exposure and anxiety sensitivity Of indirectly exposed 17% had PTSD

(Continued)

TABLE 1. (Continued)

Author/Year	Nationality	Sample (N)	Control Group Used	Study Design	Type of Disaster	Time From Disaster Work	Method	Outcomes Measured and Reported	Findings
8 Paton (1994)	Armenia	N = 21 100% male *70%	Yes, N = 16 Fire fighters	Cross-sectional	Earthquake Armenia	Volunteers immediately upon return Professionals post-3 mo	Questionnaire, IES and designed questions	PTSD	The volunteer group were significantly more likely to perceive interteam relations, communication problems, and publicity as stressors Firefighters had significantly higher symptoms of PTSD on 2 subscales
9 Ursano et al. (1999)	USA	N = 54 Air force volunteers 91% male 9% female *76%	No	Longitudinal	Explosion in the USS IOWA	T1: 1 mo T2: 4 mo T3: 13 mo	Questionnaire, identification with victim scale, DSMPTSD-IV scale IES, SCL-90-R and designed questions	Identification with the dead PTSD Somatization Obsessive-compulsive symptoms Interpersonal sensitivity Depression Anxiety Phobic anxiety Hostility Paranoid ideation Psychoticism Health care utilization	Identification with the deceased is a risk factor for PTSD Especially identification with the deceased as a friend

\*Response in % at measurement or at T1 if the study was longitudinal.

\*CAPS-1 indicates Clinician-Administered PTSD Scale; A Review of the first ten years of research.

compared with 17% of those not directly exposed. For the latter, the disaster experience was often one of growth and personal satisfaction. For those directly exposed, duration of exposure was strongly correlated to frequency and severity of PTSD symptoms. The anxiety sensitive subscale -psychological concerns, was significantly related to both frequency and severity of PTSD symptoms. Thus, volunteers who were highly fearful of losing control when anxious, were most likely to experience frequent and severe PTSD symptoms. Coping with behavioral disengagement, restraint, alcohol-drug disengagement, and suppression of competing activities were significantly associated with more frequent and severe PTSD symptoms. Volunteers who had an opportunity to process their experience and to reintegrate their emotions after the disaster, reported lower levels of distress.

Paton (1994) studied training effectiveness and looked at professionals firefighters versus volunteers who worked on the aftermath of the Armenian earthquake of 1988. Using schema theory they hypothesized that training effectiveness could be evaluated by assessing the incidence with which event characteristics are perceived as stressors. The results indicated that training and experience of the firefighters did not prepare them for major disaster work. Contrary to expectations, firefighters were more likely to perceive event demands and characteristics as stressors. They reported symptoms of PTSD more frequently and at a significantly greater intensity than volunteers. The firefighter group were also significantly more likely to perceive staff problems, role uncertainty, leadership problems, access difficulties, not being able to do the job, inactivity, being pushed to the limit, and a lack of support from other team members as stressors. However, the volunteer group was significantly more likely than the firefighters to perceive inter-team relations, communication problems, and publicity as stressors.

Ursano et al. (1999) looked at the relationship between identification with victims and PTSD in volunteers working on the USS Iowa naval ship explosion. They were measured longitudinally at 1, 4, and 13 months. The conclusion was that identification with the deceased is a risk factor for PTSD and its symptoms. Identification with the dead as a friend is specifically associated with higher risk for the volunteers.

## DISCUSSION

The aim of this review was to study the literature on mental and physical health morbidity among disaster volunteers. Nine articles were identified that met the inclusion criteria. Overall this review indicates that regardless of the type of disaster, volunteering may lead to mental and physical morbidity. The main findings show that volunteers vary from considerable to high levels of mental health complaints, in particular PTSD. Compared with professional workers, volunteers tend to have higher complaint levels more similar to those that can be seen in the literature for direct survivors. An explanation for this finding might be that volunteers are often survivors themselves who actively take part in the recovery process. A volunteer was considered to be an external person who receives basic training within his/her organization or an external person with no training, such as walk-in volunteers. The "walk-in volunteers" are often university students or unemployed people, thus immediately available at the time of a disaster.

Because of the cross-sectional nature of 7 of the 9 studies, it was hard to assume any cause and effect between predictors and outcomes. This review identified the following risk factors for mental health complaints: Identification with victims as a friend, severity, and/or length of exposure to gruesome events during the disaster work, and lack of postdisaster social support. In addition, personality type, anxiety sensitivity, various coping styles, little experience with disaster work, and role confusion or ambiguity about what was expected of them were also mentioned.

Identification with victims, particularly as a friend was related to higher rates of PTSD, greater intrusion, avoidance (Cetin et al., 2005; Ursano et al., 1999), somatization (Ursano et al., 1999) and depression, both acutely and long-term (Ursano et al., 1999). Cetin et al. (2005) found that volunteers identified more strongly with victims than professionals and scored higher than professionals on intrusion, avoidance, and arousal scores for PTSD. Volunteers might identify strongly with victims who often are their neighbors or friends. Ursano et al. (1999) found that younger volunteers were more likely to identify with the victim as a friend. This may be one of the contributing factors for why younger individuals exposed to death and trauma may be at greater risk for negative outcomes. Identification with deceased victims, not rescue work as such may be the main risk factor for PTSD in nonprofessionals.

Severity and/or length of exposure were assessed in 2 studies (Long et al., 2007; Mitchell et al., 2004). Mitchell et al. (2004) found a significant relationship between exposure and PTSD symptoms whereas Long et al. (2007) reported a weak relationship between exposure and PTSD, anxiety, depression, and anger. However, Long et al. (2007) did not assess the degree of exposure and it could be assumed that no disaster worker was left unexposed after 9/11 because of the ongoing perceived danger. A dose-response relationship between exposure and number of stressors during disasters and subsequent health has been documented (Norris et al., 2002a, b). Also, level of exposure to gruesome tasks during disaster work has been linked to increased use of health care facilities (Fullerton et al., 2004), which indicates more complaints. Length of exposure was also found to increase the likelihood of PTSD symptomatology (Mitchell et al., 2004). This result is consistent with findings from studies of other types of trauma where length of exposure is related to PTSD (Emsley et al., 2003).

Lack of postdisaster social support—expressed as difficulties to discuss the experience with colleagues or family was found in 2 studies (Dyregrov et al., 1996; Mitchell et al., 2004). This was related to increased general distress symptoms. In the study of Dyregrov et al. (1996) 75% of the volunteers compared with 43% of the professionals experienced such difficulties. Studies have shown that social support is an important facilitator for working through difficult experiences (Brewin et al., 2000; Flannery, 1990; Ozer et al., 2003) as well as disaster experiences (Cook and Bickman, 1990) and is even beneficial for PTG (Karanci, 2005; Paton, 2005). Social support helps with constructing a narrative and normalizing acute emotional responses. Despite the beneficial effect of social support found in the past (Brewin et al., 2000; Ozer et al., 2003), perceived and in particular objective support was not explored in most of the studies.

Mitchell et al. (2004) reported that the psychological concerns dimension of the anxiety sensitivity measure was significantly positively correlated to symptoms of PTSD. Those highly fearful of losing control when anxious, were most likely to experience frequent and severe PTSD symptoms. This is supported by Hagh-Shenas et al. (2005) finding that volunteers who scored significantly higher on anxiety sensitivity than professional workers, correlated with higher depression, anxiety, and more physical health complaints.

Different ways of coping were found to be related to symptoms as previously found in other traumatized populations (Olff et al., 2005a). Mitchell et al. (2004) revealed that greater use of behavioral disengagement, restraint coping, alcohol-drug disengagement, and suppression of competing activities were significantly associated with more frequent and severe PTSD symptoms. Dyregrov et al. (1996) found that volunteers were more likely to use more denial, active cognitive, and behavioral coping measures to sustain their tasks than professional helpers, although they did not

specify what the impact was on their mental health. Generally, in the literature, active problem-focused coping styles have been associated with good health outcome, whereas defensive coping may be protective in the short-term to keep functioning but associated with poor health in the long run because of sustained activation levels (Olf et al., 2005b).

Lack of experience with disaster work was reported by Armagan et al. in which those with less experience had more PTSD symptoms (Armagan et al., 2006). This is in accordance with the findings of Chang et al. (2003), Guo et al. (2004), and Fullerton et al. (2004) on professional workers. The study of Armagan et al. (2006) varies in that the volunteers are professionally trained and working outside their own community, having traveled from Turkey to Indonesia. Most have training in medicine or other disciplines that are useful in disaster work.

Role confusion or ambiguity about what was expected of them was found by Dyregrov et al. (1996) with regard to volunteers. Paton (1994) found the opposite where professionals reported more role confusion than volunteers. This may reflect the different types of disasters where professionals feel confident in their roles and are closer to their daily work (bus accident) but an earthquake setting with thousands of people dead or injured may be new to them. New roles are taken on and the pre-existing structure may not be in place requiring them to perform new tasks or to perform known tasks with higher flexibility than before and thereby stretching their coping ability.

Four studies directly compared volunteers with professionals (Cetin et al., 2005; Dyregrov et al., 1996; Hagh-Shenas et al., 2005; Paton, 1994). Although 3 studies point to a greater physical and mental health effect on volunteers (Cetin et al., 2005; Dyregrov et al., 1996; Hagh-Shenas et al., 2005), 1 found professionals to have more PTSD complaints (Paton, 1994). This might be because volunteers were measured immediately after the rescue work but the fire-fighters 3 months later. This opens questions about the influence of life-events, both personal and work related. Life events have been shown to significantly contribute to PTSD symptomatology in professional workers (Renck et al., 2002; Witteveen et al., 2007). However, immediate reactions tend to be higher and gradually decrease with time. Paton suggests that it might be due to their expectation of what is a gruesome event. As discussed before, the disaster setting and the nature of the event may be important. It might influence variables like control, exposure, and role ambiguity. Professionals usually have predefined as well as rehearsed roles, and they operate within a known structure. Volunteers take on tasks assigned onsite, usually have to work within changing operational structures, and it is taken for granted that they cope with it. The volunteers in the study of Dyregrov et al. (1996) talked about role confusion as being one of the factors experienced. Role confusion can be a significant stressor in volunteers, especially when they have to deal with survivors and bereaved (Bartone et al., 1989).

Unexpectedly, differences between professions arose where complaints of police officers were lower than those of fire-fighters (Carlier et al., 1998; Chang et al., 2003; Marmar et al., 1996; North et al., 2002; Renck et al., 2002). This may be because of differences in tasks during a rescue operation although no study could be found in the literature that had looked into this. Studies commonly group them into a group of "rescue personnel" (Spinhoven and Verschuur, 2006). During a disaster, fire-fighters can be sent into partially collapsing or not completely safe buildings, where they may have to put themselves, their colleagues, and even the person they are attempting to rescue at some level of risk. They are there to save that person's life and, at the same time, may be faced with unsafe conditions such as smoke, heat, fire, release of hazardous chemicals, threat of explosion, broken glass, and great physical strain. Police

officers, during disaster operations, frequently witnessing horrifying events, have to be engaged in securing the scene, keeping bystanders away, organizing and are most frequently organizing operations, and upholding law and order. This difference in tasks puts fire fighters at greater physical risk, sometimes continuously, for days. Further research is needed concerning the different intervention needs, during and after a mission, of fire fighters and police.

Regarding duration of effects, volunteers participating in longitudinal studies were not approached later than 13 months postdisaster, which does not allow for prediction of long-time duration. However, longitudinal studies identified 1 main trend—that the severity of symptoms decreased as time passed (Dyregrov et al., 1996; Ursano et al., 1999). However, we know from the literature that a subset of people can be affected for many years post-trauma and these may be the people where interventions are most needed or PTSD may start with onset even after many years (Andrews et al., 2007).

In sum, this review has revealed adverse affects on physical and mental health of disaster volunteers. Moreover, an increased effect on volunteers over and above professional rescue workers has been revealed with identification with victims as a friend, severity of exposure to gruesome events during the disaster work, and lack of postdisaster social support as the strongest predictors found. Unfortunately, this morbidity has hardly been followed up in longitudinal design studies.

Identifying risk or resilience factors for physical and mental morbidity assists organizations in identifying volunteers who require being assigned to less demanding tasks or followed up in a specific way postdisaster. Moreover, these factors might be influenced, changed, or even removed in certain disaster settings. Scientifically gathered information about them can be used to design appropriate evidence-based, interventions, programmatic approaches, and training.

## Limitations of the Review

This review is based on a limited number of studies. More studies would allow for analyzing the volunteers further based on type of disaster and level of training. Also a professional in one country might be classified as semi-professional in another. The group of volunteer firefighters, as an example, can vary from a group of ill-trained and inexperienced people on a one time mission to a group of well-trained, frequently responding semi-professionals. Such group variations have been rarely studied and were not investigated in this review. The results of this review should be seen in the light of the limited research available on the topic. However, considering the numbers of volunteers mobilized yearly, we believe this review to be an important addition to the existing literature on disaster workers and that it clearly highlights the need for further research on this topic.

## Recommendations for Future Research

It is remarkable that none of the volunteer studies and only a few of the professional rescue worker studies explored variables that have been found predictive of poorer outcomes in professionals who work with trauma on a daily basis. These are factors like neuroticism (Alexander and Wells, 1991), hardiness (Dyregrov et al., 1996), avoidant coping style (Hull et al., 2002), history of prior treatment for psychological disorders (Carr et al., 1997; Hull et al., 2002), physical injury or threat to life (Lai et al., 2004; North et al., 1999), low social support, lower socioeconomic status (Norris et al., 2002; Katz et al., 2002), increased taking of sick leave (Carr et al., 1997), female gender (Andrews et al., 2007; Brewin et al., 2000; Olf et al., 2007), fatigue (North et al., 2002), and young age (Fullerton et al., 2004; Green et al., 1996). Future studies of volunteers should include these risk factors.

The type of disaster, e.g., an isolated incident like a bus accident where the infrastructure has not fallen apart as compared with the Tsunami, where whole communities were wiped out, is another important element. Also, we must speculate whether reactions to natural disasters are fairly compared with man made disasters that may entail intent to hurt another, e.g., the September 11th, 2001 events. It is important to clearly define the volunteer status, training, and the field of action, as well as disaster setting, the nature of the event, and socioeconomic status such as unemployment (Schuring et al., 2007) to do comparisons between volunteers and professionals.

Although guidelines now exist for the psychosocial care of victims of disaster (Bisson et al., 2010), there is a long overdue need for developing scientifically based guidelines and/or protocols on how to select, train, and support disaster response volunteers to attend to their health and well-being.

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