

Running head: The Ghislenghien disaster

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A Phenomenological Analysis of Disaster-Related Experiences in Fire and Emergency
Medical Services Personnel

Erik De Soir¹, Marcia Knarren², Emmanuelle Zech³,
Jacques Mylle⁴, Rolf Kleber⁵, & Onno van der Hart⁶

¹MSc, MA, Department of Behavioral Sciences Departement, Stress and Trauma Research Center, Royal Military Academy, Belgium. Please address correspondance to Erik De Soir, Stress and Trauma Study Center, 30, avenue de la Renaissance, B-1000 Brussels, Belgium or by email to erik.de.soir@telenet.be or erik.desoir@mil.be

² MSc, Faculty of Psychology, University of Maastricht, The Netherlands

³ PhD, Prof dr, University of Louvain, Faculty of Psychology, Belgium

⁴PhD, Prof dr, Department of Behavioral Sciences, Royal Military Academy, Belgium

⁵ PhD, Prof dr, Faculty of Social Sciences, University of Utrecht, The Netherlands

⁶ PhD, Prof dr, Faculty of Social Sciences, University of Utrecht, The Netherlands

Abstract

This article explores the experiences in fire and emergency services personnel during and immediately after a technological disaster using a phenomenological approach. Personnel, engaged in the rescue operations during and immediately after the Ghislenghien gas explosion reflected upon their disaster-related experiences in a specially designed self-reporting questionnaire which also contained open ended questions. Fire fighters reported more perceived threat and direct exposure to death than emergency services personnel. Qualitative data analysis indicates that the central characteristics of this potentially traumatizing event were the suddenness and massiveness of the impact and the fact that it involved young victims and/or multiple deaths. With regard to emotions, powerlessness, horror, fear, a sense of apocalypse, and grief were experienced by both fire fighters and emergency services personnel. As to the most shocking aspects of their disaster experience, fire fighters noted the death of colleagues, the involvement of friends and family, the massive impact and the burned victims as most shocking. Emergency services personnel and in-hospital staff reported the impact, the confrontation with death, the involvement of friends and family, and the pain, suffering and screaming of burned victims as the most shocking aspects of this event. Qualitative differences in the lived experiences of fire fighters, emergency medical services and in-hospital staff might be explained by differences in life threat, contact with death and various degrees of training.

Keywords

Technological disaster, fire fighters, emergency medical services, lived experience

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Introduction

Individuals exposed to stressful, potentially traumatizing events are at risk for developing posttraumatic stress reactions (PTSR), acute stress disorder (ASD), and posttraumatic stress disorder (PTSD). Research on the effects of such events usually concentrates on primary victims, i.e., those directly threatened or injured in an accident or a disaster (1, 2). Less is known about the specific contextual variables that might lead to PTSR in high-risk occupational groups such as fire fighters, rescue services and emergency personnel (3-5) while understanding these variables might lead to more adequate psychosocial support for fire and emergency medical services personnel.

The weak point of most studies of occupational trauma in emergency workers is that the research focused on event-specific i.e. objective aspects instead of the lived experience of potentially traumatizing rescue interventions which indicate the way in which these events are experienced on a subjective level. In times of disaster, those target groups are more specifically at risk for encountering traumatizing events (6-14). Indeed, they are working with the injured or the dead and therefore exposed to a variety of stressors. Ambulance personnel working in pre-hospital care are very often exposed to stressful events in their daily routine but large-scale accidents or disaster situations add their own specific stressors to more routine rescue work. As a result, ambulance personnel have been found to be at risk of developing a PTSD after a traumatic event (15). Overall, it is to be expected that rescue work has detrimental effects on the well-being of fire and emergency services personnel.

In fact, according to previous research, the incidence of PTSD after experiencing a traumatic event in the general population is 10 to 15% in general on average, and lifetime

prevalence of PTSD is estimated to be 7.8% (16); although estimates for specific at risk populations are higher. For example, the prevalence of PTSD in German fire fighters was up to 18.2% (12). According to Clohessy and Ehlers (15) as well as Grevin (17), estimates of prevalence of PTSD in emergency personnel range around 20%. However, others reported a PTSD prevalence of 3 to 7% in rescue workers (18). These differences in PTSD prevalence might be related to both situational event-specific and person-related factors such as trauma exposure, but this is still unclear. While most studies indicate levels of posttraumatic stress based on PTSD prevalence, to our knowledge no study investigated the qualitative aspects of the psychological post-intervention sequelae in fire and emergency services personnel during and after disasters. Such information is expected to broaden our understanding of the lived experience of potentially traumatizing events of fire and emergency services during disasters in order to allow better psychosocial support for these target groups.

One study (20) actually analyzed the written stories from 52 ambulance nurses and emergency medical services technicians who each described a traumatic event. Those descriptions were analyzed by Van Kaam's method (21-23). Their findings indicate that the nurses and technicians showing a strong identification with the victims experienced more overwhelming emotions and feelings than those who did not identify so much. Previous research has shown that identification with the victim was indeed a strong predictor of posttraumatic stress among helpers (11), especially when children are involved (24-25). In addition, several studies (26-28) highlighted a series of situational risk factors for the development of posttraumatic stress symptoms among emergency services personnel: 1) the victims' ages (e.g., infants' and children's injuries/deaths have a greater impact); 2) exposure to gruesome injuries and/or death, and; 3) facing dangerous and/or unpredictable situations.

The cognitions and emotions experienced during an accident were also found to be predictors of posttraumatic distress (29). According to the opinion of Herman (30), when

encountering a traumatic event, intense fear, helplessness, powerlessness and threat of death are common. However, from a resilience perspective, in which the focus is on the personal strengths of people, it can be expected that some emergency responders may report no complaints or symptoms related to the traumatic stress experience and may sometimes even report on growth instead of distress. There exists extensive research on the positive consequences after confrontation with adversity, emotionally disturbing, potentially traumatizing events (31-33). These positive effects are related to positive affects and cognitive processing of the traumatizing event resulting in, for example, a perception of decreased experienced threat, lower risk for physical injury and less uncontrollability of the situation. According to Moran (34), the positive consequences of task-oriented incidents such as fighting fires, and person-oriented incidents such as rescue work should be distinguished. In this study, fire fighters who contributed to the rescue of disaster victims described less positive reactions in their rescue experience than those involved only in fighting the fire. It is thus expected that the positive impact of emergency work should occur more often with task-focused activities than among rescue personnel involved in more person-focused incidents.

In the current study, we explore the experiences of the personnel who served at the disaster scene or in the regional hospitals after the massive gas pipe explosion that occurred in an industrial park in Ghislenghien, Belgium, on July 30th, 2004. Debris from the gas pipe weighting several tons was thrown up to 200 meters into the air. The heat of the fire was felt at nearly 2 kilometers away from the explosion site. Debris from buildings was projected up to 6 kilometers. In total, the disaster killed 24 people; mainly factory workers, fire fighters, and a police officer. About 132 people were wounded from which many suffered severe burn injuries. Most of the wounded victims were factory workers, fire fighters, police officers, and car occupants passing by at the moment of the explosion.

This paper examines the similarities and differences between the experiences of fire fighters and emergency medical personnel (including in-hospital rescue staff) by analyzing the reported emotions and cognitive reactions to the disaster 4 months (T1) and 14 months (T2) after the disaster. Since the data collected on the exposure among fire fighters and emergency medical personnel did not allow a *pairwise* comparison at T1 and T2, detailed comparison of the evolution over time did not belong to the aims of this study. We investigated the characteristics of the disaster which were most reported, before assessing the feelings and emotions, and indicating which aspects were viewed as the most shocking, by using a qualitative analysis method of the answers to open-ended questions. Similarly to Laposa and Alden (35), we expected that fire fighters would report their work-related experiences to be more physically dangerous and involving greater threat to their lives, highlighting the death of five fire colleagues during the disaster, compared to those of emergency medical services and hospital staff personnel. Since the emergency medical services and in-hospital staff personnel were exposed more directly to human suffering but less confronted with life threat, we expected them to report more on the emotional burden of this unusual work. These hypotheses lead to different expectations regarding the type of potentially traumatizing events both target groups were exposed to. It is to be expected that emergency services personnel and in-hospital emergency responders will describe more victim-related experiences while fire fighters are supposed to report more exposure to the disaster event itself.

Method

Participants

This study is part of a broader scientific research led by the Stress & Trauma Research Center of the Royal Military Academy, the Faculty of Psychology of the University of Louvain, the Service d'Appui Psychologique aux Intervenants (Psychological Support Service

for Caregivers) and the Union Royale des Sapeurs-Pompiers du Hainaut (Royal Association of Fire Fighters of the Province of Hainaut). Only fire, rescue, and emergency medical personnel who participated in the rescue operations on the disaster scene in Ghislenghien or in the emergency management in the regional hospitals were approached. They were contacted through their normal command structure. Two self-report questionnaires were distributed in a closed envelope, respectively at T1 and T2, and were returned in an anonymous way; the closed envelopes were collected at the fire stations or hospitals and collected by personal contact.

Finally, 103 fire fighters and 77 emergency medical personnel filled in the questionnaires at T1; the response rates were respectively 42% and 31,4%. The group of fire fighters consisted of 100 men and 3 women, aged between 18 and 59 years old ($M = 40$; $SD = 10.72$). The emergency medical group consisted of 22 men and 55 women, between 24 and 57 years old ($M = 40$; $SD = 9.11$). Only 23 male fire fighters and 35 emergency medical personnel (12 men and 23 women) filled in the questionnaires at T2. Their age ranged from 23 to 58 years ($M = 39$; $SD = 10.17$) and 23 to 55 years ($M = 40$; $SD = 9.19$) respectively. The procedure used for distributing the questionnaires did not allow the use of registration numbers to keep track of the participants from T1 to T2. There is only anecdotic evidence explaining the important loss of participants between the measurements at T1 and T2; i.e. 75% among the fire fighters (from 103 to 22) and 50% (from 77 to 35) among the emergency personnel (see also limitations of the study).

Measures

Description of the instruments

To assess the experiences of the above mentioned population, a questionnaire was specially designed to fit the Ghislenghien disaster. It contained 1) an informed consent, 2) a

set of demographic questions, 3) a part related to the experience of the disaster on the scene of the accident (the epicenter) or in the periphery, 4) questions related to the emotional experience of today, and, 5) questions related to both social support and professional help. Additionally, a question assessed whether or not there were elements about which the respondent did not want to talk and eventually the reasons for not wanting to talk about it, and finally, a blank page for any kind of comments (see *infra*).

Open ended questions addressed respectively (1) how respondents experienced the disaster ("Please describe how you experienced the Ghislenghien disaster and how you got involved in it; e.g. "When did you arrive, where were you, what did you precisely do or see, what did you feel?"); (2) the most shocking aspect of the event ("Which aspect of this event shocked you most e.g. of what you heard, smelled, certain behaviors, a memory, a person, an object)? Describe this as precisely as possible."; (3a and 3b) additional professional or private aspects having influenced their reactions ("Are there in your professional/private environment additional things (e.g. reactions and/or behaviors, or the organization itself) that touched or shocked you at the moment of the event or as a consequence of it?". The following was written at the top of the blank page: "This space has been entirely saved for you in order to allow you to express yourself freely, without limitations, about what happened to you (in the context of the event), about the way you lived through the event and about the way that you still deal with it today. You can also write on the impact that the event had on you, your life and your family. You can also write about the way that you deal with this event today, about the help that you get from other people or about the help you think you need in order to recover from the event. If you need more space, do not hesitate to add some more paper." Answering the full questionnaire took approximately 30 minutes.

Qualitative Data Analysis

In order to focus on the qualitative aspects of the experiences of the fire and emergency services personnel involved in the Ghislenghien disaster, a phenomenological method of analysis was used to examine the core of the disaster-related experiences. Phenomenological psychology was used because this variant of phenomenology focuses on human behavior as expressions of meaningful experiences which are obtained by descriptions from participants (36-37). The qualitative data analysis was inspired by the grounded theory method, an interpretative variant of qualitative research grounded in phenomenology and symbolic interactionism and used to uncover the potentially traumatizing core of the disaster experiences and the characteristics of the event. An assumption when using the grounded theory method is that the assigned meaning to an event determines the response of a person to that event (38).

To analyze the data, the Van Kaam method was used (36-39). This method consists of six steps. First, descriptive expressions are listed and then classified into categories and ranked by frequency of occurrence. Second, these expressions are reduced to terms that describe the experience more precisely. Then, the focus is on the difference and similarities between experiences, in order to uncover the characteristics which are constant and the characteristics which are typical for certain subgroups (37). Third, the irrelevant elements (not inherent to the experience) of Step 2 are eliminated. Fourth, a hypothetical identification of the lived experience arises. Fifth, this identification is applied to some participants to test whether the description fits the data. Finally in a sixth step, when needed, the description is expanded or reduced. This approach resulted in a prototypical identification of the disaster experience and a theoretical description of the traumatic core of the Ghislenghien disaster. The qualitative data analysis in this study was carried out with the MaxQDA 2 software.

Results

Characteristics of the Disaster Experience

The analysis of the disaster experiences as reported resulted in 20 characteristics for the fire fighters and 18 characteristics for the emergency medical personnel. They are regrouped in respectively 14 and 13 categories and ordered according to the frequency of occurrence of the characteristics. We assume that the more frequent the characteristics are mentioned, the more prototypical they are.

Fire fighters. For fire fighters, experiencing the disaster in which colleagues died, made the experience of the event mainly characterized by the death of friends (category 1 – 78,7%) and to a lesser degree by the death of other victims on the roadside and on the disaster site (category 2 – 25,5%). The disaster and especially the casualties among colleagues had made an extensive impact and members of the involved local fire brigade described their group as one big family. However, after these fire and rescue interventions, also positive aspects (category 3 – 20,2%) were expressed. Fire fighters mentioned that they were thankful to be alive, appreciating their job and feeling lucky to be still alive. They also reported that they loved their most significant others even more after the disaster than before. Moreover, some were thankful for the psychological support (category 9 – 7,4%) which they and/or colleagues got afterwards. Some noted the impact (category 4 – 19,2%) of the intervention, during the rescue operations and afterwards, even several months later. One fire fighter said ‘At the beginning of the month October {nearly 3 months after the disaster}, I got a breakdown, it was difficult.’ Others mentioned the impact on a physical level during the intervention e.g., ‘I collapsed like a piece of doll.’ Overall, an apocalyptic feeling and the impact on the human and physical level sometimes resulted in an inability to speak (category 8 – 8.5%). Still others were unable to talk or did not want to talk about the disaster, from the

moment of the explosion till several months later. One fire fighter wrote: 'What I saw? One page is not enough.' For some fire fighters, the disaster remains their worst memory and some were not able to hold their tears (category 13 – 3,2%) after the intervention. Sometimes, some aspects of dissatisfaction (category 10 – 6.7%) were expressed, i.e. about the disorganization on the spot.

During the rescue interventions, fire fighters searched and found victims, burned (category 5 – 18,1%), wounded (category 6 – 17,0%) and/or suffering (category 11 – 5,3%), and screaming and/or crying (category 12 – 4,3%) for help or because of fear. Especially when driving along the way to the epicenter, they encountered burned people lying by the roadside. Some fire fighters mentioned the massive destruction (e.g. 'There was nothing') and the massive amount of victims (category 7 – 16,0%). Somebody wrote it down as follows: 'As the devastation of the world after a war'. Before and at the beginning of the intervention, the fire fighters did not know much about the origin of the explosion and the fire. Some of them initially heard or thought that a plane had crashed. Due to a lack of information, there was much uncertainty during the first moments after the disaster. Sometimes, the unfamiliarity (category 6 – 17,0%) with disasters in general seemed to contribute to a feeling of not knowing what to do (powerlessness), but this feeling disappeared soon after instructions were given. Stress (category 13 – 3,2%) was evoked in a few fire fighters when they were at a certain distance from the disaster and did not know much or anything at all about the disaster (in the beginning). On the spot, fire fighters were sometimes at risk during the intervention. A few experienced a wrong perception of time (category 13 – 3,2%); for example, they did not seem conscious that time passed during the intervention. Furthermore, during the intervention fire fighters mentioned a feeling of disconnection from the reality i.e. a feeling of not belonging to their own body anymore. After the intervention, this feeling was experienced as not having had many emotions during the rescue operations and wondering why not.

Moreover, the feeling of working as on automatic pilot (category 14 – 2,3%) was also present during the intervention.

Emergency medical personnel. The most frequent experience of the disaster event during emergency medical interventions related to the injured victims (category 1 – 81,3%) – ‘The wounded persons arrived, it was terrible’. Most emergency medical personnel waited in the hospitals for the disaster victims to arrive, saw the arrival of the first wounded and burned people (category 6 – 29,3%), who were screaming (category 7 – 24,0%) for help, asking for painkillers and crying (category 10 – 13,3%) because of the immense pain. Especially the massive (category 3 – 33,3%) arrival and the massive suffering of the shocked, wounded and burned victims were very hard to see as some described, e.g. ‘I realized the horror because the first wounded persons arrived’. Many described the ‘overwhelming impact of the scene of a war’ (category 2 – 50,7%), with the devastation of the environment and buildings, while others related the impact to the massive arrival of wounded and burned people (category 3 – 33,3%). This disaster caused a lot of casualties and some victims which were still alive asked to get euthanasia, which severely impacted (category 2 – 50,7%) on the medical personnel who tried to assist the victims. Emergency medical services and hospital staff personnel described the disaster as ‘very shocking’, e.g. ‘It was a nightmare’, ‘Hopefully, I will not experience such an event again’. Emergency medical personnel experienced the situation at the emergency room as apocalyptic and reported they could not talk shortly after the disaster or they were not able to answer any questions, nor they did not want to.

The disaster also impacted on their personal lives as some fire fighters died (category 4 – 33,3%) during the event. Wounded and burned victims, crying and screaming (category 10 – 13,3%), are very hard to see, e.g. ‘The most difficult (most painful) was at the emergency room and at the surgery room.’ In addition, some emergency medical personnel mentioned that they will never forget the images of what they saw during the intervention. Expressions of

this impact are, for example, 'I shall live with these memories my whole life' and 'How to forget? Time goes by, but the memories are still very vivid'. The fatalities among the fire fighters were also very hard to experience. Some of the emergency medical personnel knew the deceased fire fighters on a personal level and they felt related because they participated in the same rescue operation. Coping with the family members and friends (category 5 – 32,0%) of the disaster survivors was also experienced as very difficult to handle. In addition, a few emergency medical personnel reported about the fact that they still could not believe that something like that happened or that they could simply not accept that some of the fire fighters died during the disaster.

At the beginning of the disaster, there was not much information because it happened so suddenly. For example, it was unknown (category 3 – 33,3%) what happened, where it happened and which actions needed to be taken. The unknown evoked additional feelings of stress (category 9 - 14,7%), e.g. when preparing to depart or waiting for the arrival of the victims. Stress was triggered in emergency medical personnel and victims because of the uncertainty about the situation of family and/or friends. Family or friends of the victims had to be dealt with, taken care of, and informed about the situation of loved ones by the medical rescue staff. The possible likelihood of involved friends or family members and the unknown consequences also triggered a state of restlessness (category 11 – 8,0%).

Some emergency medical personnel also noted positive aspects (category 8 – 16,0%) in relation to the disaster and reported positively about the mutual help between personnel and citizens, the benefits and the effectiveness of their support. They also described positive aspects of their life now. These aspects can be considered as a result of experiencing a disaster. For example, 'This event made it possible for me to appreciate life, to be lucky to live along and without suffering, or not that much compared to others. This event changed my perspective in a positive way.' It seems that, after having been confronted with the disaster,

they tried to moderate daily happenings, to be positive, and as times passes they will learn to live with the disaster event. However, some others also spoke about their dissatisfaction (category 8 – 16,0%) concerning various aspects related to their rescue work or related to the period after the disaster. For example, the unhealthy curiosity of bystanders during the rescue work, the media hype, the lack of psychological debriefing after the rescue operations and the little care and support for families and personnel after the disaster.

During the disaster intervention, a few emergency medical personnel described that they felt like they worked on automatic pilot (category 12 – 6,7%). Those who described this sensation, felt no emotions and worked professionally but as living robots. Furthermore, when working at the disaster area a feeling of life threat was sometimes evoked. In addition, a feeling of life threat was sometimes present when taking care of the victims and/or family in a hospital. It may be surprising that only very few emergency medical personnel mentioned life threat (category 13 – 5,3%) to be a concern, but this can be explained by the fact that most respondents had been working within the hospital.

Feelings and emotions.

Fire fighters. For fire fighters, the most frequent reported feeling was powerlessness (category 1 – 90,4%). They felt powerlessness because they were on the spot and did not know who to help first and where to start. Fire fighters felt powerless when seeing all the wounded and burned victims; the fire fighters in the first rescue squads reported consternation, the scenery seemed unreal. The impression on the spot also evoked a feeling of horror (category 2 – 75,5%) and was described as an apocalypse by a few fire fighters (category 4 – 12,8%), e.g., ‘I got a feeling of apocalypse when seeing the scattered bodies.’ Fire fighters also experienced fear (category 3 – 31,9%), especially due to the awareness that friends or family members were possibly involved in the disaster. On the disaster scene, there was fear of getting involved in an accident because of the risks and as a result of not seeing colleagues

anymore. When surviving the risks, some fire fighters experienced a feeling of grief (category 5 – 4,3%), due to the loss of friend. A few also reported feelings of panic, sadness, frustration resulting from the feeling of uselessness and sympathy for the families and friends who lost loved ones (category 6 – 1,0%).

Emergency medical services. Among emergency personnel, the most experienced emotion was horror (category 1 – 55,5%). A feeling of horror was experienced in relation to the massive arrival and amount of first wounded and burned victims, screaming and crying. The horrible pains and the suffering of the victims were visible on their faces. This massive arrival and suffering of the victims also triggered a feeling of powerlessness (category 2 – 50,7%), not knowing where to start, what to do, a feeling of being overwhelmed by the situation. Moreover, a feeling of fear (category 3 – 34,7%) was also evoked. Emergency medical personnel got frightened when they saw the immense flames, heard the loud sound of the explosion, thought about the emergency personnel on spot, and saw the frightened patients. Other emotions were reported to a lesser extent. A feeling of sadness or grief (category 4 – 8,0%) was related to the confrontation to the families and friends of the victims. Emergency medical personnel rarely experienced feelings of anger (category 5 – 5,3%). Just a few expressed their anger because they could not understand ‘why’ the disaster happened and ‘why’ people died. When they realized that their own family members or friends were or could have been be on the disaster scene, a feeling of panic arose or they stayed in despair (category 6 – 4,0%) for a long time.

The Most Shocking Aspects

Fire fighters. The most shocking aspects reported by the fire fighters were the casualties of colleagues and the contact with death (category 1 – 40.4%) during the intervention. They also mentioned the impact (category 2 – 29.8%) of the disaster (e.g. the amplitude of the explosion) and the amount of victims and damage (category 4 – 18.1%) as

most shocking aspects. Others noted as most shocking the encounters with burned casualties (category 3 – 25.3%) and the view when arriving on the spot (category 5 - 17.0%) e.g., ‘Seeing the horror which led to nothing.’ Still others reported the experience of a feeling of being powerless (category 6 – 13,8%) or the confrontation with the victims (category 7 – 11.7%) they searched for. Finally, the unknown aspects before and/or during the intervention (category 8 – 7.5%) and seeing the carbonized bodies and cars (category 8 – 7.5%) shocked.

Emergency medical services. The most shocking aspects reported by the emergency medical personnel were both the casualties among the fire fighters (category 1 – 33.3%) and the confrontation with death (category 2 – 33.3%). For instance, experiencing a contact with death or hearing some victims asking for euthanasia. For nearly one third, the dying of the five fire fighters was especially shocking because they knew some of them personally (category 3 – 32.0%) – e.g. ‘Most shocking was the death of a fire fighter who I knew very well’. Seeing the burned victims in pain (category 4 – 30.7%), suffering and screaming (category 6 – 18.7%) or the massive arrival (category 5 – 22.7%) of burned victims was also a shocking aspect for the emergency medical personnel on duty. Some of the medical staff wrote about the massive environment and emergency services which got involved with the disaster (category 5 - 22.7%). Besides what was seen or heard, the smells (category 8 – 16.0%) appeared to be shocking. The emergency rescue personnel reported about the odor of the materials (in the hospital or the mobile emergency post) and the odor of the wounded victims, i.e. of burned flesh. Lastly, not knowing (category 8 – 16.0%) what to expect at the beginning of the intervention and family members and friends waiting during the intervention because nothing was known, was viewed as shocking afterwards.

Disaster-Related Experiences After 14 months

At T2, both fire fighters and emergency medical personnel reported which aspects of the disaster experience were still very present in their minds. In order to describe these aspects

in a coherent narrative structure, the categories will not necessarily be mentioned in the order of decreasing frequency of appearance.

Fire fighters. The most frequently described aspect in their experience was the impact on both a psychological and personal level (category 1); e.g., ‘The event changed a lot of things in my family life.’ Some fire fighters noted that they did not answer on the first questionnaire because they did not feel ready yet (category 5). Furthermore, the disaster had such an impact that it stayed vividly in the mind of some fire fighters, e.g., ‘The entire intervention from the emergency call to the arrival to the end of the intervention to the return to the fire department stays very clear and very precise in my memory.’ Others called the intervention the worst intervention ever. Still others felt turned upside down by the disaster experience. Especially, the memories of the view on the spot (category 2) were still difficult, e.g., when they arrived and got an apocalyptic feeling; or seeing the enormous flames. The memories of the wounded or death victims (category 5), everywhere on the road, the confrontation with death (category 5) and the involvement of friends/family members (category 5) as well, still stays vividly in their mind. In addition, they still reported that the victims suffered during and after the disaster (category 6), but also the fire fighters and their families suffered after losing some friends and/or family members and because of the personal impact. All these experiences contributed to the fact that some fire fighters were unable to speak during the intervention and this even lasted till one year after the event. The next statement makes this very clear: ‘I was never able to talk with somebody intimately about my suffering.’ and ‘On the way back, nothing is said to each other.’ Moreover, powerlessness (category 4) was experienced as a result of the massive victims and the size of the devastation. As some firefighter explained: ‘I did not know where to start? With whom?’ However, also positive aspects (category 3) were experienced. Some fire fighters spoke about the strength which they got out of the experience: they reported a feeling of personal growth, appreciating

more the simple things of life, and the friendship between colleagues was seen as more firm after the disaster experience. Fire fighters also spoke about the support they got from family or friends.

One year later (T2), they reported respectively the next aspects as most shocking: the confrontation with death (category 1), the implication of friends or family members (category 2) and the death of victims, the psychological or physical impact and the feeling of powerlessness (category 3).

Emergency medical personnel. Emergency medical staff recalled the massive impacting event (category 1) and the amount of victims (category 3) at the hospital as characteristic of their disaster experience (e.g., ‘Seeing the victims arriving with tens together at the emergency department’). They also reported that ‘victims were lying everywhere’, they screamed (category 2) for help because of the immense pain and suffering (category 4), and because of the huge size of their burn injuries (category 5). In addition, for those working on the disaster scene, the view was characterized by a big amount of emergency services and a lot of bodies scattered around. On a sensory level, sounds (category 6) were still remembered (e.g. ‘That sound stays on my mind forever.’). Some emergency medical personnel mentioned the sound of the explosion and others mentioned the sounds of the ambulances and helicopters landing and taking off (some hospitals being close to the disaster scene).

The most shocking disaster aspects mentioned one year later (T2) were still the death of fire fighters and /or friends or family members (category 1), the permanent confrontation with severely burned people, their immense burns and eventually death (category 2), and victims asking for euthanasia and/or screaming because of the pain (category 3).

Discussion

In sum, the disaster intervention at Ghislenghien, as experienced by fire fighters and/or emergency medical personnel can holistically be described as an event which had a huge impact on the psychological and personal life level. Seeing the severely wounded or dead victims, colleagues, friends or family members was horrible. Knowing about or seeing deceased friends and/or family members during or after the disaster were considered the most shocking aspects of a disaster experience. In addition, the massive amount of victims, burned, injured, screaming, and suffering, was hard to deal with and evoked feelings of powerlessness. The first minutes of 'not knowing' what the disaster was about, evoked feelings of stress and restlessness. However, the experience of the disaster also turned out to be positive for some fire or emergency medical services personnel, especially when working at the disaster scene.

Compared to the fire fighters, emergency medical personnel were more directly involved with the injured victims whereas fire fighters had to cope more with the physical aspects of the disaster (e.g. heat, smoke, fire, smell, etc.). The unusual amount of injured victims during the disaster resulted in a chaotic situation, which contributed to the fact that the impact of the disaster with respect to the massiveness of human suffering was more intense in emergency medical personnel compared to the fire fighters. In contrast to the emergency medical personnel, fire fighters were mostly present on the site of the disaster. Fire fighters are used to work on the scene of an accident or a fire, but rarely do fire fighters die during an intervention. Furthermore, fire fighters more frequently reported the impact of the first encounters with the victims on the disaster site. This disaster was also characterized as an event in which friends, family members and victims passed away and working on the disaster scene was described as risky. Both the direct contact with death and the perceived life threat appeared to be much higher in fire fighters. Time was not always consciously perceived. In

addition, the apocalyptic view at the disaster scene and the impact seems to have provoked dissociative experiences in some fire and rescue workers. The inability to speak or not wanting to speak about the disaster experiences was related to working on the spot as a fire fighter. However, after the intervention, more fire fighters reported positive aspects in comparison to emergency medical personnel (22.2% vs 16.00%).

The fire fighters involved in this disaster, experienced a more direct exposure to death and more life threat than the emergency medical personnel. This is in accordance with the literature (35): when comparing the experiences of fire fighters with those of emergency medical personnel: fire fighters' work related experiences are physically more dangerous and involve greater threat to their lives. Furthermore, psychological responses following the performance of rescue work during a disaster, as fear of the unknown, appear from this study. Previous qualitative research on the meaning of traumatizing events, as described by nurses in ambulance service (20), indicated the potentially traumatizing event as an encounter with the unforeseen and meaningless. Emergency services personnel have to handle the potentially traumatizing event without the possibility of preparing themselves for it. Just as in a lot of critical daily life events, the outcome of the Ghislenghien disaster was negative with 24 victims dying on-scene and more than 100 other victims had already been injured for life when the rescue services personnel arrived. Further research is needed to investigate if the first unknown minutes of a disaster intervention may indeed evoke a traumatic stress response. Moreover, the potentially traumatizing character of such a disaster becomes clear by the fact that seeing the casualties, colleagues and friends or family members evokes a feeling of powerlessness and horror. This experience can be related to the concept of 'effroi de la mort', described by Lebigot, (40). The concept of 'effroi' is difficult to translate, but stands for the very first state of frozen, petrified fright after a traumatic blaze; a state which precedes the development of stress and anxiety, confronting the survivor with a unique sense of total

loneliness, abandonment and exclusion from the world of the living. It leaves the survivor behind without words, a disruption between the signified (death) and the signifier (symbolic representation of the real face of death) as described by some of the fire fighters. Lebigot (40) states that the human being has no representation of 'the real of death' in his psyche; therefore, a sudden confrontation with death leaves the trauma survivors behind without words.

The descriptions of fire and emergency services personnel involved in the Ghislenghien disaster contained mentioned both cognitive and emotional experiences of disconnection from the reality. This is also in accordance with Jonsson and Segesten (20) who described the reactions of Swedish ambulance nurses who were so focused and concentrated on helping the victim that they totally distanced themselves from the surroundings, being so emotionally committed that their field of vision narrowed. One can expect this phenomenon to occur on an even bigger scale when being confronted with the massive impact and amount of victims as reported in this study. Jonsson and Segesten (20) also confirmed that helpers can have strong feelings of engagement and empathy with victims and/or family members and at the same time can feel powerlessness. Their research also showed how it seems impossible to avoid these strong feelings to well up during the contact with victims.

Our analysis of the experienced emotions uncovered the fact that working as a fire fighter evoked feelings of horror and powerlessness. These feelings were more prevalent among fire personnel, who had been directly exposed to the images at the disaster scene. A feeling of apocalypse was also experienced because of the direct encounter with the disaster environment. A feeling of powerlessness was less manifest among emergency medical personnel, probably because of the availability of a more adequate equipment and structure to help the victims. Compared to the fire fighters, they were less overwhelmed by the sudden and

dangerous event. In addition, they were working in their own familiar environment, i.e. the emergency department of the hospital.

The differences in reaction to the most shocking aspects seemed to be related to one's proximity to the different disaster elements. Emergency medical personnel were shocked by the screaming, pain and suffering of the victims, including the smell of burned flesh. In contrast, fire fighters were primarily shocked by the death of their colleagues. In addition, the feeling of powerlessness, the view on the spot and the carbonized victims and cars shocked fire fighters the most.

The differences between emergency medical personnel and fire fighters, with respect to the way in which the disaster intervention was still experienced or relived after more than a year, was the reported impact experienced on the spot. The massive amount of burned victims and the screaming of victims, was still considered most shocking by emergency medical personnel while the personal and psychological impact of the disaster and the feeling of powerlessness was still the most shocking aspect for fire fighters. The inability to speak and the remaining feeling of powerlessness was also more often present in the fire fighters' disaster experiences. Finally, the sound of the explosion, the ambulances and the helicopters were more experienced by emergency rescue staff at hospitals.

According to Moran (34), the disaster experience of fire fighters and emergency medical personnel which involve multiple deaths is traumatic. This view was supported by the participants' answers to open-ended questions. Moreover, the positive aspect explained by some emergency personnel about the availability of materials during the disaster intervention might be related to Antonovsky's sense of coherence (41). Of this concept, consisting of the interrelated factors namely manageability, comprehensiveness and meaningfulness; more specifically the manageability (the present resources meet the demands) of a given situation, seems to lead to less posttraumatic stress (42). Comparing the experiences of fire fighters and

emergency medical, in the Ghislenghien disaster leads to the conclusion that fire fighters experience more 'post disaster positivism' than emergency medical personnel. Even after more than a year, fire fighters expressed still more 'positivism'. It seems that, in this case, the more traumatic an event was experienced, the more post disaster positivism or growth was reported.

Conclusion

This study has contributed to the trauma literature by shedding light on the characteristics of disaster as experienced by fire fighters and emergency medical personnel. The results of this phenomenological analysis can help the personnel from other fire, rescue and emergency services to recognize the normality of their reaction to the potentially traumatizing aspects of a disaster and their rescue activities. These results can also be used to prepare fire and emergency services personnel to understand the possible psychological impacts upon confrontation with potentially traumatizing events. Our findings also highlighted the differences between emergency medical personnel, mainly working in an intra-hospital setting, and, the fire personnel, involved in, search and rescue, fire extinguishing and first medical aid. This phenomenological analysis offers an important addition to the existing quantitative trauma literature in which context-specific data are less explicit. This results of this study could not confirm whether or not fire fighters who contributed to the rescue of disaster victims described less positive reactions in their rescue experience than those involved only in fighting the fire. However, in general, fire fighters reported more positive changes after the intervention than emergency services personnel who were more involved in person-focused incidents and confronted with extensive human suffering of both victims and their families.

This study has a number of limitations. There has been an important drop out between both measure moments (T1 and T2) for which no unambiguous explanation is available. The informal and anecdotic data, gained during the presentation of the preliminary results in the respective fire departments, indicated that over time the involved fire and rescue personnel wanted to stop talking or bringing back memories about the disaster. Their participation in this study may be non random and the most stricken emergency responders may not be represented – or perhaps the other way around, there is no way of telling. Given that all the fire fighters but three were men, it cannot be presumed that the findings are also valid for female fire fighters. Furthermore, to deepen the understanding of the traumatic core of a disaster, in-depth interviews and content analyses are necessary. The timeframe and the resources available to the researchers involved in this study did not allow one-to-one contacts with all the stricken rescuers and caregivers to uncover their experiences as they were, both on the time of the disaster and in the immediate aftermath (T1) nor after more than one year (T2). Finally, since grounded theory research does not allow to generalize the research findings (37), actual findings only contributes to one's understanding of the nature and meaning of the experience belonging to a certain population in a certain setting.

The assumption that the closeness of death had the most obvious impact on a person (43) is supported. The demise of friends and/or family members was the most shocking, potentially traumatizing, aspect in this disaster experience. This unspeakable experiences of fire fighters, confronted with their own death through the direct life threat and the death of their colleagues, can be related to the concept of *effroi de la mort* (44) or a close encounter with death, leaving the survivor without words.

Reporting mostly horror and feelings of being totally out of control, is in accordance with criterion A2 of PTSD (42) and since the participants involved in this study have been

confronted with death also criterion A1 of PTSD is met, hence the potential for posttraumatic stress reactions and PTSD is present.

The result that emergency medical personnel seemed to have experienced more horror than the fire fighters could be explained by the fact that it is a more diverse and less specifically trained group, e.g., all the staff present in the hospital during the disaster had to participate in the first response at the emergency department, even staff who had never seen severely wounded people in their whole life due to the fact that they were used to work in administration, kitchen, cleaning service, etc.

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References

1. Soeterman RJH, Yzermans CJ, Kerssens JJ, Dirkzwager AJE, Donker GA, van den Bosch WJHM, van der Zee J. The course of post-disaster health problems of victims with pre-disaster psychological problems as presented in general practice. *Fam Pract* 2006;23(3):378-384.
2. Dirkzwager AJE, Grievink L, van der Velden PG, Yzermans CJ. Risk factors for psychological and physical health problems after a man-made disaster. *Br J Psychiatry* 2006;189:144-149.
3. Beaton R, Murphy S. Secondary traumatic stress in crisis workers: Research implications. In: C Figley (Ed.), *Compassion fatigue*. New York: Brunner-Mazel, 1995, pp 51-81..
4. Morren M, Yzermans JC, van Nispen RMA, Wevers SJM. The health of volunteer fire fighters three years after a technological disaster. *J Occup Health* 2005;47:523-532.
5. Durham T, McCammon S, Allison E. The psychological impact of disaster on rescue personnel. *Ann Emerg Med* 1985;14:664-668.
6. Fullerton CS, Ursano RJ. The other side of chaos: Understanding the patterns of posttraumatic responses. In: Fullerton CS & Ursano RJ (Ed.), *Posttraumatic stress disorder. Acute and long-term responses to trauma and disaster*. Washington, DC: American Psychiatric Press, 1997, pp 3-15..
7. Laposa JM, Alden LE. Posttraumatic stress disorder in the emergency room: Exploration of a cognitive model. *Behav Res Ther* 2003;41:49–65.
8. Leon GR. Overview of the psychosocial impact of disasters. *PrehospDisast Med* 2004;19:4-9.

9. Smith A, Roberts K. Interventions for post-traumatic stress disorder and psychological distress in emergency ambulance personnel: A review of the literature. *Emer Med J* 2003;20:75-78.
10. Mitchell JT, Dyregov A. Traumatic stress in disaster workers and emergency personnel. In: Wilson, J.P., & Raphael, B. (Eds). *International Handbook of Traumatic Stress Syndromes*. New York: Plenum,1993, pp 905–914..
11. Ursano RJ, Fullerton CS, Vance K, Kao T. Posttraumatic stress disorder and identification in disaster workers. *Am J Psychiatry* 1999;156:353-359.
12. Wagner D, Heinrichs M, Ehler U. Prevalence of symptoms of posttraumatic stress disorder in German professional fire fighters. *Am J Psychiatry* 1998;155:1727-1732.
13. Weiss D, Marmar C, Metzler TJ, Ronfeldt H. Predicting symptomatic distress in emergency services personnel. *J Consult Clin Psychol* 1995;63:361–368.
14. De Soir E. Psychologische debriefing bij brandweermannen en ambulanciers. *NVBB magazine* 1999;146:27-36.
15. Clohessy, Ehlers. PTSD symptoms, responses to intrusive memories and coping in ambulance service workers. *Br J Clin Psychol* 1999;38:251-265.
16. Kessler RC, Sonnega A, Bromet E, Hughes M. Posttraumatic stress disorder in the national comorbidity survey. *Arch Gen Psychiatry* 1995;52:1048-1060.
17. Grevin F. Posttraumatic stress disorder, ego defense mechanisms, and empathy among urban paramedics; *Psychol Rep* 1996;79: 483-95.
18. Hodgkinson PE, Stewart M. *Coping with catastrophe: A handbook of disaster management*. London: Routledge,1991.
19. Myles G, Levine K, Ramsden F, Swanson. The impact of providing help: Emergency workers and cardiopulmonary resuscitation attempts. *J Trauma Stress* 1990;3:305-313.

20. Jonsson A, Segestin K. The meaning of traumatic events as described by nurses in ambulance service. *Accident and Emergency Nursing* 2003;11:142-152.
21. Van Kaam A Phenomenal analysis exemplified by a study of the experience of really feeling understood. *J Indiv Psychology* 1959;15: 66-72.
22. Van Kaam A. *Existential Foundations of Psychology*. Pittsburg: Duquesne University Press, 1966.,
23. Van Kaam A. *Existential Foundations of Psychology*. New York: Doubleday, 1969.
24. Dyregrov, A. *Katastrofpsykologi*. Lund: Studentlitteratur,1992.
25. Dyregrov A, Mitchell JT. Traumatic stress in disaster workers and emergency personnel. In: Wilson, J.P., & Raphael, B. (Eds). *International Handbook of Traumatic Stress Syndromes*. New York: Plenum, 1993, pp 905–914.
26. Hartsough D. Emergency organizational role. In: *Role Stressors and Supports for Emergency Workers* 1985. NIMH; DHHS Publication N°. (ADM) 85-1408.
27. Green B, Grace M, Gleser G. Identifying survivors at risk: Long-term impairment following the Beverly Hill Supper Club Fire. *J Consult Clin Psychol* 1985;53:672-678.
28. Martelli T, Waters L, Martelli J. The police stress survey: Reliability and relation to job satisfaction and organizational commitment. *Psychol Rep* 1989;64:267-273.
29. Jeavons S, Greenwood KM, Horne DJ de Le. Accident cognitions and subsequent psychological trauma. *J Trauma Stress* 2000;13:359-365.
30. Herman JL. *Trauma en herstel. De gevolgen van geweld van mishandeling thuis tot politiek geweld*. Amsterdam: Wereldbibliotheek, 2002.
31. Shakespeare-Finch JE, Smith SG, Gow KM, Embelton G, Baird L. The prevalence of posttraumatic growth in emergency ambulance personnel. *Traumatology* 2003;9:58-70.

32. Bravo M, Rubio-Stipec M, Canino GJ, Woodbury MA, Ribera JC. The psychological sequelae of disaster stress prospectively and retrospectively evaluated. *Am Journal Community Psychol* 1990;18:661-680.
33. Tugade MM, Frederickson BL, Barrett LF. Psychological resilience and positive emotional granularity: Examining the benefits of positive emotions on coping and health. *J Personality* 2004;72:1161-1190.
34. Moran CC. Individual differences and debriefing effectiveness. *Aust J Disast Trauma Studies* 1998;1:14.
35. Laposa JM, Alden LE. Posttraumatic stress disorder in the emergency room: Exploration of a cognitive model. *Behav Res Ther* 2003;41,:49-65.
36. Valle RS, Halling S. *Existential-phenomenological perspectives in psychology. Exploring the breadth of human experience*. London/New York: Plenum Press, 1989.
37. Wester F, Perters V. *Kwalitatieve analyse* 2004. Bussum: Coutinho B.V.
38. Baker C, Wuest J, Stern PN. Method slurring: The grounded theory/phenomenology example. *J Adv Nursing* 1992;17:1355-1360.
39. Crotty M. *Phenomenology and nursing research*. Melbourne: Churchill Livingstone, 1996.
40. Lebigot F. Le traumatisme psychique. *Rev Fr Stress Trauma* 2004;4 :5-11.
41. Engelhard IM, Van den Hout, MA, Vlaeyen JWS. The sense of coherence in early pregnancy and crisis support and posttraumatic stress after pregnancy loss: A prospective study. *Behav Med* 2003;29:80-84.
42. APA, American Psychiatric Association. *Diagnostic and statistical manual of mental disorders (4th Ed)*. 1994. Washington, DC: Author.
43. Hagström R. The acute psychological impact on survivors following a train accident. *J Trauma Stress* 1995;8:391-402.

44. Lebigot F. L'effroi du traumatisme psychique. Le regarder en face ou s'en protéger.

Rev Fr Stress Trauma 2002;2:139-146.