

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

Erik De Soir, MSc, MA;<sup>1</sup> Marcia Knarren, MSc;<sup>2</sup> Emmanuelle Zech, PhD;<sup>3</sup> Jacques Mylle, PhD;<sup>1</sup> Rolf Kleber, PhD;<sup>4</sup> Onno van der Hart, PhD<sup>4</sup>

1. Department of Behavioral Sciences, Royal Military Academy, Brussels, Belgium
2. Department of Psychology, University of Maastricht, Maastricht, The Netherlands
3. Department of Psychology, University of Louvain, Louvain, Belgium
4. Department of Social Sciences, University of Utrecht, Utrecht, The Netherlands

## Correspondence:

Erik De Soir, MSc, MA  
Stress and Trauma Study Center  
30 Avenue de la Renaissance  
B-1000 Brussels, Belgium  
E-mails: erik.de.soir@telenet.be,  
erik.desoir@mil.be

**Keywords:** Emergency Medical Services; EMS; firefighters; lived experience; technological disaster

## Abbreviations:

ASD: acute stress disorder  
EMS: Emergency Medical Services  
PTSD: post-traumatic stress disorder  
PTSR: post-traumatic stress reactions

Received: June 1, 2010

Accepted: June 21, 2010

Revised: December 22, 2010

doi:10.1017/S1049023X12000507

## Abstract

This article explores the experiences of fire and Emergency Medical Services (EMS) personnel during and immediately after a technological event using a phenomenological approach. Personnel engaged in the rescue operations during and immediately after the Ghislenghien gas explosion reflected upon their experiences in their responses to a specially designed, self-reporting questionnaire that included open-ended questions. Firefighters reported more perceived threat and direct exposure to death than did EMS personnel. Qualitative 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 firefighters and EMS personnel. Firefighters noted that the death of colleagues, the involvement of friends and family, the massive impact, and exposure to the burned victims were most shocking. Emergency Medical 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 firefighters, EMS personnel, and in-hospital staff might be explained by differences in life threat, contact with death, and various degrees of training.

De Soir E, Knarren M, Zech E, Mylle J, Kleber R, Van der Hart O. A phenomenological analysis of disaster-related experiences in fire and Emergency Medical Services personnel. *Prehosp Disaster Med.* 2012;27(2):1-8.

## Introduction

Individuals exposed to stressful, potentially traumatizing events are at risk for developing post-traumatic stress reactions (PTSR), acute stress disorder (ASD), and/or post-traumatic stress disorder (PTSD). Research on the effects of such events usually has concentrated on primary victims, i.e., those directly threatened or injured in an event.<sup>1,2</sup> Less is known about the specific contextual variables that might lead to PTSR in high-risk occupational groups such as firefighters, rescue services, and emergency personnel.<sup>3-5</sup> Understanding these variables might lead to more adequate psychosocial support for fire and Emergency Medical Services (EMS) personnel.

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

The incidence of PTSD after experiencing a traumatic event in the general population is 10% to 15%, and lifetime prevalence for PTSD is estimated to be 7.8%.<sup>16</sup> However, estimates for specific at-risk populations are higher. For example, the prevalence of PTSD in German firefighters was as high as 18.2%.<sup>12</sup> According to Clohessy and Ehlers<sup>15</sup> as well as Grevin,<sup>17</sup> the prevalence of PTSD in emergency personnel is estimated to be approximately 20%. However, others reported a PTSD prevalence of 3% to 7% in rescue workers.<sup>18</sup> These differences in the prevalence of PTSD might be related to both situational event-specific and person-related factors such as trauma exposure, but this is unclear.<sup>19</sup> While most studies indicate levels of post-traumatic stress based on PTSD prevalence, no study has investigated the qualitative aspects of the psychological post-intervention sequelae in fire and emergency services personnel during and after disasters. Such information could broaden our understanding of the lived experience of potentially traumatizing events of fire and emergency services during disasters to facilitate better psychosocial support for these target groups.

One study analyzed written stories from 52 ambulance nurses and EMS technicians, each of whom described a traumatic event.<sup>20</sup> Those descriptions were analyzed using Van Kaam's method.<sup>21-23</sup> The nurses and technicians who showed a strong identification with the victims experienced more overwhelming emotions and feelings than did those who did not identify so strongly. Identification with the victim is a strong predictor of post-traumatic stress among helpers,<sup>11</sup> especially when children are involved.<sup>24,25</sup> In addition, several studies<sup>26-28</sup> have highlighted a series of situational risk factors for the development of post-traumatic stress symptoms among emergency services personnel: (1) the victims' ages (e.g., injuries/deaths in infants and children have a greater impact than adults); (2) exposure to gruesome injuries and/or death; and (3) facing dangerous and/or unpredictable situations.

The cognitions and emotions experienced during an event also are predictors of post-traumatic distress.<sup>29</sup> According to Herman, when encountering a traumatic event, intense fear, helplessness, powerlessness, and threat of death are common.<sup>30</sup> 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 sometimes may report growth instead of distress. There is extensive research on the positive consequences after confrontation with adversity, emotionally disturbing, and potentially traumatizing events.<sup>31-33</sup> 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. The positive consequences of task-oriented incidents (i.e., fighting fires) and person-oriented incidents (i.e., rescue work) should be distinguished.<sup>34</sup> In this study, firefighters who contributed to the rescue of disaster victims described less positive reactions in their rescue experience than had those involved only in fighting the fire. Thus, it is 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, the experiences of the personnel who served on-scene or in the regional hospitals after the gas pipe explosion that occurred in an industrial park in Ghislenghien, Belgium, on July 30, 2004 were explored. Debris from the gas

pipe weighing several tons was thrown as high as 200 meters into the air. The heat of the fire was felt nearly 2 km from the explosion site. Debris from buildings was projected up to 6 km. In total, the explosion killed 24 people, mainly factory workers, firefighters, and a police officer, and approximately 132 people were wounded. Many suffered severe burn injuries. Most of the wounded victims were factory workers, firefighters, police officers, and car occupants passing by at the moment of the explosion.

The purpose of this study was to explore the experiences in fire and Emergency Medical Services (EMS) personnel during and immediately after a technological event using a phenomenological approach. Similarly to Laposa and Alden,<sup>35</sup> it was expected that firefighters would report their work-related experiences were more dangerous physically and involved a greater threat to their lives (highlighting the death of five fire colleagues during the event) compared to those of EMS and hospital staff personnel. Since the EMS and in-hospital staff personnel were exposed more directly to human suffering, but confronted less with life threat, it was expected that they would report more on the emotional burden of this unusual work. These hypotheses lead to different expectations regarding the type of potentially traumatizing events to which both target groups were exposed. It was expected that emergency services personnel and in-hospital emergency responders would describe more victim-related experiences and that firefighters would report more exposure to the event.

## Methods

### *Participants*

This study is part of a broader scientific research project led by the Stress and 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 Firefighters of the Province of Hainaut). Only fire, rescue, and emergency medical personnel who participated in the rescue operations on the scene of the event in Ghislenghien or in emergency management in the regional hospitals were approached. They were contacted through their normal command structures. Two self-report questionnaires were distributed in a closed envelope at T1 (four months after the event) and T2 (14 months after the event), and were returned anonymously; the closed envelopes were collected through personal contact at the fire stations or hospitals. 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.

The similarities and differences between the experiences of firefighters and emergency medical personnel (including in-hospital rescue staff) were examined by analyzing the reported emotions and cognitive reactions to the event at T1 and T2. Since the data collected on the exposure among firefighters and emergency medical personnel did not allow a *pairwise* comparison at T1 and T2, detailed comparison of the evolution over time was not included in the aims of this study. The characteristics of the event that were most reported were investigated before the assessment of the feelings and emotions. A qualitative analysis method of the answers to open-ended questions was used to assess which aspects were viewed as the most shocking.

### *Measures*

*Description of the Instruments*—To assess the experiences of the above-mentioned populations, a questionnaire was designed to fit

the Ghislenghien event. It contained: (1) an informed consent; (2) a set of demographic questions; (3) a section related to the experiences on the scene of the accident (the epicenter) or in the periphery; (4) questions related to the current emotional experiences; and (5) questions related to both available social support and professional help. Additionally, one question was used to assess whether there were elements the respondent did not want to discuss and the reasons, and finally, a blank page for comments.

Open-ended questions addressed: (1) how respondents experienced the event and its aftermath (“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., 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.” Approximately 30 minutes were required to complete the questionnaire.

#### *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 event, 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 behaviors as expressions of meaningful experiences that are obtained by descriptions from participants.<sup>36,37</sup> The qualitative data analysis was inspired by the grounded theory method, an interpretative variant of qualitative research grounded in phenomenology, and symbolic interactionism. The analysis was used to uncover the potentially traumatizing core of the experiences and the characteristics of the event. When using the grounded theory method, it is assumed that the meaning assigned to an event determines the response of a person to that event.<sup>38</sup>

The Van Kaam method was used to analyze the information.<sup>36-39</sup> This method consists of six steps: (1) descriptive expressions are listed, and then classified into categories and ranked by frequency of occurrence; (2) these expressions are reduced to terms that describe the experience more precisely. Then, the focus shifts to the differences and similarities between experiences, in order to uncover the characteristics that are constant and the characteristics that are typical for certain subgroups;<sup>37</sup> (3) the irrelevant elements (not inherent to the experience) of Step 2 are eliminated; (4) a hypothetical identification of the lived experience arises; (5) this identification is applied to some participants to test whether

the description fits the data; and (6) when needed, the description is expanded or reduced. This approach resulted in a prototypical identification of the experience and a theoretical description of the traumatic core of the Ghislenghien event. Qualitative data analysis was performed using MAXQDA 2 software (VERBI GmbH, Berlin, Germany), which supports researchers performing qualitative data or content analysis by helping to systematically evaluate and interpret textual data.

#### **Results**

One hundred and three firefighters and 77 emergency medical personnel filled in the questionnaires at T1; the response rates were 42.0% and 31.4%, respectively. The group of firefighters consisted of 100 men and three women, from 18 to 59 years of age (mean = 40 ± 10.7 years). The emergency medical group consisted of 22 men and 55 women, from 24 to 57 years of age (mean = 40 ± 9.1 years). Twenty-three male firefighters and 35 emergency medical personnel (12 men and 23 women) filled in the questionnaires at T2. Their ages ranged from 23 to 58 years of age (mean = 39 ± 10.2 years) and 23 to 55 years of age (mean = 40 ± 9.2 years), respectively.

There is only anecdotal evidence explaining the loss of participants between the measurements at T1 and T2, i.e., 75% among the firefighters (from 103 to 22) and 50% (from 77 to 35) among the emergency personnel (see limitations).

#### *Characteristics of the Disaster Experience*

There were 20 characteristics identified for the firefighters and 18 characteristics for the EMS personnel. They were reorganized into 14 and 13 categories, respectively, and ordered according to the frequency of occurrence. It was assumed that the more frequently the characteristics were mentioned, the more prototypical they were.

*Firefighters*—For firefighters, 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-scene (Category 2: 25.5%). The event and the casualties among colleagues had made an extensive impact, and members of the local fire brigade involved described their group as “one big family.” However, after these fire and rescue interventions, positive aspects (Category 3: 20.2%) also were expressed. Firefighters mentioned that they were thankful to be alive and appreciated their jobs. They also reported that they loved their most significant others even more after the response than before. Moreover, some were thankful for the psychological support (Category 9: 7.4%) that they and/or colleagues received after the responses. Some noted the impact (Category 4: 19.2%) of the intervention, during the rescue operations and afterward—even after several months. One firefighter said, “At the beginning of the month October [nearly 3 months after the event], 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 levels sometimes resulted in an inability to speak (Category 8: 8.5%). Others were unable or unwilling to talk about the disaster, from the moment of the explosion through to several months later. One firefighter wrote: “What I saw? One page is not enough.” For some firefighters, the disaster remains their worst memory, and some were not able to hold back 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-scene.

During the rescue interventions, firefighters searched and found victims, with burns (Category 5: 18.1%), wounds (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 people with burns lying by the roadside. Some firefighters mentioned the massive destruction (e.g., “There was nothing”) and the massive amount of victims (Category 7: 16.0%). One wrote, “As the devastation of the world after a war.” Before and at the beginning of the intervention, the firefighters 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 explosion. 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 provided. Stress (Category 13: 3.2%) was evoked in a few firefighters when they were at a distance from the epicenter, and did not know much or anything about the event (in the beginning). On the spot, firefighters sometimes were at risk during the operation. A few experienced an erroneous perception of time (Category 13: 3.2%); e.g., they did not seem conscious that time passed. Furthermore, firefighters mentioned a feeling of disconnection from reality during the operation, i.e., a feeling of not belonging to their own bodies. After the operation, this feeling was experienced as not having had many emotions during the rescue operations, and wondering why not. Moreover, the feeling of working on automatic pilot (category 14: 2.3%) also was present during the intervention.

*Emergency Medical Personnel*—The most frequent experience 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 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 (Category 3: 33.3%) arrival of a large number of victims and the suffering was hard to witness, i.e.; “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 number of wounded and burned (Category 3: 33.3%). This explosion caused many casualties, and some victims who still were alive asked for euthanasia, which severely affected (Category 2: 50.7%) the medical personnel who were trying to assist the victims. Emergency Medical Services and hospital staff personnel described the scene as “very shocking,” e.g., “It was a nightmare,” and “Hopefully, I will not experience such an event again.” Emergency medical personnel experienced the situation at the emergency department as “apocalyptic” and reported that they could not speak shortly after receipt of the victims, were not able to answer any questions, or did not want to.

The experience also affected their personal lives, as some firefighters died (Category 4: 33.3%). Wounded and burned victims, crying and screaming (Category 10: 13.3%), are very hard to experience, 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 never will forget the images of what they saw. Expressions of this impact included, “I shall live with these memories my whole life” and “How to forget? Time goes by, but the memories are still very vivid.” The experiences of fatalities among the firefighters also were difficult. Some of the emergency medical personnel knew the deceased firefighters 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 survivors also was difficult. In addition, a few emergency medical personnel reported that they still could not believe that something like this had happened or that they simply could not accept that some of the firefighters had died.

At the beginning of the response, there was not much information available. For example, it was not known (Category 3: 33.3%) what had happened, where it had occurred, and what needed to be done. 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 the 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. The likelihood of friends or family members being involved, 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 assistance provided by emergency service personnel and citizens, and the benefits and the effectiveness of their support. They also described positive aspects of their life since the event. These aspects can be a result of experiencing the 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 events, to be positive, and as time passes, to learn to live with the experience. However, 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 limited care and support provided for families and personnel.

A few emergency medical personnel said they felt like they had worked on automatic pilot during the disaster (Category 12: 6.7%). Those who described this sensation felt no emotions and worked professionally as living robots. Furthermore, while working at the scene of the event, a feeling of life threat sometimes was experienced. In addition, a feeling of life threat sometimes was present when providing care of the victims and/or family. Only very few emergency medical personnel mentioned that a life threat (Category 13: 5.3%) was a concern; this can be explained by the fact that most of the respondents had been working within the hospital.

#### *Feelings and Emotions*

*Firefighters*—The firefighters’ most frequently reported feeling was powerlessness (Category 1: 90.4%). They felt powerless because they were on the spot, and did not know whom to help first and where to start. Firefighters felt powerless when seeing all the victims; the firefighters in the first rescue squads to arrive at the scene

reported consternation—the scene seemed unreal. The experience also evoked a feeling of horror (Category 2: 75.5%), and was described by a few firefighters as “an apocalypse” (Category 4: 12.8%), e.g., “I got a feeling of apocalypse when seeing the scattered bodies.” Some firefighters also experienced fear (Category 3: 31.9%), especially due to the awareness that friends or family members possibly were involved. On the scene of the event, there was fear of getting involved in an accident because of the risks, and of not seeing colleagues anymore. When surviving the risks, some firefighters 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 had lost loved ones (Category 6: 1.0%).

*Emergency Medical Services*—Among EMS personnel, the most frequently experienced emotion was horror (Category 1: 55.5%). A feeling of horror was experienced in relation to the arrival of large numbers of wounded and burned victims who were screaming and crying. The horrible pain and the suffering of the victims were apparent on their faces. This arrival of suffering victims also triggered a feeling of powerlessness (Category 2: 50.7%), not knowing where to start, what to do, and a feeling of being overwhelmed. Moreover, a feeling of fear (Category 3: 34.7%) also was evoked. Emergency medical personnel became frightened when they saw the flames, heard the loud sound of the explosion, thought about the emergency personnel on the scene, 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 confrontation with the families and friends of the victims. Emergency medical personnel rarely experienced feelings of anger (Category 5: 5.3%). A few became angry because they could not understand why the event happened and why people died. When they realized that their own family members or friends were or could have been on the scene at the time of the explosion, they felt panic, or they remained in despair (Category 6: 4.0%) for a long time.

#### *Most Disturbing Aspects*

*Firefighters*—The most shocking aspects reported by the firefighters 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 event (e.g., the amplitude of the explosion) and the number of victims and amount of damage (Category 4: 18.1%) as most disturbing aspects. Others noted that the most shocking encounters were with burned victims (Category 3: 25.3%), and the scene when they arrived (Category 5: 17.0%) e.g., “Seeing the horror which led to nothing.” Still, others reported that the most shocking experience was a feeling of being powerless (Category 6: 13.8%), or being confronted with the victims (Category 7: 11.7%) they were searching for. Finally, the unknown aspects before and/or during the response (Category 8: 7.5%), and seeing the carbonized bodies and cars (Category 8: 7.5%) were shocking.

*Emergency Medical Services*—The most disturbing aspects reported by the emergency medical personnel were both the casualties among the firefighters (Category 1: 33.3%) and the confrontation with death (Category 2: 33.3%), i.e., experiencing a contact with death or by hearing some victims asking for euthanasia. For nearly one-third of the medical services personnel, the death of the five firefighters was especially disturbing because they knew some of them personally (Category 3: 32.0%), e.g., “Most shocking was the death of a firefighter who I knew very well.” Seeing the

victims in pain with burns (Category 4: 30.7%), suffering and screaming (Category 6: 18.7%), or the arrival (Category 5: 22.7%) of burned victims also was disturbing. Some others reported about the massiveness of the disaster situation in the hospital (Category 5: 22.7%). Besides what was seen or heard, the smells (Category 8: 16.0%) were disturbing. The emergency rescue personnel reported the odor of the materials (in the hospital or the mobile emergency post) and the odor produced by the wounded victims, i.e., of burned flesh. Lastly, not knowing (Category 8: 16.0%) what to expect at the beginning of the response, and family members and friends waiting for information because nothing was known, was viewed as disturbing afterwards.

#### *Disaster-Related Experiences after 14 Months*

At T2, both firefighters and emergency medical personnel reported which aspects of the disaster experience still were very present in their minds. In order to describe these aspects in a coherent narrative structure, the categories are not mentioned in the order of decreasing frequency of appearance.

*Firefighters*—The most frequently described aspect in their experience was the impact both on a psychological and personal level (Category 1), e.g., “The event changed a lot of things in my family life.” Some firefighters noted that they did not answer the first questionnaire because they did not feel ready (Category 5). Furthermore, the disaster had such an impact that it stayed vividly in the mind of some firefighters, 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 response the “worst intervention ever.” Still others felt turned upside down by the experience. In particular, the memories of the view at the scene (Category 2) still were difficult, e.g., when they arrived and experienced an apocalyptic feeling; or when they saw the enormous flames. The memories of the wounded or dead victims (Category 5) scattered everywhere along the road, being confronted with death (Category 5), and the involvement of friends/family members (Category 5), remained vividly in their minds. In addition, they recalled victims who had suffered (Category 6), and the firefighters and their families who had suffered after losing some friends and/or family members, including the personal impact. All these experiences contributed to the fact that some firefighters were unable to speak during the response and this lasted for at least one year after the event. “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 number of victims and the amount of devastation. As some firefighter explained: “I did not know where to start? With whom?” However, also positive aspects (Category 3) were experienced. Some firefighters spoke about the strength that grew out of the experience: they reported a feeling of personal growth, appreciating more the simple things of life, and that the friendship between colleagues became closer following the experience. Firefighters also spoke about the support they received from family or friends.

One year later (T2), they reported on: (1) being confronted with death (Category 1); (2) the implications for friends or family members (Category 2); and (3) the death of victims, the psychological or physical impact, and the feeling of powerlessness (category 3).

*Emergency Medical Personnel*—Emergency medical staff recalled the massiveness of the damage (Category 1) and the

number of victims (Category 3) at the hospital (e.g., "Seeing the victims arriving with tens together at the emergency department"). They also recalled that "victims were lying everywhere," they screamed (Category 2) for help because of the immense pain and suffering (Category 4), and the high number of victims with burn injuries (Category 5). In addition, those working at the scene recalled the amount of emergency services needed and the scattered bodies. On a sensory level, sounds (Category 6) still were remembered (e.g., "That sound stays on my mind forever."). Some emergency medical personnel remained haunted by the sound of the explosion while others remembered the sounds of the ambulances and helicopters.

The most disturbing aspects mentioned one year later (T2) were the death of firefighters and/or friends or family members (Category 1), being confronted with severely burned casualties, and eventually, their death (Category 2), and victims asking for euthanasia and/or screaming because of their pain (Category 3).

### Discussion

The disaster response at Ghislenghien, as experienced by firefighters and emergency medical personnel, had a huge impact on the psychological and personal life of those who responded, provided care, as well as on the lives of their family and friends. 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 difficult to cope 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 EMS personnel, especially those who worked at the disaster scene.

Compared to the firefighters, EMS personnel were directly involved with the injured victims, whereas firefighters had to cope more with the physical aspects of the event (e.g., heat, smoke, fire, smell, etc.). The unusual number of injured victims resulted in a chaotic situation, which contributed to the fact that the impact of the disaster with respect to the massive human suffering was more intense in EMS personnel compared to the firefighters. In contrast to the EMS personnel, firefighters mostly were present on the site of the event. Firefighters are used to working on the scene of an accident or a fire, but rarely do firefighters die during an operation. Firefighters more frequently reported the impact of the first encounters with the victims on the disaster site. This disaster also was characterized as an event in which friends, family members, and victims died, and working on the scene was described as "risky." Both the direct contact with death and the perceived life threat appeared to be much higher in the firefighters. Time was not always consciously perceived. In addition, the apocalyptic view at the 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 their experiences was related to working on the spot as a firefighter. However, after the intervention, more firefighters reported positive aspects in comparison to EMS personnel.

The firefighters involved in this disaster experienced a more direct exposure to death and more life threat than did the EMS personnel. This has been documented in the literature<sup>35</sup> when comparing the experiences of firefighters with those of emergency medical personnel: firefighters' work-related experiences

are physically more dangerous and involve greater threat to their lives. Furthermore, fear of the unknown provoked psychological responses following the performance of rescue work. Previous qualitative research on the meaning of traumatizing events, as described by nurses in an ambulance service,<sup>20</sup> indicated the potentially traumatizing event was an encounter with the unforeseen and meaningless. Emergency medical services personnel have to cope with the potentially traumatizing event without the possibility of being prepared. Just as in some other critical daily life events, the outcome of the Ghislenghien event was extremely negative and unpredictable: 24 victims instantly killed on-scene and >100 other severely injured (burned). Further research is needed to investigate if the first unknown minutes of an intervention may evoke a stress response. Moreover, the potentially traumatizing character of such an experience becomes clear by the fact that seeing the casualties, colleagues and friends and/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.<sup>40</sup> The concept of "effroi" is difficult to translate, but represents 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 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 firefighters. Lebigot states that the human being has no representation of "the real of death" in his/her psyche; therefore, a sudden confrontation with death leaves the survivors behind without words.<sup>40</sup>

The descriptions of fire and emergency services personnel involved in the Ghislenghien disaster mentioned both cognitive and emotional experiences of disconnect from reality. This also is in accordance with the findings of Jonsson and Segesten<sup>20</sup> who described the reactions of Swedish ambulance nurses who were so focused and concentrated on helping the victim that they distanced themselves from the surroundings; they were so emotionally committed that their vision narrowed. Therefore, it was expected that this phenomenon will occur on an even bigger scale when being confronted with the number of victims reported in this study. Jonsson and Segesten 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 powerless.<sup>20</sup> Their research also showed that it seems impossible to avoid these strong feelings during the contact with victims.

This analysis of the emotions experienced uncovered the fact that working as a firefighter evoked feelings of horror and powerlessness. These feelings were more prevalent among those fire personnel who had been directly exposed to the images at the scene. A feeling of apocalypse also was 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 more adequate equipment and structure to help the victims. Compared to the firefighters, 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, firefighters were shocked primarily by

the death of their colleagues. In addition, the feeling of powerlessness, the scene, and the carbonized victims and cars shocked firefighters the most.

According to Moran, the experience of firefighters and emergency medical personnel which involved multiple deaths is traumatic.<sup>34</sup> 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 response might be related to Antonovsky's sense of coherence.<sup>41</sup> Focusing on the interrelated factors of manageability, comprehensiveness, and meaningfulness; more specifically the manageability (the present resources meet the demands) of a given situation, seems to lead to less post-traumatic stress.<sup>42</sup> Comparing the experiences of firefighters and emergency medical personnel in the Ghislenghien disaster leads to the conclusion that firefighters experience more "post-disaster positivism" than do emergency medical personnel. Even after more than one year, firefighters expressed still more "positivism." It seems that, in this case, the more traumatic the event was experienced, the more post-disaster positivism or growth was reported.

Reporting mostly horror and feelings of being totally out of control is in accordance with criterion A2 of PTSD,<sup>42</sup> and since the participants involved in this study have been confronted with death, also criterion A1 of PTSD is met, hence the potential for development of post-traumatic stress reactions and PTSD is present.

### Limitations

This study has a number of limitations. There was a large dropout rate between T1 and T2 for which no unambiguous explanation is available. The informal and anecdotal 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 have been non-random, and the emergency responders most stricken may not have been represented—or perhaps the other way around. Given that all the firefighters but three were men, it cannot be presumed that the findings also are valid for female firefighters. Furthermore, to deepen the understanding of the traumatic core of a disaster, in-depth interviews and content analyses are necessary. The time-frame and the resources available to the researchers involved in this study did not allow one-to-one contacts with all of the stricken rescuers and caregivers to be able to uncover their experiences, at the time of the disaster and in the immediate aftermath (T1), or after more than one year (T2). Finally, since grounded theory research does not allow generalization of the research findings,<sup>37</sup> actual findings only contribute to the understanding of the nature and meaning of the experience of belonging to a certain population in a certain setting.

### Conclusion

This study sheds light on the characteristics of the damage as experienced by firefighters 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 reactions to the potentially traumatizing aspects of a disaster and their rescue activities. These results also can be used to prepare fire and emergency services personnel to understand the possible psychological impacts upon confrontation with potentially traumatizing events. These 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 providing medical first aid. This phenomenological analysis offers an important addition to the existing quantitative trauma literature in which context-specific data are less explicit. The results of this study could not confirm whether or not firefighters who contributed to the rescue of victims described less positive reactions in their rescue experience than did those involved only in fighting the fire. However, in general, firefighters reported more positive changes after the intervention than did emergency services personnel who were more involved in person-focused incidents and confronted with extensive human suffering of both victims and their families.

The assumption that the closeness of death had the most obvious impact on a person is supported.<sup>43-44</sup> The demise of friends and/or family members was the most shocking, and potentially traumatizing, aspect in this disaster experience. The unspeakable experiences of firefighters, confronted with their own death through the direct life threat and the death of their colleagues, can be related to the concept of a close encounter with death, leaving the survivor without words.

The result that emergency medical personnel seemed to have experienced more horror than did the firefighters could be explained by the fact that they were 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 worked in areas such as administration, kitchen or cleaning services, and had never seen seriously injured people.

### Acknowledgments

The authors thank Frédéric Daubechies, Director of the Service d'Appui Psychologique aux Intervenants, for both his practical and moral support and his assistance with the organization of this study. Without his help in contacting the fire, rescue, and EMS personnel involved, this research never would have been possible. We also express our gratitude to the leaders of the Fire and Emergency Departments and to the Union Royale des Sapeurs-Pompiers du Hainaut (Royal Union of Firefighters of the Province of Hainaut) more specifically for the immediate support and enthusiasm with respect to this study.

Last but not least, the authors express their respect and devotion to the community of fire, rescue, and emergency medical personnel, for the work they continue to do and the services they continue to deliver in these sometimes very dramatic contexts, thereby often risking their own lives.

### References

- Soeterman RJH, Yzermans CJ, Kerssens JJ, et al. 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.
- 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.
- Beaton R, Murphy S. Secondary traumatic stress in crisis workers: research implications. In: Figley C (ed.), *Compassion Fatigue*. New York: Brunner-Mazel; 1995:51-81.
- Morren M, Yzermans JC, van Nispen RMA, Wevers SJM. The health of volunteer firefighters 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, eds, *Posttraumatic Stress Disorder. Acute and Long-Term Responses to Trauma and Disaster.* Washington, DC: American Psychiatric Press; 1997:3-15.
7. Laposa JM, Alden LE. Posttraumatic stress disorder in the emergency room: exploration of a cognitive model. *Behav Res Ther.* 2003;41(1):49-65.
8. Leon GR. Overview of the psychosocial impact of disasters. *Prehosp Disast Med.* 2004;19(1):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(1):75-78.
10. Mitchell JT, Dyregrov A. Traumatic stress in disaster workers and emergency personnel. In: Wilson JP, Raphael B, eds, *International Handbook of Traumatic Stress Syndromes.* New York: Plenum; 1993:905-914.
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 firefighters. *Am J Psychiatry.* 1998;155(12):1727-1732.
13. Weiss D, Marmar C, Metzler TJ, Ronfeldt H. Predicting symptomatic distress in emergency services personnel. *J Consult Clin Psychol.* 1995;63(3):361-368.
14. De Soir E. Psychologische debriefing bij brandweermannen en ambulanciers [in Dutch]. *NVBB Magazine.* 1999;146:27-36.
15. Clohessy E. PTSD symptoms, responses to intrusive memories and coping in ambulance service workers. *Br J Clin Psychol.* 1999;38(Part 3):251-265.
16. Kessler RC, Sonnega A, Bromet E, Hughes M. Posttraumatic stress disorder in the national comorbidity survey. *Arch Gen Psychiatry.* 1995;52(12):1048-1060.
17. Grevin F. Posttraumatic stress disorder, ego defense mechanisms, and empathy among urban paramedics. *Psychol Rep.* 1996;79(2):483-495.
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(2):305-313.
20. Jonsson A, Segestin K. The meaning of traumatic events as described by nurses in ambulance service. *Accid Emerg Nurs.* 2003;11(3):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 JP, Raphael B, eds, *International Handbook of Traumatic Stress Syndromes.* New York: Plenum; 1993:905-914.
26. Hartsough D. Emergency organizational role. In: *Role Stressors and Supports for Emergency Worker. HS Publication (ADM) 85-1408.* Rockville, Maryland: National Institutes of Mental Health, U.S. Department of Health and Human Services; 1985.
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(5):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(1):267-273.
29. Jeavons S, Greenwood KM, Horne DJ de Le. Accident cognitions and subsequent psychological trauma. *J Trauma Stress.* 2000;13(2):359-365.
30. Herman JL. *Trauma en herstel. De Gevolgen van Geweld van Misbehandeling thuis tot politiek geweld.* Amsterdam: Wereldbibliotheek; 2002.
31. Shakespeare-Finch JE, Smith SG, Gow KM, et al. The prevalence of posttraumatic growth in emergency ambulance personnel. *Traumatology.* 2003;9:58-70.
32. Bravo M, Rubio-Stipec M, Canino GJ, et al. The psychological sequelae of disaster stress prospectively and retrospectively evaluated. *Am J 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(6):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(1):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.* Bussum: Coutinho B.V.; 2004.
38. Baker C, Wuest J, Stern PN. Method slurring: the grounded theory/phenomenology example. *J Adv Nur.* 1992;17(11):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(2):80-84.
42. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (4th Ed).* Washington, DC: APA; 1994.
43. Hagström R. The acute psychological impact on survivors following a train accident. *J Trauma Stress.* 1995;8(3):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.