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Swissair Flight 111 Disaster Response Impacts: Lessons Learned From the Voices of Disaster Volunteers

Terry L. Mitchell, PhD, CPsych
William Walters, MSW
Sherry Stewart, PhD

From the Department of Psychology, Wilfrid Laurier University (Mitchell), the Canadian Red Cross, Indonesia (Walters), and the Departments of Psychiatry and Psychology, Dalhousie University (Stewart)

Contact author: Terry L. Mitchell, Assistant Professor, Faculty of Science, Department of Psychology, Rm. 2018, Wilfrid Laurier University, Waterloo, Ontario N2L 3C5, Canada. E-mail: tmitchel@wlu.ca .

This qualitative research study provides insight into the specific experiences, trauma, and needs of disaster volunteers as an understudied and marginalized sector of response and recovery personnel. Based on a qualitative analysis of in-depth interviews, the authors present the tasks, exposures, impacts, and search for meaning of the Swissair Flight 111 disaster volunteers who were exposed to human remains during response and recovery efforts. The article is structured to amplify the voices of volunteers to reveal the specificity of disaster fieldwork and resultant multilevel impacts critical to understanding and responding to contemporary disasters. The article concludes with a discussion of the need for clinical and operational policies and protocols that acknowledge the risk and impact of volunteer exposure to human remains and serve to protect the well-being of future volunteer disaster response and recovery workers.

KEY WORDS: disaster, volunteers, human remains, PTSD, qualitative research, Swissair Flight 111, Nova Scotia

Exposure to disasters is known to have both short- and long-term cognitive, emotional, physiological, and behavioral consequences (Chu, 1998; Fullerton & Ursano, 1997; Schnurr & Green, 2004). Despite a growing body of literature about the traumatic nature of events such as disasters and increased knowledge about their adverse impacts, inadequate attention has been given to the experience and well-being of disaster rescue workers and volunteer responders. Response workers often experience trauma in relation to the cognitive and sensory assaults of disaster response work, while attempting to process and integrate what they are seeing, hearing, touching, and smelling around them (Fullerton & Ursano, 1997). The range and magnitude of stress responses vary significantly among those involved in disaster response operations chiefly in relation to the individual's role in the response efforts. There is, however, a well-established link between human remains exposure and the development of posttraumatic stress disorder (PTSD) (Leffler & Dembert, 1998; Ursano, 1990). Despite the known risks of disaster exposure, in particular human remains exposure, there is a dearth of research investigating the experiences of and impact of this type of exposure on volunteer disaster workers. On reexamining the voices of the Swissair Flight 111 (SA111) disaster volunteers who were exposed to human remains, we learn important details about volunteer experiences and impacts and begin to address a critical gap in the literature that describes the phenomenological nature of experience and exposure, as well as short- and long-term impacts on volunteer disaster workers.

This article extends from and further explains the initial findings of a larger mixed-method study in which the initial analyses of volunteer responses ($n = 13$) to standardized questionnaires indicated that 71% of the volunteers that were exposed to human remains were suffering from likely PTSD according to scores on a self-report measure (Mitchell, Stewart, Griffin, & Loba, 2004). The first analysis of the community-level health utilization data from this study (three years prior as compared with 3 years postdisaster) also identified community residents as potential secondary victims with the report of certain disease categories significantly increasing in this region following the disaster, that is, respiratory, neurological, Cardiovascular Disease, mental health, gastrointestinal, and endocrinological/immunological diseases (Weerasinghe, Stewart, Mitchell, & Russell, 2003). Also, our earlier work on coping-related drinking (Stewart, Mitchell, Wright, & Loba, 2004) demonstrates the negative impact of volunteer exposure. The present article involves further analysis of interview transcripts of the seven response volunteers from the original sample who were involved in the recovery of human remains in the aftermath of the Swissair disaster. In this secondary analysis, we consider the response and recovery experiences of a much understudied group of disaster response workers—individuals who have endured human remains exposure in their role as disaster response and recovery volunteers. As very little is known about this group of disaster workers, we seek to contribute to increased understanding and insight into the experiences and needs of disaster volunteers by listening to first-hand field accounts and by amplifying the voices of the volunteers themselves. Drawing upon in-depth qualitative interviews, we analyze qualitative data to describe the field experiences, impacts, and coping strategies of volunteer recovery workers involved in the SA111 disaster who were exposed to human remains. Despite the small number of interview participants in this subsample of recovery volunteers, we are able to provide otherwise rare accounts of recovery volunteer experiences with

reflections on their specific tasks, exposures, and impacts. Working with very rich data (Denzin, 1989) and detailed first-person accounts, we represent the voices of disaster response workers whose role was to recover human remains. Given the known mental and physical health impacts of human remains exposure and the long-term social, relational, occupational, and health impacts of posttraumatic stress, we portray the specific experiences and responses of volunteer disaster recovery workers. We conclude the article with a call for further research on volunteer impact, treatment models, and protocols to inform volunteer involvement in disaster response and recovery efforts.

▶ Methods

In 1999, an interdisciplinary research team, working in partnership with a community advisory group, studied volunteer- and community-level impacts of the SA111 disaster. The Community Advisory Group involved 12 community members from various disciplines included three clergy, three mental health professionals, a community fire chief, a community volunteer, an Emergency Measures Coordinator, a Ground Search and Rescue Captain, and two elected civic leaders from the impacted communities. Utilizing an ecological perspective (Bronfenbrenner, 1979) and a mixed-method methodology (Tashakkori & Teddlie, 1998), the team of researchers studied trauma exposure, stress responses, and resilience in the aftermath of the disaster.

The research team received ethical approval from a university research ethics board to conduct a research study to determine both individual- and community-level impacts of the crash of SA111. All interview participants were provided with a letter of information, and all signed a consent form that indicated the voluntary nature of the interview process. All participants were also given a resource sheet with information about possible negative health responses that can be associated with exposure to disasters with contact information for counseling and support services in their area of residence.

Utilizing a naturalistic paradigm (Hammersley & Atkinson, 1983) and a participatory action research methodology (Green et al., 1995), the team of researchers studied the nature and mechanics of exposure, trauma, stress responses, and resilience during and in the aftermath of the disaster. Such an approach allowed for a wholistic evaluation of the subjective realities of people who experienced the response efforts and the aftermath of the SA111 disaster.

The data for this article are derived from a subset of the qualitative data (7 of 13 volunteer interviews). The initial study involved volunteer respondents who were categorized as instrumental and recovery volunteers. Instrumental volunteers were individuals who provided logistical support such as food, clothing, and transportation to response and recovery workers both professional and volunteer. The recovery volunteers were those who were actively involved in the recovery of airplane debris and human remains. For the purpose of this article, we selected the recovery volunteer transcripts as an intensity sample ("Information-rich cases that manifest the phenomenon of interest intensely but not extremely") of volunteers (Patton, 1990, p. 171). The disaster response volunteer data selected for this article ($n = 7$) were collected over a period of 9 months between July 2001 and April 2002, approximately 3 years after

the SA111 disaster. Volunteer interviews were open-ended, semistructured, and lasted for approximately 1.5–2 hr. The interview guide invited participants to tell their stories in relation to their personal experiences the night of the crash, their role in response and recovery efforts, and the impacts of such work on themselves. Interviews were audiotape recorded and transcribed, and the transcripts were checked against the original tapes. All identifying data were removed to ensure participant anonymity. (All names used in the representation of findings in this article are assigned pseudonyms.)

Each of the seven volunteers (two women and five men) included in this article participated in the collection and cataloging of human remains, personal effects, and airplane debris. Participants worked in the field between 7 and 35 days. Further participant demographic information is not reported due to the small sample size, in order to better protect the confidentiality of research participants.

▶ Data Analysis

In February 2004, the disaster recovery volunteer transcripts were reanalyzed using the coding procedure of Strauss and Corbin (1998). Transcripts were coded using a three-phase process of open, axial, and selective coding derived from a grounded theory approach to data analysis (Strauss & Corbin, 1998). In the initial phase of the data analysis process, a series of broad categories with subthemes were developed: impacts and processing experience (meaning, hope, respect, and honor), commitment and determination (positive and negative coping), impacts (social, relational, occupational, PTSD symptoms: physical, behavioral, cognitive, and emotional), communication (coworker, family, community, and confidentiality), positive implications of involvement, traumatic incidents (direct and secondary), work environment (recognition, information sharing, role, changes in the nature of role over time, coordination, policy/protocol, duration, intensity: emotional and physical), interventions and supports (in field and external), and coping (positive-active coping, negative).

Based on the open-coding process and the preliminary placement of codes into purposeful groupings, subsequent categories were derived and existing categories refined, leading to the process of axial coding. During the axial-coding process, the relationship between all previous codes and coding categories was explored and the connections between all data were further considered and collapsed to reach a data synthesis revealing a narrative of key constructs: the task, the exposure, the impact, and the meaning. This analysis of a largely underinvestigated phenomenon intentionally privileges the voice of the disaster recovery volunteers versus the interpretive voice of the researchers. However, the narrative constructed from volunteer voices in this article has consciously been employed by the authors to share insights, to increase understanding, and to inform policy recommendations for future involvement of volunteers in disaster response efforts.

▶ Rigor

Lincoln and Guba (1985) describe "trustworthiness" as having collected data that are

to be found credible. They argue that the basic issue in relation to trustworthiness is to demonstrate that the findings of an inquiry are worth paying attention to. In establishing trustworthiness, Lincoln and Guba outline several key issues to be attended to while carrying out research: credibility, dependability, confirmability, and transferability.

In the execution of this research initiative, several strategies were employed to ensure that the findings were trustworthy. To establish credibility, four key techniques were employed: prolonged engagement, persistent observation, constant comparison, and member checks. Dependability and confirmability were assured via an extensive audit trail that outlines the chronology of community and research events as well as details of each stage of the data analysis process. The first two authors independently coded and analyzed the volunteer data and conferred on interpretation before axial coding and checked back with the original transcripts during the writing up of the article to confirm and to seek negative cases of emergent interpretations/representations of the data. Transferability speaks to the degree to which the findings apply to other similar situations as determined by the reader of the article. In order for such a determination to be made, there needs to be "thick data" (Denzin, 1989). In the context of this study, transcribed interviews provided a wealth of "thick data" detailing very consistent accounts of the recovery workers experiences. While working with a small sample ($n = 7$), we believe that the information yielded from the voices of these individuals, especially in relation to being exposed to human remains, is highly transferable and applicable on a much broader level, beyond the confines of this study.

▶ Findings

The Task

To give specific contextual information to the reader and to highlight the profound nature of the volunteers' experiences, we provide an extended quote derived from the transcript of one of the recovery volunteers as a forward to the findings on the volunteers' field experiences.

I'll Do It For Them Because They Can't

About the fifth day, by that time getting worn down [pause] I was starting to wonder, I needed some, some attainable goal. Some reason for what I'm doing. Why am I doing this to myself? I needed something to keep going. To try and dig that strength out. Because I was starting to tire down, I was starting to get tired out. And ah, near a point that I hadn't been before. So I was in kind of an untested territory with myself as far as my resilience was concerned. And I wasn't sure where my mind or where my body was going to go from here if I kept going. And even then I (was) suspecting that you're okay now but if even if you stop at this point, is there going be a ... a period of time where the effects are still accumulative or whatever when, when it stops physically, is it going to continue emotionally or whatever? The toll. And I needed something to cling to because usually,

when you're out on a search, you have the energy to keep going no matter how tired you are because you think, if I just keep going, you might find the person alive and if you don't at least, ah know you, work hard because you want to be able to find them even if they are dead, to say that the families have somebody and they're not laying out there in the woods somewhere for two or three years for some hunter to come across or, or not get them back at all and I can understand that being very important. And that's what hit me. Coming back in transport one day, we were coming back in the camp and there were some family members out by the water and it just struck me then. You know, there it is right there. [pause] That's... [long pause, gets emotional] That's why I'm doing it. I'll do it for them because they can't [pause] nor should they be expected to [pause] do what I'm doing. Ah, so I'll do my best and I'll make sure that my guys have the opportunity to do the best and we'll get everything that we can.

When SA111 crashed into the Atlantic on September 2, 1998, at 10:31 p.m., many residents of the surrounding area were already at home in bed. Fishers and volunteer firefighters responded as they always had to marine disasters and readily went to the shore, launching their boats to assist. Individuals initially presumed that they went out to sea to rescue survivors of the crash. In reality, however, response and rescue workers were faced with the profound realization that all 229 passengers and board personnel had perished in the disaster. Responders were confronted with an extraordinary and horrific watery debris field.

... the confusion and the eeriness of the night, um was sort of like a messed up painting when on acid. It was black. It was rainy, miserable. The waves were pretty high. The sea was coming over the bow. The Hercules dropping para-flares which wouldn't make it thought the clouds completely and it would give this weird glow to the whole area.

It was just a surreal night ... it was sort of like one of Dante's levels of hell.

Bert who was with me was starting to get very panicky because of what we heard on the radio. There was a lot of fishermen losing control on the radio and the final straw was when he heard one fisherman talking about how he had found a pair of legs because he thought it was hose and he was pulling it up and these female legs floated to the surface and he lost it. And then when Bert heard that, he said, George we've got to go. I can't deal with this.

It was beyond my experience to see humans in that condition. Ah, I think what struck me apart from the gruesome and the grotesqueness of it was the fragility of the human body that ah, something that can walk and talk and do things can be reduced to this in a flash and there's nothing you can do about it. It is that fragile. It can be extinguished that quickly and torn asunder that easily.

Despite the surreal and grotesque nature of the debris field left by the tragedy and the emotional and physical demands of the rescue efforts, on the first night an untold number of community volunteers stayed out in the darkness searching for people to save.

... I felt that it was necessary to stay out there as long as possible just in case.

You know, your logic dictates everyone was dead and there wasn't a chance of survival. We didn't know that that night.

After the first night, as ground search and rescue teams started to be organized and deployed in an organized manner, volunteers were asked to follow a strict protocol for collecting, bagging, and tagging human remains, personal effects, and airplane debris. All items needed to be securely wrapped and identified. The volunteers took their roles seriously and worked with a high degree of respect, professionalism, and care as illustrated in the following quotes from three volunteer response workers.

Well, [pause] we "bagged and tagged it" as they say, it got picked up and brought back [pause]. There was a routine for plane stuff. It went into one bag and [pause] body parts, or alleged body parts, went into another. We would have just been talking about tissue here eh. Something that is so undefined that you know, unless I was a doctor or something wouldn't know. You know, it could have been jellyfish... So I mean we were aware that we might be dealing with tissue from a person, okay?, but we didn't know. So we did what we were supposed to do and we came back in

... you made sure that (you covered) the area that was cast for you to do that there was no rush job. You had to do a very thorough job that you were set out to do. Your task had to be very efficient or else.

... we'd stop around noon and take half an hour and because, at least the way I felt, that an half an hour was enough because we were searching and we didn't know what we could find or what we would come in contact with. Maybe a person was still alive or something, so we didn't want to take an hour.

The task shifted from rescue to recovery with the daunting role for both workers and volunteers of salvaging parts of the devastated aircraft, recovery of human remains, and cataloging of personal effects. The daily events of volunteers involved long hours, in extreme settings. Groups of three were taken by boat or helicopter to one of over 300 small islands within St. Margaret's Bay and Mahone Bay, Nova Scotia.

Within a few hours actually we knew that there was gonna be no survivors. When the reports were coming back in on what was being found, there was absolutely no way that anybody survived it. So we knew that. So there was a real general sadness over the support camp we'd set up, but everyone was still very dedicated. "Well okay then, here's what we have to do. We have to go out and we have to bring these things back." But it was ... it was hard.

Volunteers worked in remote areas under all types of weather conditions. While individuals worked together in teams, they were asked not to speak with one another about what they were finding. The task was physically demanding with individuals working long hours, sometimes weeks on end without rest.

> One recovery volunteer spent 34 days in the field and some volunteers, particularly in the first two weeks, were working from six in the morning to midnight.

> When I left, when I left (for) the crash site, it was dark. When I arrived on shore it was light and when I went home it was light, it was a new day. It was totally, it was like a bad dream or a nightmare and when I went to sleep, I kind of, it wasn't that I forgot about it, but I left it behind me. It wasn't a, [pause] it was very surreal.

Although it was evident for most response workers very early in the operation that the probability of finding survivors following the total devastation of the aircraft was remote, volunteers worked conscientiously and continued to be motivated by the hope that there might be someone to rescue.

> It's not a job, it's a task that you're asked to do and you volunteer to do it and ah, there's always the hope, the hope is, the hope is really what keeps you going. It's not something that you can give up on, the hope. Because if you give up on hope, you really have nothing, you know. There's nothing to work with or nothing to accomplish so hope is a wonderful thing to keep you, you know, striding ahead.

Exposure and Impact

In this section, we present the impact findings in the subcategories of behavioral, emotional, cognitive, and physiological impact. (Although the *Diagnostic and Statistical Manual of Mental Disorders* lists only three symptom categories, our finding of four symptom clusters has been corroborated by earlier work by Stewart, Conrod, Pihl, & Dongier [1999].) The profound nature of the multiple exposures and the related physiological, cognitive, behavioral, and emotional impacts are revealed in the following vivid quote from one recovery volunteer. This quote indicates the profound intersection of exposures and impacts and contextualizes the volunteer's experience as a preface to the structured presentation of findings.

The Experience Was So Intense

> The experience was so intense. The sensory input was so high, the emotional level so high that when it started to wane, when it started to decline, Ah, you found yourself missing that adrenaline I guess. The sensory excitement. The whole intensity of it. It was ah, a real depressing feeling came over you that this isn't like it was the first couple of days now, you know, the smell of the jet fuel is starting to disappear. The pieces of the plane are being battered and worn and becoming soggy. The human remains are beginning to decay and ah, that's what I was getting mad at. I was angry. I wanted fresh debris. I wanted it to be like it was the first couple of days. I wanted a fresh crash, damn it. [laughs] was the sort of mindset that I had. I want a new crash. I want it back the way it was... Why was it? Um, it was easier then. It was more, if you could possibly fathom that it was more. Um, it was cleaner. It was newer. Um, to deal with ah, fresh human remains in my mind is much more preferable to deal with than decaying remains.... It's, it's a much different experience to, um, collect parts of a person that have been very recently torn apart, than it is to pick through, um, stuff that's

ah, that smells offensive, that looks, ah, I would compare um, the first human remains would be ah, grotesques and unsettling where as later on, they became offensive ... Um, it smelled bad. It looked, rotten. It was rotten. It was getting old. And that's what was bothering me. The same with the plane parts and everything else. The freshness of it was going away and it was just, it was something peculiar that I just, I noticed, and it struck me. I actually laughed after when I realized, hey buddy, you know you're telling off debris here. [laughs] ... This isn't really going to change anything. It just struck me as kind of funny that I was actually doing that. That, that had happened.... And ah, using a few expletives then I realized you're angry at the debris is what I was angry at and I was actually angry at the debris. It was, I was ah, talking to myself but complaining to the debris, animating it. That ah, I wasn't happy. I was ah, telling the debris off. In a way. Like you'd talk to yourself if you were going to anticipate a confrontation with somebody or if you had an issue with a person and you were sort of rehearsing ah, how you would ah, address that confrontation. Going through various scenarios. Ah, you know, improvising kind of. And I, I was telling the debris off. I was angry at the debris and I when I realized what I was doing, I ah, oop, hee ho ... Pull over to the side and put a pink flag out the window. Help needed here....

Due to the nature, intensity, context, and duration of the volunteers' fieldwork, volunteers had multiple types of exposure and various levels of impact. The biggest challenge for many volunteers was to come to terms with the distinction between their original expectations and their actual role in the disaster response efforts. Most, if not all, individuals volunteered to rescue survivors of the crash. That is the traditional role of coastal people and the designated role of ground search and rescue volunteers. The SA111 response efforts challenged this expectation and called upon volunteers to assist in the unfamiliar role of recovering human remains rather than rescuing survivors.

It was hard because you know we're used to, like I said, we go out and we hope to find the person alive and well maybe hypothermic, or whatever right, and we bring them home. And even when we do find someone who's deceased we bring the body back to the family.

I don't think it was so much the bodies but the fact that we went out there to do a job, to provide first aid, to provide medical service to help people and how can you help body parts? You can't. And I think that, that was the hardest part for them.

Because really our team, I mean, we're a search and rescue team and what we were doing was search and recovery. So ... Um, I never realized what a big world of difference there was in the two until then.

The volunteers were also exposed to sleep deprivation and physical and emotional exhaustion over extended periods of time from 1 week to over 1 month. Recovery volunteers were exposed to massive loss of life, grieving family members, repeated exposure, and threat of exposure to dismembered human remains, personal effects, as well as intense international media coverage.

I didn't sleep really the first five or six days. Maybe an hour or so but I'd wake up and it

would be two or three in the morning and I figure I might as well go back down and get ready to go out back in the field. After ... [pause] After about the fifth day, um then it started getting [pause] I started wearing from fatigue and a, as well as, the nature of the operation. Ah, there was ... there were a lot of factors involved. Part of it was fatigue. Just the physical demands traveling that much shoreline and being up that much compounded by the, the ah the nature of the material being recovered and as well ah, one of the more difficult aspects would be the ah ... seeing the families.

And we all sat together and we cried, oh we cried. Because when they handed out the pamphlets and it had all the names on it. It was when you looked at it, you realized, that there were whole families. You know, there would be six, seven names all the same. It was like, "Oh my god, that was that whole family, gone."

Yeah. I think that's what really brought it home. Even more than the day we saw the human remains, was seeing the families come. That, those were people. They're not just pieces of people that you put into a bag. They were people. They had lives, they had families....

I lived, I won't say I slept but I ate and lived Swiss Air all the time I was down there. So in the evening when I did come home, I'd turn on the news and just find out. It just went along with it. I just saturated myself in it. It might have been a good thing or a bad thing. It's just the way ... It felt like what I wanted so that's what I did.

Due to the nature of the volunteer response workers' task and multiple levels of exposure while in the field, volunteers experienced a variety of impacts. The trauma effects were immediate for some behaviorally, emotionally, cognitively, and/or physiologically.

Behavioral: "I washed my clothes five times."
Volunteer respondents reflected on and discussed the various ways in which they had modified or changed their lives during and following the disaster efforts. Volunteers responded in various ways that resulted in individuals being in the field for various periods of time and exposure.

So, they realized that there was something wrong. That the members were not showing up the next day. Some of them would go home and some of them would stay there. They wouldn't go home at all.

Volunteers reported various behavioral outcomes, which included excessive washing, isolating themselves, and not talking with anyone about the recovery experience or responses to the experience. For three volunteers, these behavioral responses contributed to marital problems, and for some, their behavioral responses also contributed to difficulties at their place of employment.

I washed my clothes five times now and I can still smell people on them.

I stayed in the woods ... I just built a little lean-to you know and got under there and if it rained, I would sleep under one of the buses. I had a sleeping bag. I go in the woods and

sleep all the time anyway. Sometimes I go for four or five days in the woods and wouldn't come out.... I want to be alone all the time. I don't want nobody around with me.... I want to be alone and I'm by myself, I can cope with things better that way.

Roy actually sold the boat that I was out in that night.

It slowed me down and it made me frustrated and it made me angry. And my work suffered.

Silence was a common behavioral response, a response that was promoted in the field but which was carried back to the volunteers' homes and communities further isolating and putting volunteers at risk.

Nobody ever indicated that they had found anything [pause] like body parts. And they probably did. Some did. Some had to have. But nobody talked about it.

I never talked with anyone who was out there.

Emotional: "I reached a point of saturation."

The emotional impacts were very significant for the recovery volunteers with clear reports of cognitive posttraumatic symptoms, intrusive thoughts, flooding, and dissociation. The exposure to human remains in particular required a type of emotional disengagement that resulted variously in intense emotional release or conversely emotional numbing.

Ah, there was, there was a point that I reached which was an interesting experience. That I reached a point of saturation. Where if someone had slaughtered ten children in front of me, it wouldn't have, it wouldn't have raised my heart rate. I would simply look at it and I, I couldn't go any further than I had gone emotionally. There was no more. There wasn't another level. I had reached the limit that I could endure and I think it was just psychologically protective. That it was to me, the analogy I would use is like a sponge. And I didn't know how much more I could take and then I reached a point where the sponge was full and the rest just washes off. For me, other people might break or whatever. Um, luckily, I didn't. I don't think I did.

... young recruits that were down on the shore and actually picking up body parts and some of them got into trouble. You know, reality just suffocated them I think.

I felt kind of stifled over the whole time and it, and I didn't really understand it because I hadn't been anything, through anything quite on that scale.

Cognitive: "What the hell is wrong with me?"

The thoughts of volunteers were also affected as they attempted to cognitively and emotionally process the mass casualty and the challenging and grotesque nature of the recovery work. As the physical and emotional impacts of exhaustion, sadness, fear, and anger were felt, individuals struggled to understand their experiences and their responses.

> You know it's like a tunnel. You went into it and you came out the other end. [pause] and while you were in there, it was dark.

Volunteers were confronted with exposures and responses that were both equally foreign to them. Realizing that they were being affected on multiple levels, volunteers began to question their personal emotional, physiological, and cognitive responses wondering what was happening to them.

> You just kept thinking, "What is wrong with me?" I'd get up in the morning and I'd be like, "Oh, why am I so fuzzy, why can't I, what's wrong with me?" That's what I constantly thought.

> But it was hard to feel that tired all the time. It really was. And kind of a shock. Because you constantly thought, "what the hell is wrong with me?"

> I mean there was a long period of time. You know, the crash is always in your head and you thought about it constantly....

Physiological: "The body tells you."
The volunteers also spoke of tremendous exhaustion, of various physical responses, early signs of somatization significant enough to require time off work.

> The body tells you ... You may be silent, even your brain may be silent but your body will not be silent for long. I've found that out.

> It's a different kind of tired. [laughs]. You feel like you've been sucked dry.

Delayed Responses: "The first year afterwards, I, I took a bit of a decline."
The volunteers reflected on how the SA111 response and recovery involvement had affected them over time. Volunteers identified sleep problems, for some increased smoking and/or drinking, as well as relational, employment, emotional, and behavioral impacts, including a fear of flying. In particular, people identified an enduring exhaustion, the presence of depressed affect, and difficulty in relating to those who were not involved in the response efforts. For at least three of the participants, these impacts also contributed to the dissolution of their marriages.

> The fatigue's been very slow to go. Um, probably the worst thing of all was the overwhelming fatigue. Um, I just don't have the energy I used to. You know, it's slowly coming back but that was the longest effect. And I mean the depression, you know, I guess that's all just part and parcel of feeling depressed. Um, what ... post traumatic stress ... whatever right.

Finding Meaning in Disaster, Death, and Devastation

Volunteers struggled with the massive loss of life and their inability to rescue any survivors from the disaster.

> We didn't save anybody. Why should we go there to get thanks by these people because

really at the end of the day, [we didn't] do anything to help them.

Another volunteer stated—

Hazen said to me that he felt like we failed. And I'm like, I feel that way too.

Finding meaning in such devastation caused constant struggle with their role and their sense of contribution or failure. Ultimately, as described in the recovery volunteer's quote below, volunteers gained significant meaning and strength from various sources, including their interaction with grieving family members.

I Didn't Feel Like I Failed Anymore

At the anniversary, we talked to a lot more. And I know, they kept telling us, "We couldn't believe all you did for us." Every day that they were out there, they saw all of these people in orange combing here and combing there. Going out on boats to here, going out on helicopters to here. She said, "Every day, there was just more of you and more of you and more of you. She says I couldn't believe that all of these people would drop everything they were doing and would come help us. And you helped us so much. We'll never be able to thank you." I had all of the same theme kind of thing. People telling us over and over, "I can't believe what you did for us." I thought, they don't think we failed. So then, I felt a lot better about it and so did some of the other people on the team that I had talked to who had the same feeling. They said, "Yeah, after that, I didn't feel like I failed anymore. Because they don't think I failed anymore.

In light of the reality of the situation and the catastrophic nature of the event, although experiencing a range of adverse impacts, each individual employed various strategies to aid them in finding meaning in their disaster response efforts. Although many response workers felt a sense of failure in light of their valiant effort during the relief and recovery process but their inability to rescue any crash victims, interactions with the family members often helped to put their sense of disappointment and failure into perspective. Many recovery volunteers were then able to see how truly grateful these individuals were for the effort they had exerted. Such contact with victims' family members often served to validate the recovery workers' experience and to aid in putting closure to their own emotional distress.

One key theme that readily appeared in the data was the abrupt realization of the fragility of the human body and delicate nature of human existence. Such realizations led many people to question their own mortality and the degree of control they have over their own destiny and existence.

I don't think you ever really make sense of it. It's just um, [pause] that whole notion, it kind of made me think a little bit more. It made me rethink life and rethink death and um, kind of concluded that we really don't have control and I guess, I guess that's the way it's supposed to be. You know, it's just the way it happens and unfortunately, as it is, that's the way things work.

Religion, faith, and an increased understanding of the human spirit also became a source of comfort for many response workers and oftentimes served as a means to help the volunteers to give meaning to the disaster and their personal experiences. Turning to one's faith aided many in helping them find meaning and answers to how and why such things can happen. Many people resolved themselves to the notion that there are no simple answers and that such occurrences are beyond human control.

> Ah, my faith is, I won't say very strong, it's unshakeable. I have rock solid faith. Um, I'm not ah, I'm beyond the point where I would ask the typical question, why would God allow something like this to happen?, because my personal belief is that ah, there is a universal consciousness of some kind or another. I think it's far beyond human intellect to comprehend the nature of that. I leave that in the realm of the unknowable, the infinite....

> The fact, you know, was that maybe it could be your mother, your father, your brother, your sister you know, or a child of yours, you know. So from day to day you kind of would go about your work and do the best you could and sometimes you would get a little strength from your buddy next to you whether he was on your right or the left. You know. But it was always sad. There was never any jokes or anything passed on and I've never noticed people humming hymns more than on those searches.

Weighing their experiences overall, the volunteers did not seem to regret their involvement in the recovery efforts. Nonetheless, most expressed the wish to move on from the disaster, and the hope that they would not be met with this type of life challenge again. Yet, some said that they would volunteer again, if needed.

> ... it was quite an experience and I hope to God that it never happens again....

▶ Discussion

As with previous sections, our discussion begins with the words of a volunteer who recounts his/her experience while working in the field. The volunteer details the careful, methodical, and respectful manner in which the response worker carried out his role.

The volunteer passionately and compassionately describes his exposure to personal effects and shares his reflections on the profound psychological impact of such an experience.

It Was Like The Whole Universe Just Closed Right In On Me

> And ah, I was taking the clothing and the clothing would get tangled all wrapped up in seaweed and everything so you would have pull everything apart. And, I, I thought it was a t-shirt that was my initial impression when I was trying to get this particular, well they're all knotted and twisted and tangled from rolling in it and stuff. [sighs] And I ah, I opened it up,

> I cleaned everything off and folded it up to put it in the bag and ah, a lot of times, rung it out if it were saturated for, just for the weight problems. I took it out and finally got it untangled and it was just ah, it was just a little jumper [baby's clothing item]. That might be blocked out a bit, actually it's kind of weird. I can't really picture it right now. Um, but I do, I do remember that the ... it was like, the whole, it was like in a movie or something that you see zoom in on one spot like from outer space—"vomp" [participant imitates sound]. Right in on that one spot on the planet. It was like the whole universe just closed right in on me and right in on that. And I was holding it up and I, oh shit. It just, it just stopped me. I was just dead in the water. And, I thought, you poor little bastard. And that's when it hit me. Yup. No sweat. If I could ah, little guy, I'd trade places with ya. [participant emotional]

When reflecting on the voices of the response volunteers and their lived reality during their involvement with the SA111 disaster, we are humbled by the fact that the data so eloquently and succinctly reveal more than we could offer from an interpretive authorial voice. We are committed to honoring and amplifying the voices of volunteers in this text to describe the experiences of disaster response volunteers and the interplay between their task, exposure in the field, and the resultant impacts they suffered. Volunteer voices have clearly described the profound nature of their experience as response workers, and they have articulated the various impacts of their involvement with the SA111 recovery efforts. Having honored this voice, we now transition to a discussion of these graphic experiences in relation to contemporary understandings of exposure to traumatic events with an emphasis on posttraumatic stress as a probable outcome.

The crash of SA111 off the coastal of a rural area of Nova Scotia in September 1998 presented a unique disaster response experience for local response personnel, many of whom were members of the surrounding communities and served in a volunteer capacity. In such areas, where there are limited paid emergency and disaster response personnel, members of the local community often serve in an auxiliary role as volunteer firefighters and members of the ground search and rescue teams. Although often well-versed in their respective fields and accustomed to responding to incidents such as auto accidents and searching for missing persons, they were ill-prepared for the magnitude of the SA111 response due the catastrophic nature of the crash, the total annihilation of the aircraft, and the disembodiment of all 229 passengers and crew. In this case, what appeared to be a routine search as local volunteers manned their boats and headed out to sea to assist survivors, turned into a salvage mission of the most grotesque nature.

The volunteers worked for up to 34 days on shoreline recovery work and performed a pivotal role in the response efforts, working on a daily basis combing the beaches collecting forensic evidence for investigative and victim identification purposes. As the findings chronicled, the nature and duration of these activities had a vast impact on the response workers due to multiple, repeated, and prolonged exposures to dismembered and decomposing human remains, personal effects such as children's clothing, fragmented components of the aircraft—most not exceeding the surface area of a dinner plate—ongoing interaction with grieving family members, and the relentless presence of the international media.

Existing research indicates that various adverse psychological and emotional impacts have been identified in disaster-affected populations (Bowman, 1997; Browne & Neal, 2001; Coarsey-Rader, 1995; Davis, 2003; Freedman et al., 2002; Fullerton, McCarroll, Ursano, & Wright, 1992; Herman, 1997; Litz, Gray, Bryant, & Adler, 2002; Sprang, 2002; Stephens, 1997; Suar, Mandal, & Khuntia, 2002; Wright & Bartone, 1994). The fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV*; American Psychiatric Association [APA], 1994) defines a traumatic event as an occurrence in which a person has experienced, witnessed, or was confronted with an event or events that involved actual or threatened death, serious injury, or a threat to the physical integrity of self or others and the person's response involved intense fear, helplessness, or horror. PTSD is an extreme response to a traumatic event characterized by specific clusters of symptoms experienced following the event (APA, 1994, *DSM-IV*). The PTSD symptom cluster can be formulated into three broad categories: reexperiencing/intrusion (nightmares, flashbacks, intrusive thoughts, or images), avoidance/numbing (detachment, restricted effect, avoidance of reminder, thoughts, and activities), and hyperarousal (hypervigilance, decreased concentration, increased startle response, insomnia, irritability); in order for a diagnosis of PTSD to be made, these symptoms must last for 30 days or more and result in significant social or occupational distress (APA, 1994, *DSM-IV*). However, a diagnosis of acute stress disorder, while bearing many similarities to PTSD in its symptom cluster structure, can be made as soon as symptoms have persisted for 2 days, theoretically allowing for more prompt diagnosis and earlier intervention (Mitchell & Everly, 1997).

Although the majority of response workers are highly trained professionals within their respective fields (such as paramedics, medical practitioners, members of search and rescue units, police officers, and firefighters), this study focused on the experiences of volunteer response workers who had various degrees of training and experience in emergency response. The SA111 disaster was a catastrophic event beyond the range of normal emergency response efforts. When placed in such situations, in addition to being presented with challenges regarding their familiarity with their assumed role, workers may be exposed to grave human tragedy and hardships that may contribute to the psychological impact of their work (DeWolfe, 2000). In such situations, response workers are often traumatized through their senses as they struggle to process and integrate what they are seeing, hearing, touching, and smelling around them (Fullerton & Ursano, 1997). In the SA111 disaster, the volunteers were exposed for an extended period of time to human remains, and this exposure had a variety of behavioral, cognitive, emotional, and physiological impacts. In a study conducted by Fullerton et al. (1992), professional rescue workers who were involved in a mass casualty disaster suffered adverse effects. The rescue workers complained of intrusive images and smells following exposure to the deaths of victims, and some reported difficulties in sleeping, nightmares, and images of the dead during the night. Fullerton et al. also identified that response workers felt helplessness and guilt at not being able to do more to help the victims. The recovery volunteers in the present SA111 study similarly suffered negative impacts from their exposure to a mass casualty disaster compounded by the emerging reality that there was complete devastation of the aircraft and no survivors. The distress was heightened by the inconceivable devastation of the airplane and unimaginable disembodiment of humans that resulted in the recovery of human remains versus intact human bodies. In a study by Coarsey-Rader (1995), the psychological and emotional effects of investigating the fatal air crash of USAir Flight 1016, which claimed the lives of 38

passengers when it crashed on July 2, 1994, revealed that persons who work with affected populations and who are exposed to grotesque elements often become secondary victims. Due to the implosion of the SA111 aircraft and the difficulty and duration of the response efforts, the degree of distress for SA111 disaster volunteers was affected by both extremes in duration and intensity of exposure. The SA111 response volunteers felt helpless at not being able to rescue survivors or to provide intact corpses to grieving families. We concur with Coarsey-Rader that such exposures can produce secondary disaster victims.

▶ Limitations

Although we have established the strengths of the data and the compelling importance of the volunteer voice, we also acknowledge that this article is subject to several critical limitations. We are working with data from a small group of volunteers who agreed to participate in the research and who may not necessarily be characteristic of the majority of volunteers. The research participants may be more or less traumatized. However, we suspect that those who suffered the greatest long-term distress after the disaster would not have participated in this study given the avoidance of trauma reminders characteristic of those with PTSD (APA, 1994, *DSM-IV*) and that the volunteer effects discussed here are a conservative portrait of PTSD impact on the SA111 recovery volunteers. The data are all first-person accounts that were gathered retrospectively, approximately 3 years after the disaster occurred. The data are therefore subject to recall biases. Finally, this paper was based on a secondary analysis of the original data completed 6 years after the disaster occurred. Given this time lag, it is possible that the findings may not accurately reflect contemporary volunteer disaster experiences. However, we believe that the in-depth first-person accounts gathered in this study provide critical information that has not been reported previously in the literature.

▶ Conclusion

It is evident in the findings of this qualitative study that volunteer responders were exposed to multiple tragic deaths and the shock of the loss of "physical integrity" of the SA111 crash victims due to the profound physical impact of the crash. We learned that the volunteers' selfless, dedicated service resulted in varying degrees of feelings of helplessness and horror as they engaged in their volunteer recovery task. Volunteer interview transcripts revealed the characteristic cluster of PTSD responses of reexperiencing, avoidance, numbing, and hyperarousal. Volunteers described immediate, short-term, and long-term impacts with negative personal, social, and occupational outcomes. Volunteer responders were grossly impacted by the nature and duration of their tasks and the cumulative effect of their multiple exposures. The Swissair response volunteer activities involved multiple exposures including identification with victims through personal clothing and effects, exposure to grotesquely fragmented and decomposing human remains, and direct contact with hundreds of

grieving family members. Further, ongoing international media coverage of the response efforts served to compound the distress of the SA111 volunteers. It is important, however, to acknowledge that some volunteers gained meaning and strength from their interaction with family members and their ability to contribute at a time of need. The personal contact contributed greatly to the volunteers' ability to complete their task with respect and dignity for human remains, honor for the lives of the deceased passengers, and service to their grieving families. The ability of volunteers to give meaning to their disaster experiences appears to have contributed to adaptive coping as found by Meichenbaum (1994).

Further research is required to investigate short- and long-term impacts, with attention to volunteer needs in the field for communication, support, and debriefing. The development of treatment vehicles and modalities must also be considered for short- and long-term follow-up of volunteers who serve in disaster response efforts. Given the profound impact of human remains exposure and the long-term personal social and occupational costs of PTSD, it is recommended that emergency and disaster organizations develop specific policies and protocols for volunteer involvement, support, treatment, and follow-up, in particular when responders are exposed to human remains.

▶ Acknowledgments

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