

Trauma, Stress, and Firefighters: Mental Health Consequences of Repeated Exposure

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Abstract

Background: Firefighters must be ready to respond to a broad range of emergencies every duty day. In the course of many of these emergencies, firefighters witness events which have the potential to induce emotional trauma, such as badly injured people, deceased children, and individuals who are highly distraught. Previous research suggests that repeated exposure to these traumas (RET) may have negative impacts on the emotional and mental health of fire service personnel. Research on the mental health of firefighters has been limited to small surveys reporting the prevalence of specific mental health problems such as depression and post traumatic stress disorder among firefighters.

Objective: Despite the likelihood that RET leads to negative outcomes in firefighters, data is lacking on how exposure impacts fire service personnel. The current study examines the experiences of firefighters related to RET.

Methods: Using formative research methods, we examined the beliefs and experiences of firefighters and administrators from across the United States regarding the impact of RET on firefighter health.

Results: Study findings highlight the cumulative psychological toll of repeated exposure to traumatic events including desensitization, flashbacks, and irritability.

Conclusion: Findings of this study suggest that RET should be a focus of research on the occupational hazards of firefighting and other emergency services.

Keywords: firefighters, mental health, depression, post traumatic stress, trauma, EMS

Introduction

With significant declines in the number of fires nationally over the past several decades (e.g., only 5% of calls being were actual fires in 2011; (1)), firefighters' responsibilities have shifted from primarily engaging in fire suppression activities to include a broad range of emergency response operations. Present-day firefighters are responsible for rescue operations, hazardous materials management, responding to natural disasters and domestic attacks, and providing emergency medical services. Medical calls typically include a range of needs from simple sprains and strains on a baseball field to wide variety of potentially traumatic events including a parent who is experiencing a heart attack, a child who has drowned in a swimming pool, a car accident that has mutilated an adolescent, a fire with possible trapped victims, or a terrorist attack. A common saying in the fire service, as quoted by the 2005 documentary *Into the Fire* is that "Your worst day is our everyday"(2). Not surprisingly,

it has been suggested that regular exposure to these events may have a negative psychological toll on firefighters' mental health.

Given that repeated exposure to trauma (RET) is a necessary occupational hazard, it is not surprising that the mental health of first responders has been the focus of several previous studies(3–11). Although many firefighters are remarkably resilient, research suggests that many suffer negative psychological consequences from their experiences. For instance, evidence suggests that rates of depression and depressive symptomatology among fire and EMS personnel is higher than the general population. Pyle and colleagues (12) examined the rates of depressive symptoms using the Center for Epidemiologic Studies Depression screening measure in a sample of 132 firefighters in the Midwest and found that 15.6% of participants scored in the range consistent with depression. In a population based study of both career and volunteer firefighters from the Midwest, Haddock and colleagues (13) found that between 11.8% and 26.5% of firefighters surveyed evidenced scores in the range of concern on the CES-D10, depending on their smoking status. Tak et al. (10) surveyed 525 firefighters three months after Hurricane Katrina and found that more than a quarter (27%) were in the range of concern for depressive symptoms after responding to the disaster. However, it was unclear whether their symptoms were primarily related to disaster response or to being a victim of the disaster itself. These data suggests that rates of depressive symptoms among firefighters are substantially higher than prevalence rates found the general population of the United States (U.S.), which typically are less than 10% (14,15).

Several studies have documented high rates of alcohol use and binge drinking among firefighters, which has been hypothesized to be related to RET. Haddock and colleagues (16) found that 56% of career firefighters and 45% of volunteer firefighters in their population-based sample reported a binge drinking episode (5 or more drinks in a sitting) during the past 30 days, which is similar to that reported by Carey and associates (58%) (17) in their sample of career firefighters in the Northeast. Both reported rates are substantially higher than the general population nationally which is typically under 20% (18). North et al. (19,20) found that alcohol disorders were “endemic” among firefighters who had responded to the Oklahoma City bombing and that using alcohol as a coping mechanism resulted in poorer functioning. Boxer and Wild (21) surveyed 145 firefighters using the Michigan Alcohol Screening Test and found and found that 29% of firefighters had scores in the range of concern for probable or possible problems which is high compared to the national rate of 13% of current or past alcohol abuse or dependence. Research suggests that those experiencing emotional distress and PTSD often report the development or exacerbation of risky drinking behaviors (22) which may account for some of the high rates of problem drinking among firefighters.

Previous studies examining the relationship between the firefighter role and post-traumatic stress disorder (PTSD) have produced mixed results. The prevalence of PTSD in the U.S. is currently estimated to be 3.5% (15). While a number of studies have found rates of PTSD among firefighters to be higher than the rate found in the general population (4,19,20,23), many do not. For example, Corneil et al. (4) estimated a prevalence rate of 22% for 203 firefighters in the US from two large metropolitan

departments in the Northwest and 17% among 625 firefighters in one large metropolitan fire department in Canada. North and colleagues (20) found that 13% of firefighters responding to the Oklahoma City Bombing experienced clinically significant PTSD symptoms. Conversely, Meyer and colleagues (24) completed diagnostic interviews with 142 trauma-exposed firefighters from a large, urban department in the Northeast and found that only 4.2% met the criteria for a diagnosis of PTSD. Dudek and Koniarek (25) found a prevalence rate of 3.9% of firefighters with diagnosable PTSD in their sample of 464 firefighters using a diagnostic interview. Del Ben and colleagues (23) published a rate of 8% of PTSD among firefighters in their study.

Potential reasons for the widely varying prevalence estimates for PTSD among firefighters include the frequent use of convenience samples of firefighters in the literature, the varying experiences of firefighters from different departments, and variability in how well departments prepare their personnel for potentially traumatic events. In addition, an emerging hypothesis for the mixed literature on RET and mental health outcomes among firefighters suggests that forcing the typical firefighter's response to RET into the rubric of PTSD fails to capture the actual impact of trauma on mental health outcomes in this occupation. For instance, Fisher and Etches (26) point out that firefighters often experience a phenomenon described in the literature as "secondary trauma", "vicarious trauma" or "compassion fatigue." The terms refer to the negative psychological impact experienced by first responders and others who come into contact with many traumatic experiences being experienced by others, rather than one highly traumatic personal event which underlies their symptomology. It has been posited that the accumulation of events experienced by firefighters can result in a

negative psychological toll that, while not meeting diagnostic criteria for specific disorders, may still be significant and impactful on firefighters' work and home lives. Thus, the nature of exposure to trauma in the fire service may require a shift in focus from PTSD to post-traumatic stress symptomatology (PTSS).

PTSS is conceptualized as the symptoms of PTSD whereas PTSD refers to the constellation of symptoms that are a diagnosable disorder. As an example, Haslam and Mallon (27) reported that only 6.5% of the emergency responders in their study met the criteria for PTSD, however a large number of firefighters reported trouble with sleep, recurrent distressing dreams, avoidance behaviors, and feelings of helplessness which are all symptoms of PTSD. When Mishra and colleagues (28) surveyed 105 emergency medical services personnel in Hawaii using the PTSD Check List, very few endorsed enough symptoms to be considered in the range of clinical concern for PTSD, however 88% reported experiencing PTSS. Thus, PTSS appears to be much more common in this population than PTSD, which is consistent with firefighters' vicarious exposure to trauma. Thus, the literature on firefighter's psychological health is increasingly focused on understanding the impact of RET on firefighters and how RET may manifest given that many firefighters may not report or experience currently diagnosable mental disorders(26,29,30).

While previous studies have sought to quantify or theorize about psychological health among firefighters, the purpose of the current inquiry is to understand the perspectives and experiences of fire service personnel related to post traumatic stress symptoms and RET using formative research methods such as focus groups and key

informant interviews. Working with firefighters and fire service leaders from across the country, we were able to examine the experiences of a variety of personnel.

METHODS

Findings from the current study were part of a larger qualitative study of firefighter health funded by the American Heart Association (AHA National 0830390N, PI Jahnke) to examine cardiovascular risk factors, physical and psychological health concerns among firefighters in the U.S. Data for the current study were extracted from the full transcripts of focus groups and key informant interviews. The research protocol was approved by the relevant Institutional Review Boards.

Fire Department Solicitation. Departments to be considered for participation were solicited through an article in Fire Chief magazine(31) and then selected based on purposive sampling techniques (32) to ensure a cross-section of departments with variety in region, type of department and size. The final sample consisted of firefighters and fire service leaders from across the country in career, volunteer and combination departments and in small, medium and large metro departments. In total, participants represented 34 different fire departments across the country. Full details of department recruitment have been published previously.(33).

Participants. Table 1 provides the demographic characteristics of study participants, stratified by fire department type (i.e., career, volunteer, or combination). Participating firefighters were typically male and Caucasian consistent with the demographics of the fire service nationally (34). Also, participants represented a broad range of experience and roles in the fire service, providing a rich sample of firefighters from across the U.S.

Insert Table 1 Here

Focus Group/Interview Protocols. Focus groups were conducted with crews of firefighters typically occurred in the firehouses. Chiefs and those in leadership positions typically participated in one-on-one key informant interviews. Focus groups and key informant interviews began with an explanation of the study, an outline of the process and time for questions. In addition to psychological health, domains covered in the sessions included (1) general perceptions of health and wellness in the fire service (2) physical fitness (3) nutrition and the food culture among firefighters (4) tobacco use (5) alcohol use (6) sleep challenges (7) safety and seatbelt use (8) health related policies and programs for firefighters. Psychological health and stress management often were raised by participants as part of the discussion about alcohol among fire service members. While questions initially were not designed to assess RET, this topic was frequently raised by participants and thus was analyzed as a separate thematic domain.

Approach to Analysis. Recordings of focus groups and interviews were transcribed verbatim for analysis. For the current study, any data related to mental health were extracted from the complete transcripts. Mental-health focused transcripts were then reviewed for common themes. As the themes related to RET and post traumatic stress symptoms began to emerge, the transcripts were again reviewed for that specific content. Initially, transcripts were analyzed separately by region to determine whether there were differences between participants in the East, West and

Central regions. As themes seemed similar across regions, they were combined for analysis. Transcripts were uploaded to NVivo (35), a computer program designed to assist in thematic analysis. Two researchers independently reviewed the full transcripts for emergent themes across interviews and groups. Data was coded into “parent nodes” for general categories and “child notes” for more specific themes as they emerged. Themes were summarized and example quotes were identified by each researcher. Divergence of opinion on emerging themes were discussed and each coder revised their coding scheme. A third reviewer who attended most of the session and was familiar with all the transcripts reviewed the results for completeness and clarity.

RESULTS

While some firefighters had a specific incident that they identified as negatively affecting them, most participants discussed the impact of repeatedly being exposed to traumatic incidents and the psychological impact that resulted. Firefighters noted the large number of traumatic events they had to face as part of their job and difficulties they had coping with the resulting mental images and thoughts about these events. Typical statements by firefighters about exposure to traumatic events on the job included:

“...just the stress that follows stress. You know, just any call that day that's hard to shake and you collect that over a career. You know, it doesn't go away.” ~ Career, Chief

“We had an accident on one of our main highways where we were working to try to get this car open, and the lady died before we could open it. It goes home with you. I mean, you don't stop thinking about it ever. I mean, there's not a day that goes by in my life where I don't close my eyes and think about every person we've lost.” Volunteer, Firefighter

"When I was training officer, I used to tell the new guys, 'Make sure,' because curiosity when you get on the department is really high when you're new. And you want to be involved in every call, you want to be involved with every patient whether it's a - a body that's been burned beyond recognition or whatever it is, an amputation. You - I always told them, "One thing you must remember is you have to sleep with that for the next several nights. Because it doesn't matter what it is when you close your eyes. You will see it. And - and you handle that. So, make sure that your curiosity doesn't - until you're ready to handle that."
Volunteer, Firefighter

Impact of Repeated Exposure to Trauma (RET)

Participants reported a broad range of negative psychosocial outcomes resulting from RET for their mental health, occupational functioning, and their personal and family relationships.

Desensitization. One common theme that emerged as an outcome of RET was desensitization.

"Well, I mean, after you see enough people die and enough carnage, you go, "Oh well." And then, you don't really reflect on it much. You know? You don't really say, "Oh, that's terrible." Like my wife will say, "Oh, that's horrible." You know? And I'm like, going... How do respond to that? You know? Well, I mean, you start getting...cold." ~Career, Firefighter

"You just get numb to it. You go to these stuff and you don't - don't let it bother you." ~Career, Firefighter

At times, the desensitization reportedly created conflicts with family members who had a different frame of reference.

"I think you get desensitized to a lot more than that because you know, being here, you actually see stuff that's actually an emergency. And then, you know, I go home, and the girlfriend completely freaks out because, "Holy crap! We forgot milk at the store!" And if - we get in fights all the time because she freaks out about stuff and I'm just like, "Are you - are you serious?" So, I think that - that affects your life just - I know like XXXX was said, it's, you kind of get desensitized." ~Career, Firefighter

“So, when something happens outside this job, your reaction is a stark contrast to what your spouse or family would think a normal person's reaction would be, therein lies some conflict sometimes. You know, like, you don't think this is a big deal because to you, it's not. It's not an emergency to you, but, you know, everyone's perception of what an emergency is different for them. So, I've gotten into some issues just in - over my reaction or lack thereof of a reaction to something when it should have been much bigger. I should be really upset, and I'm not.” ~Career, Firefighter

Others experienced the desensitization as an adaptive coping mechanism that helped them to manage experiencing multiple traumas over time.

“You just get numb to it. You go to these stuff and you don't - don't let it bother you.” ~Career, Firefighter

“Firefighters.... have strange defense mechanisms and you don't want to sound cold, but you do get to the point where it just doesn't - I don't want to sound cold, but it doesn't affect you like it would most people.” ~Career, Chief

Cynicism and Irritability. Some firefighters indicated that being on the job resulted in them becoming more cynical and negative toward people and made them more irritable in their interactions with others.

“I think dealing with, like, dealing with, like, rough and tough city people, it just makes you way more cynical in your personal life. You're - I'm far more aggressive with people than I was five years ago. I - I was happy go lucky. I don't care what they're doing. Now, it's like somebody can really just set me off.” ~Career, Firefighter

Flashbacks. Several firefighters reported having flashbacks about particularly traumatic calls and intrusive thoughts about things they had experienced while on the job.

“I know that for myself, my calls, like at the very beginning of when I started this or when I started EMS, like I'll get flashbacks or something. One little thing, like

I'll see a little kid or something and I'll remember that from a call that I had when I was, um, you know, 18 or 19 years old. ~Career, Firefighter

"I can say that, I think one part for me, because I'm a medic, and a lot of times I go on a call ...from store to store. I've visualized a person that was laying there dead. That's a problem for me a lot of times. I remember how this man was laid out and he was out. And - and, so every time I go to the bank, I visualize him dead. Or, I go to a store when I drive past the store, I'm like, "Oh, that's where that person got shot in the leg." Or, "That's where that baby got hit," or "That's where..." I tend to associate people with buildings." ~Career, Firefighter

Coping

Despite personnel discussing the negative impact of RET, they also often discussed the adaptive coping mechanisms they use to manage their experiences. Typical coping techniques included compartmentalizing the event, repeatedly thinking about the event until it loses its negative valence, and using humor with fellow firefighters.

"I've had a number of my friends ask me how I can do this and do it for so many years. And the way I describe it is, I can go to the scene, and I - I draw a curtain across the event, and like, put the event behind that curtain. But like, it was just mentioned, once in a while that event comes out from behind the curtain. And there's a couple of events that I've dealt with a gentleman here that will never be gone. And, because, you know, the curtain's there, but things just sneak through." ~Volunteer, Firefighter

"we might see an incident where somebody's shot up or somebody's, you know, lost a limb or - we see all these - these things that people consider extremely gruesome, but we get up and go look at it and come back and eat dinner. You know? And when you really, really think about it, that's kind of, like, not normal. So, we all have this - we all have our ways of coping, whether we want to believe it or not." ~Career, Firefighter

"You just replay it nonstop in your head thousands of times and it finally just gets easier." ~Career, Firefighter

“I think if you don't - if you don't have the fun that we have, the - the joking, the screwing around that we do sometimes, yeah, the cumulative stuff will get to you.” ~Career, Firefighter

DISCUSSION

While several personnel reported a single event or call that was personally distressing, many firefighters reported the distress they experienced was the result of cumulative stress in response to a range of negative occupational experiences. RET resulted in a number of negative symptoms for firefighters including desensitization, irritability and cynicism, and intrusive flashbacks. Firefighters described feeling desensitized to experiences based on the extreme trauma they had experienced and that, at times, the desensitization led to conflicts with non-firefighting friends and family. Others described developing a “numbness or “coldness” to responding to calls. Some firefighters perceived that their experiences on the job had made them more cynical and on edge than they were prior to joining the fire service. Flashbacks also were a common among personnel. Notably, many personnel reported that it was not any single event that caused them distress or symptoms but rather pieces of different events.

One challenge in assessing the impact of RET has been the lack of appropriate assessment instruments. For example, measures of PTSD typically refer to one traumatic event and ask about symptoms (e.g. flashbacks, nightmare) specifically linked to that event (36–39). Findings of the current study suggest that it is more common for negative outcomes in firefighters to be the result of a series of negative events rather than one single event as it typically assumed for PTSD. Also, it is likely that some of the responses of firefighters to RET (e.g., humor, compartmentalization) are actually adaptive for firefighters as coping mechanisms. Future research also should examine

the relationship between these exposures and maladaptive health behaviors and outcomes.

Despite experiencing extreme trauma, many emergency responders effectively manage their emotional responses. Many participants in the current study indicated they were able to effectively manage the stress they experience from RET. In a sample of 58 volunteer firefighters responding to a hotel fire, Hytten and Hasle (40) found that 80% of those responding to the event felt they had coped well with the incident and two thirds indicated they experienced their involvement in the rescue operations was ultimately positive for them. It will be important for future research to explore the protective factors that lead to positive coping techniques and resiliency among firefighters.

Study findings suggest directions for future research. For example, obtaining accurate prevalence estimates for psychological symptoms requires obtaining population-based representative samples, which is still fairly rare for this occupational group. In addition, it is likely that a response bias exists in much of the literature relevant to RET among firefighters, with those experiencing symptoms being less likely to be interested in reporting their symptoms with researchers. Representative sampling for this type of research needs to be a particular focus of future endeavors. While limitations exist with using qualitative research approaches, current study utilized a large, diverse, and national sample of fire service leadership and rank and file firefighters in both career and volunteer departments, providing compelling rich data on the topic of psychological strain related to RET among first responders.

Findings highlight the continued need for a focus on understanding mental health among firefighters. In particular, there should be a focus on the best ways to measure and categorize symptoms. Finally, it will be important for scientist to explore what relationships exist between mental health and other health outcomes in this population.

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Table 1. Demographic and occupational characteristics (M;SD or %) of personnel.

	Career	Volunteer	Combination
Demographic	(N=295)	(N=48)	(N=80)
Age (years)	41.8(10.6)	37.1 (14.9)	38.9 (12.7)
Gender (% male)	93.2	79.2	87.5
Race (%)			
-African American/Black	10.2	0.0	1.3
-American Indian/Alaskan Native	0.3	0.0	0.0
-Asian/ Pacific Islander	19.5	0.0	1.3
-Hispanic/Latino	2.7	0.0	3.8
-Multi-ethnic	2.4	2.1	1.3
-White/Caucasian	64.8	97.9	92.5
Of Hispanic Origin (% yes)	6.5	0.0	3.8
Occupational			
Time in the Fire Service (Years)	15.6 (9.3)	16.0 (11.6)	14.3 (11.2)
Rank/Position in Fire Department			
-FF/FF paramedic	56.0	64.4	66.3
-Company Officer	23.7	13.3	20.1
-Chief	15.4	17.8	11.3
-Other Personnel	4.7	4.4	2.6