Mental Health Among Firefighters

Understanding the Mental Health Risks, Treatment Barriers, and Coping Strategies

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Background: Firefighters are at high-risk of mental health. This study qualitatively assessed the pathways toward mental health in firefighters. **Methods:** A two-phased assessment was conducted incorporating in-depth interviews (n = 52) and 10 focus group discussions (n = 82) with firefighters. Thematic analysis was used to develop codes and themes that informed the development of a conceptual model. **Results:** Firefighters recognized personalizing events by relating calls to their personal lives or prior life experiences as the main risk factor. Department debriefing with fire chiefs or leadership after traumatic events was reported as the primary coping strategy firefighters found most effective. Stigma and lack of medical professionals understanding the firefighter culture were identified as barriers for accessing mental health services or their effectiveness. **Discussion:** Pathways toward mental health in firefighters were identified that could be used to improve current strategies to protect their well-being.

Keywords: firefighters, mental health, treatment barriers, coping strategies

Firefighters are often placed in challenging situations in which split-second decisions that can impact their physical and psychological well-being.[1] Firefighters routinely respond to traumatic and stressful events such as natural disasters, domestic violence, fires, terrorist attacks, chemical spills, medical emergencies, and rescue situations.[2] Because of the consistent exposures to workplace hazards, trauma and stress in the fire service have been associated with a variety of negative mental health outcomes. Studies have shown that adverse mental health outcomes of being in the fire services are linked to post-traumatic stress disorder (PTSD), depression, sleep disruption, and suicidal behavior.[3–12] The prevalence of PTSD among firefighters ranging has been cited by studies ranging from 4.2% to upward of 37.4%.[3–7] Rates of depression in firefighters have also been reported to vary widely, with studies finding prevalence rates between 11% and 40%.[8,9] Sleep disturbances are common among firefighters, with multiple studies reporting rates of insomnia or sleep disturbances greater than 50%.[8–10] Research shows that the prevalence of suicidal ideation and suicide behaviors is high in firefighters.[11,12] A national study of firefighters reported the following suicidal characteristics: suicidal ideation (46.8%), plans of suicide (19.2%), suicide attempts (15.5%), and non-suicidal self-injury (16.4%).[11] Another study found that firefighters who responded to a suicide death were twice as likely to attempt suicide as those who had not.[13]

The literature has also identified potential sources of workplace hazards, perceived stress, and its association to mental health outcomes. Research has identified that mental health conditions, such as PTSD and depression, can develop through a single traumatic event or through cumulative traumatic events.[2,14] Firefighters often experience or witness mass fatalities, child fatalities, mutilated victims, or human suffering and pain due to the nature of the profession.[15] Studies have shown that more than 90% of firefighters experience at least one traumatic event throughout their career.[3,16] Incidents involving the death of a child are often described as the most traumatic events that affect firefighters' mental health, along with emergencies involving family members or friends of the firefighter, serious accidents, and being injured or nearly killed.[4,17]

As firefighters routinely expose themselves to variety of workplace hazards and traumatic events, firefighter's ability to cope with repeated and compounding trauma throughout their careers is critical to preventing adverse outcomes. A study reported that some commonly used coping approaches were compartmentalization, or processing through repeatedly thinking about an event until it loses negativity and using dark humor among peers.[1] Another study reported that structural systems, such as in-house and external debriefing systems, are formal means that provide firefighters with the needed space to discuss traumatic events with peers.[18]

A potentially unique challenge to supporting firefighter mental health is the social stigma around seeking help. Previous studies have identified concerns about embarrassment and perceptions of weakness, as well as lack of knowledge of mental health services, as barriers to care for firefighters.[12,19,20] Structural barriers, such as money and time constraints, are other factors that may limit care-seeking.[12] It is currently unclear how these social and structural factors may interact to create barriers for mental health care among firefighters.

Minnesota fire service comprises of approximately 20,000 firefighters employed at 775 fire departments, 18,000 of them being volunteer or paid-on-call.[21] Minnesota fire leadership presented concerns to the research team regarding mental health in firefighters; however, no studies have assessed the mental health risk among Minnesota firefighters. To address this knowledge gap, the qualitative study aimed to understand the potential risk factors and course of developing mental health conditions in Minnesota firefighters by ascertaining resources, coping strategies, and barriers to treatment.

This study aims to understand the course of mental health risks among firefighters by building a conceptual causal pathway that identifies potential key components on the path from perceived workplace hazards to developed mental health conditions through a qualitative assessment among Minnesota firefighters.

MATERIALS AND METHODS

Study Design

This study used a two-phased, sequential qualitative design consisting of in-depth interviews (n = 52), which informed focus group sessions (n = 10) among firefighters across eight Minnesota-based fire departments. The objective of using qualitative assessments through in-depth interviews and focus group discussions serves as hypothesis generating to provide context of major themes to build a conceptual causal framework. The study period was from March 2018 to May 2019 until data saturation was reached for each qualitative study phase. Ethical approval to conduct this study was obtained by the University of Minnesota's Institutional Review Board (Approval number: STUDY00001937). There were no restrictions for the recruitment of

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participants; thus, all firefighters voluntarily participating in this study were enrolled regardless of rank, gender, and so on. All participants enrolled in this study provided informed written consent.

Study Population and Recruitment

In-Depth Interviews

The study sample included only active firefighters in Minnesota. Recruitment was facilitated in collaboration with Minnesota Firefighter Initiative (MnFIRE), a nonprofit organization whose mission is to assist firefighters and their families with occupational health risks. First, clustered sampling was used for the selection of fire departments to represent all geographic regions in Minnesota (ie, urban, suburban, and rural). To obtain a wider breadth of perspectives, fire departments were grouped into three occupation-specific departmental categories: career (full-time), non-career (volunteer or paid-on-call), and combination fire departments (consisting of both career and non-career firefighters). Potential departments were selected based on the recommendation of our partners in the community. After clustered sampling at department level, convenience sampling was used for all firefighters voluntarily participating in the study from the selected departments. Fire chiefs from each of the selected departments were contacted via e-mail by a member of the study team, followed by a phone conversation. The study e-mail contained an overview of the study with its intended benefits of participation, and a recruitment flyer with study contact information to be distributed at each department. Career firefighters, non-career firefighters, and fire leaders (eg, captains, battalion chiefs, chiefs) interested in enrolling in the study reached out to the study team via e-mail or phone to schedule one-on-one, in-person interviews.

Focus Group Sessions

Focus groups were recruited from the eight fire departments where in-person interview sessions had been conducted. Fire chiefs were contacted via e-mail by a member of the study team, followed by a phone conversation. Participants from interviews could be a part of the focus group sessions, as to look at the difference in response between a one-on-one and group environment.

Data Collection

In-Depth Interviews

Initially, a semistructured interview guide was developed before the study formalized with firefighter unions about their concerns on firefighter well-being and mental health. The semistructured interview guide contains six questions prompts focusing on the following: (1) perceived mental health risks, (2) traumatic exposures, (3) departmental coping strategies, (4) personal coping strategies, (5) physical health status, and (6) barriers to treatment. Question probes were asked in response to further generate in-depth responses reflective of their own or a colleague's experience in the fire service. Interview sessions were conducted in person at a location selected by the participant or in a private room at the fire station where they were stationed at. Interviews lasted between 30 and 120 minutes. Although the interview guide was in a semistructured form, however, the interview process allowed a loose and flexible manner not to limit to the themes of the six prior questions and to maximize information collection that may not be captured by the structured guide.

Focus Groups Sessions

Five questions were developed based on themes identified during the in-depth interview sessions. These questions included (1) physical concerns as a risk factor for mental health, (2) mental health concerns, (3) departmental coping strategies, (4) external support structures, and (5) barriers to treatment. Discussions were moderated with open-ended questions to allow participants to discuss the identified interview findings freely and facilitate new ideas not captured during the interview phase. Firefighters were divided into different focus groups from leadership to address potential response and social desirability bias, and other unanticipated workplace conflicts. Among eight contacted fire departments, four fire departments participated in focus groups. In total, 10 focus group sessions were performed: four leadership groups and six firefighter groups. Focus groups varied from 3 to 13 participants, with a total of 82 respondents. Focus group discussions lasted 36–137 minutes.

Analysis

All interviews and focus group discussions were audio recorded. Thematic analysis based on the grounded theory method was used to summarize participant comments.[22] Three coders (D.D., S.J., and Y.S.) with experience working with firefighters reviewed field notes from all interview sessions to document major themes. Audio recordings were reviewed by the research team inductively to review and revise field notes and sorted into major and sub-themes reflective of the data captured. The research team generated a detailed codebook to provide consistency and transparency through the coding process. All content was reviewed for discrepancies, which were resolved through team meetings to achieve consensus. The principal investigator (H.K.) then reviewed, revised, and categorized the themes into three distinct codes (eg, perceived hazards, moderation, coping strategies).

Development of Conceptual Causal Framework

After major themes, concepts, and codes were constructed, the research team developed a conceptual causal framework to illustrate all potential pathways influencing firefighter mental health and interactions based on study findings.

RESULTS

Fire Department and Firefighters

A total of 30 fire departments were invited to enroll into the study. Of the 30 departments, eight fire departments (two career-only, four non-career only, and two combination) responded and joined interviews and four fire departments joined focus group discussions (two career-only, one non-career only, and one combination). The demographic characteristics of the fire departments and

TABLE 1. Characteristics of Firefighters and Fire Departments Participated in In-Depth Interviews and Focus Group Discussions

Interviews by Department Type	Career-Only		Paid-on-Call Only		Combination	
	n	%	n	%	n	%
Fire Departments (n = 8)						
Urban	1	50	0	0	0	0
Suburban	1	50	3	75	1	50
Rural	0	0	1	25	1	50
Firefighters (n = 52)	18	—	23	—	11	—
Age (range)	37–62	—	24–61	—	33–59	—
Gender						
Male	13	72	21	91	11	100
Female	5	28	2	9	0	0
Veteran status	3	17	2	9	1	9
Focus groups	n	%	n	%	n	%
Fire departments (n = 4)	2	—	1	—	1	—
Participants (n = 82)	21	—	33	—	28	—
Firefighter	10	48	26	79	24	86
Leadership	11	52	7	11	4	14

Combination, career, and paid-on-call/volunteer firefighters combined.

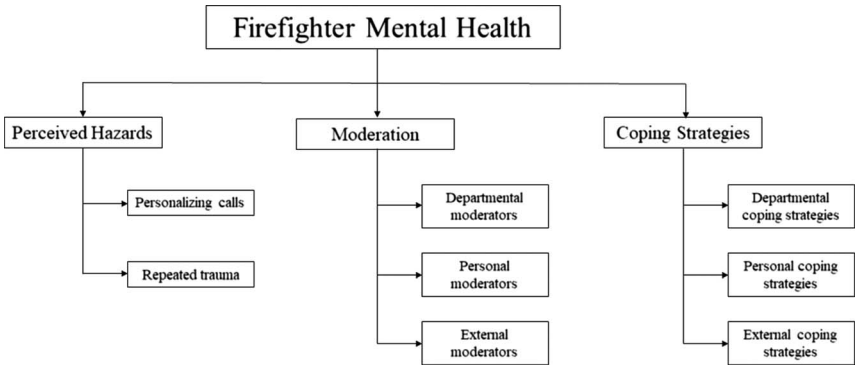

FIGURE 1. Summary of interview and focus group findings by major themes and sub-themes.

firefighters interviewed are shown in Table 1. Initially, 53 firefighters contacted the research team expressing interest in the study. One firefighter withdrew from the study for personal reasons, resulting in 52 firefighters interviewed across eight departments (urban = 1, suburban = 5, rural = 2). Participants were predominantly male (90.6%), military veterans (11.5%), and career fighters (37.5%) with an average age of 44 years (range, 24–62). In total, 82 firefighters and leaders participated in 10 focus group discussions (six firefighter groups, four leadership groups).

Themes, Concepts, and Codes

From the information discussed in the interviews, three major themes were identified: (a) perceived hazards, (b) moderation—departmental, personal, and external factors, and (c) coping strategies—departmental, personal, and external factors. Underlying concepts and key codes in each theme are outlined below (Fig. 1).

A. Perceived Hazards

Personalizing Calls

The major theme regarding mental health stress involved personalizing calls, see Table 2 for additional quotes. Personalizing occurs when firefighters relate aspects of a call to their own lives. Many firefighters with families indicated that calls involving children factored strongly into personalization. One firefighter stated:

> *"Well obviously when you have young children and you go on young children calls, that's the biggest thing and then when you get older, you see your children in all your calls too because they are in a different phase of their life until you see teenagers and college kids. You will obviously see as your family progresses and the calls kind of match on what your family is doing at that time, it connects right away."* [FF008]

Firefighters' prior life experiences also influence the personalization of calls. One firefighter, who had been impacted by suicide in their personal life, shared:

> *"What that affects now is I have a real hard time dealing with suicides in this arena… that kind of affects how I handle myself now, nightmares still. When I go to suicide calls, I don't avoid them. I walk right in and do my thing. When that does happen, though, it's like hitting the rewind button [back to the event] and then you bounce back and have a few weeks of nightmares."* [FF033]

Firefighters also expressed constant exposure to negative emotions compounded with traumatic calls also impacted their mental health.

> *"In my opinion, constant exposure to not necessarily just traumatic events… but prolonged exposure to sadness."* [FF010]

B. Moderation: Departmental, Personal, and External

Firefighters reported other factors that may influence their mental health by either exacerbating or reducing it in addition to the primary stressor. Three of these "moderating" factors that either facilitated or impeded the relationship between perceived hazards and mental health outcomes were identified based on study themes: departmental, personal, and external factors. See Table 3 for additional quotes.

B.1 Departmental Moderators

Buy-in from leadership/leadership support on mental health. Participants explained that their departmental leadership's support for mental health is paramount to a healthy environment and open discussion. Lack of mental health support was routinely discussed as a significant barrier to accessing resources and services. One firefighter stated:

> *"Coming to this department from [another fire department] is like a vast improvement… they are doing stuff with mental health here as well making sure that we are good…. I mean, I don't think you'll find that in a lot of places, but I think this place is stepping in the right direction because of the leadership. [The chief] has the buy in [for mental health], he is a good leader and has people to buy in."* [FF007]

TABLE 2. Additional Quotes to Perceived Hazards

Theme: Perceived Hazards	
Personalizing calls	"*I think as you grow older in the [fire service], I personalize a lot of things now. I see my son or I see my daughters in this now, whereas when I was younger, I guess then, I didn't.*" [LFG3]
	"*I think the hardest one would be a child, because most of us all have kids… anything that brings you back to your own family is going to be hard. I think that is probably where it hits home.*" [FF020]
	"*Mental health-wise, I don't know that all the incidents are creating the stress… I think it is how it is internalized and we need to help people learn how to cope with those kinds of incidents and how it relates to them.*" [FF030]

TABLE 3. Additional Quotes of Firefighter-Specific Moderators

Theme: Moderators		
Departmental moderators	Buy-in from leadership/leadership support on mental health	"*The change within management… it was a good move, and things are continuing to progress and change… there has been a lot more effort as to incorporate families and incorporate mental health.*" [FF026]
	Career vs non-career firefighters	"*Part-time firefighters are not always given the full respect that sometimes full-timers get… and they don't have as much training as a lot of full-timers, just due to it's a lot of volunteer hours… yet they experience the same type of tragedy and the same type of incidents that you would in any larger city or any full-time department., and they do it with less resources and less support.*" [FF022]
Personal moderators	Mental health stigma	"*I think not talking about some of the stresses and anxieties of this job and some of the mental illness things I think was the biggest stumbling block for all of us. I think now that we are talking about it, it's become a little bit healthier for all of us.*" [FF008]
		"*There still is this really big stigma… you are kind of this hero figure and for the most part, it is still considered a male-dominate industry, so I think it is very difficult for people to talk about mental health, even if they are feeling it. I think having a diverse group of people whether it is different ethnic backgrounds, genders, or whatever it is… will help people into opening up maybe more.*" [FF036]
External moderators	Lack of medical professionals with firefighter knowledge	"*Based on my partner's response to this whole EAP thing, his biggest thing was it is hard to talk to. It would be hard for me to talk to you about this stuff, because in my mind, you do not get it. So right there I already have a barrier, because you don't get it; you don't live it, you don't understand it, you won't get it. So if you put me in an office with [someone]… who has never lived this, I am not going to open up… I am already going to have that barrier.*" [FFFG3]
		"*I ventured out looking for counselors that had an emergency service background and lo and behold, there aren't many. So I tried several and went to many different counselors and just was never able to make that connection.*" [FF051]

Career versus non-career firefighters. Career status of firefighters is an important modifier, as different job classes may experience different stressors and may access different prevention and coping resources. For example, career firefighters (full-time) have a higher call frequency than non-career firefighters (volunteer/paid-on-call). However, non-career firefighters may be more likely to respond to calls involving acquaintances because they often work in smaller communities. When asked about mental health being a concern in firefighters and the differences between career and volunteer firefighters, one firefighter stated:

> *"I don't think that volunteer firefighters have the resources we have here, they don't have the time or money or maybe not even the experiences you know as the cumulative [calls], the one thing that they have which we probably don't have, is… they know the people, whereas here, we are a little bit more detached…. But smaller town volunteer firefighters might be at higher risk because they are serving their neighbors or relatives or people they have known their whole lives. And I think volunteers too because it is not their profession and it is not their career, maybe they have not been formally trained for it, they are not mentally prepared… they have to go to work in the next hour and they have no time to decompress, so I think it is a lot harder for [non-career firefighters] than it is even for [career]."* [FF008]

B.2 Personal Moderators

Mental health stigma. Many firefighters reported mental health stigma being the primary barrier to seeking help and accessing available resources. Respondents discussed how the firefighter culture influenced the way one views accessing mental health as a potential hurdle for initiating the use of mental health resources because of the "*if he is not going to ask, I am not going to ask*" [FF016] mentality. As one firefighter summarized, the overall culture of mental health within the firefighting community as:

> *"Firefighters are macho, and it is not always easy to get them to open up. I think it is a man thing, it is a macho thing. But because we are all that way, we are in tune to the fact that the other guys are doing that, so it is seeing a guy that is putting up a front or putting up walls and being able to figure out a way to approach him and get inside there and tell him that 'hey it is ok, you do not have to be tough.'"* [FF018]

B.3 External Moderators

External barrier: lack of medical professionals with firefighter knowledge. Based on the perception of firefighters, medical professionals and providers lack knowledge about firefighters and their work environment. Difficulty in finding medical professionals who understand fire service culture is a potential barrier for mental health treatment among firefighters. Our study found that there was consensus about this challenge during a focus group session. After one firefighter reported difficulty finding a therapist that understands the fire service, another firefighter stated:

> *"Yeah there is a challenge to [finding a therapist that understands the fire service]. I have gone through therapy before. You have to go find someone that understands what you are talking about, you go to a couple of them and try to explain it and what you are experiencing and they do not understand what it is I am even talking about… if they do not understand what I am trying to describe to them or explain, it just doesn't work out."* [LFG3]

C. Coping Strategies: Departmental, Personal, and External Factors

The preference of coping strategies varies by the individual. Participants expressed the importance of understanding and establishing coping strategies as a firefighter after stressful calls. In a focus group, two firefighters stated:

> *"I think giving people some direction [for coping]… giving people options of like ok maybe you should think about this if you are experiencing this, and giving people a menu of options based on their own symptomatology after a significant event…. I think organizations want to do something, we want to do something to take care of our people…."*

[Another firefighter added] "*It really comes down to 'I am having problems coping with this right now, and I do not have the coping mechanisms to be able to do it. How do I get them?' If you think about it, it really ties back to a lot of that. Whether it be a bad call or an injury or whatever, 'I don't have the skills to process this' or 'I don't have the coping mechanisms to deal with this' and that is what we need to figure out is, how do we get them?*" [LFG3]

C.1 Departmental Coping Strategies

Respondents reported using departmental coping strategies, including department debriefs, critical incident stress management (CISM), and employee assistance programs (EAP) (see Table 4).

Department debriefs. Departmental debriefs, both formal and informal, were reported as the primary coping strategy used within the department. Debriefs typically occur after a traumatic event, where the fire chief or leadership gathers firefighters to critique and discuss the call collectively. Most firefighters reported this to be an effective strategy after a traumatic event. One firefighter stated:

"We do a stress debriefing with the chief and talk about [the call] and make sure we are ok. I think you start to get everyone's opinion because it is so fresh after a call, that you have not had a chance to talk with people, like 'what happened?' or 'why did it go this way?' You get all the guys who were involved in the room and they are all very knowledgeable firefighters, more knowledgeable than I am and they start to weigh-in on what they think happened, or why things happened, or what we could have done better. It's comforting to get everyone's opinion on things, you know, we may or may not have had a chance to save someone anyways or nothing we could have done, so I think it's good. I think all departments should definitely do that." [FF018]

C.2 Personal Coping Strategies

Exercise. Many firefighters believe group or individual physical exercise helps them process and release the stress from traumatic calls. One department recognized the importance of exercise for mental health and developed a program based on it. One firefighter stated:

"In this department, we recognize that with health and wellness, physical fitness as occupational athletes is a big deal. But also understanding mental wellness, the exercise and the benefits it has with the endorphins and everything else that releases, so we got a policy in place and these guys are all gearing up… our crew, we usually try to work out before dinner. So that is another aspect that helps with dealing with this part of the job is getting in there as a group and doing a workout and doing different things as a group." [FF007]

C.3 External Coping Strategies

Firefighters reported that strong interpersonal support structures were another beneficial coping strategy. Because firefighters routinely experience a singular event collectively, it was discussed that connecting with their departmental peers and other first responders who have similar experiences was an effective means to relieve stress because of their ability to relate and understand. However, many firefighters could not find comfort sharing details with family and others that do not understand the nature of fire service.

Peer-to-peer discussions. Families knowledgeable of the fire service or similar occupational backgrounds understood the nature of the job, which allowed firefighters to comfortably share information about their work. Firefighters without familial support directed their discussions to their firefighting peers. Many firefighters reported their spouse not having a background in firefighting or a similar occupation, which made it challenging to discuss events openly.

"You talk to each other in the fire department because [my spouse] knows what I do but [my spouse] doesn't know

TABLE 4. Additional Quotes of Coping Strategies

Theme: Coping Strategies		
Departmental coping strategies	Critical Incident Stress Management (CISM)	"*I have been to 3 or 4 of them… they are definitely helpful… for example, if you have a [fatality] before you get there, you still second guess yourself 'what could we have done on this call?'… 'what could we have done different?'… and when you get together with your peers, and you get together with police, fire, EMS, dispatchers, it kind of helps you know 'hey we were all on this scene together, we worked together very well… It helps that you are not just thinking about it or stewing about it, you can get that out there and you can talk with other people who were at the same incident or who are in the same field as us. I think just generally talking to everyone about that particular incident, making sure that you have, maybe I shouldn't say closure, but more confidence that we did everything we needed to do.*" [FF041]
	Employee Assistance Program (EAP)	"*A few years ago, I actually utilized the EAP, they had like 6 sessions there. I went and talked to a psychologist… for the sleep patterns, anxiety, and that kind of stuff. That worked very well… we worked on tactics to manage the stress, kind of along the lines of anger management.*" [FF041]
Personal coping strategies	Physical activity	"*I think that physical activity can help reduce your stress level. You have to find something to relieve that stress; whether it is working out, fishing, or hunting, or whatever it is…. You need some kind of activity to help alleviate that stress…. You have got to find an outlet somehow.*" [FG1FF]
	Humor	"*If you can get all the joking and everything else, that's how a lot of people cope with [stress]; you come back and you find something weird that happened during the call and that's what everybody focuses on.*" [FF014]
External coping strategies	Family support	"*I think it takes the right person to want to do this job. Whether that is they don't mentally like the situations they are seeing or being put in or if it is because they do not have a supportive family. I have seen both as we hire on and people will [leave] pretty quickly within months or you know a year or two…. It does start with a supportive [spouse] or if you are a single, a supportive family.*" [FF027]

what I do… knows what I do, but doesn't completely know what I do because you do not want to bring that home to your family. There's just some things that you can't say to your spouse, because they don't get what you are doing… there's just some things that only the brothers [referring to other firefighters] know and what you can talk about." [FF029]

Humor. Many firefighters shared that humor helped alleviate stress. Although some firefighters acknowledged that humor may be inconsiderate from an outside perspective, others agreed that humor helps. As one firefighter stated:

"The humor helps move past [the event], if you bury it, it's going to come back some other time. So, you acknowledge it and you learn from the experience what you can." [FF015]

Conceptual Causal Pathway

The psychological stress model developed by Taylor and Aspinwall[23] was adapted and modified to illustrate a conceptual causal pathway specifically for firefighters based on our findings, shown in Figure 2. Hazards are traumatic events experienced by firefighters that induce mental health outcomes. Stress perception and coping strategies are intermediates within the causal pathway between the hazard and mental health outcome. Stress perception can influence one's mental health by personalizing the traumatic call either from past traumatic experiences or by relating it to family members. Coping strategies can help alleviate the stress from traumatic calls. The moderators influence exposure to hazards, perception of the calls, and the ability to cope with stress. Fire department culture (eg, stigma, mental health support) can impact mental health in a positive or negative way. External factors, such as community size, may increase one's chance of encountering people they may know from a call in a small community. This can negatively influence perception of the call and the ability to cope with mental stress. Personal factors, such as stigma toward mental health, might influence the use of available resources for coping.

DISCUSSION

This study identified several important key components to understand firefighters' adverse mental health and well-being from in-depth interviews and focus groups among participated Minnesota firefighters. The study findings were modeled to describe the causal pathways by identifying the potential moderators and coping strategies between the initial exposure to hazards to the risk of mental health. Although prior studies found PTSD, depression, sleep disruption, and suicidal behaviors prevalent in firefighters,[3–12] this study provides context of major themes that informed a conceptual causal model to be quantitatively tested to assess these relationships.

The results from our study have several implications. Personalizing calls can be a potential mental health risk factor, and is influenced by one's family life, past experiences, and community size (higher likelihood of responding to calls involving personal relations in smaller communities). Numerous firefighters in this study believe personalizing calls, or projecting traumatic calls to their own personal lives, has an impact on their mental health. Study findings correspond to Richardson and James' study, which also found that calls involving children led to personalizing and reflecting the traumatic event to their own families.[24] In addition, our study found that personal life experiences can influence the personalization and perception of trauma, namely, those involving suicide (especially death by suicide of a loved one). Based on these findings, providing the space for firefighters to recognize the types of calls that personally resonate with them is a critical area of training as it will provide firefighters a means to cope with trauma throughout their career.

Stigma was a major personal moderator that acted as a barrier to discussing mental health with others, which supports prior literature findings.[19,20] Study findings correspond with the findings by MacDermid et al[25] on Canadian firefighters who reported stigma toward mental health is perceived as a sign of weakness. To no surprise being a male-dominant profession, stigma toward mental health is prevalent in firefighters. Hom et al[12] found in their study on 483 firefighters (mostly male) that the percentage of firefighters were concerned about being treated differently by peers (44%), appearing weak (42%), harming their reputation (41%), others thinking less of them (37%), and embarrassment (30%). Stigma can be addressed by implementing training programs to educate and raise mental health awareness in the fire service, which according to Hom and colleagues[12] is the most cited challenge to accessing or utilizing mental health services and resources.

In regard to mental health treatment, many firefighters agreed that most mental health professionals are not knowledgeable about the fire service. This aligns with the findings by MacDermid et al[25] from Canadian firefighters emphasizing the need to have targeted treatments that are timely and effective by mental health professionals who understood the culture of the fire service. As a result of mental health professionals not understanding the culture of the fire service, participants from the present study and the study by MacDermid et al[25] reported similar challenges for having to find other resources or someone that understands their experiences. The study by Jones et al[20] found that first responders (eg, firefighters and paramedics) that had negative experiences with therapists were less likely to seek help again. The primary reasons reported from the study by Jones et al[20] involved therapists not understanding the job or the inability to help them with trauma (lack of training on "trauma-informed methods"). A study by Gulliver and colleagues[26] suggests "'clinicians who understand firefighter work culture' was rated as one of the most important components to a successful behavioral health program; a lack thereof

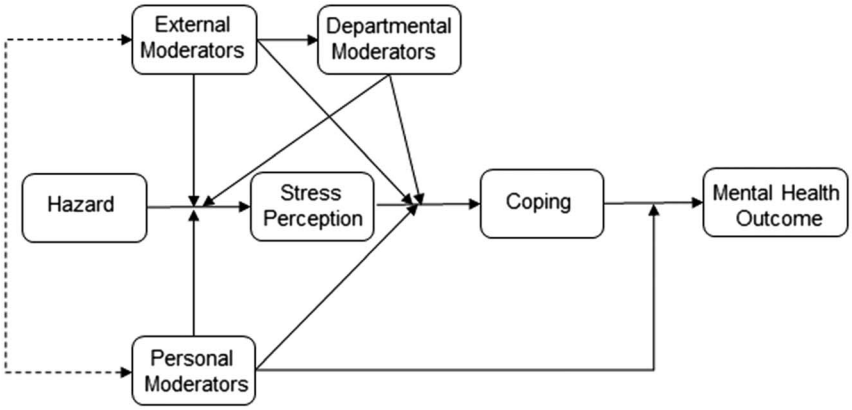

FIGURE 2. Conceptual causal pathway for mental health risk in firefighters.

rated as one of the most significant barriers." Our study supports this finding, as firefighters reported difficulty identifying mental health professionals with knowledge of the fire service, resulting in a barrier to care. This study agrees with Gulliver's recommendations for fire departments inviting mental health professionals on ride-along to understand what firefighters experience. In addition to their suggestions, our study further supports mental health training institutions and fire departments to provide education programs for mental health professionals to improve their understanding of firefighters' traumatic exposures, stigma, and mental health.

Lastly, establishing effective coping strategies is essential to firefighter well-being and adverse mental health prevention. Unlike physical injuries, where hazards can be mitigated through elimination or engineering controls, it is difficult to use traditional occupational hazard control methods to reduce adverse mental health exposures in the fire service. Therefore, firefighters rely on stress management methods. In this study, department debriefs, whether conducted formally or informally by the fire chief or leadership, were named the primary source of coping after traumatic calls, followed by personal coping strategies. Study findings agree with Hytten and Hasle's study,[27] which also found that firefighters who participated in formal debriefs found them helpful to cope with stress. It is recommended that fire departments implement formal debriefing systems, provide coping strategies, and follow up policies after traumatic calls, for both career and non-career firefighters. Findings from this study express the importance of identifying and sharing effective coping strategies after bad calls.

STRENGTHS AND LIMITATIONS

This study explored emerging concerns regarding mental health in Minnesota firefighters. One strength is that this study applied qualitative methods to develop a deeper understanding of the firefights' risk on adverse mental health and well-being and thus added better insight to address and prevent further harm. Furthermore, this study involved the adaptation of a firefighter-centric perspective on emerging mental health concerns in the Minnesota fire service. This approach provides a deeper understanding of the hazards leading to adverse mental health effects, perceptions of departmental and individual coping strategies, moderators exacerbating the impacts at each stage, and barriers to accessing treatment and resources. In-depth interviews and focus group sessions emanated themes through experience, permitting the development of a firefighter-specific conceptual causal framework.

Despite the strengths of this study, there were several limitations. Participants' self-reported perceptions and experiences may not be generalizable to other firefighters and fire departments within Minnesota and across the country because the nature of work in terms of work-related hazards and resources such as EAP, CISM, and other mental health resources are quite different from our study population. For example, west coast firefighters deal with wildfire frequently, whereas Minnesota firefighters rarely respond to wildfire. Several types of recall bias may exist in our study, which may be incorrectly remembered or remembered in their preferred way. First, due to the nature of the cross-sectional investigation, retrospective recall on key information is required and the remembered information may be incorrect or remembered in their preferred way. In addition, with the sensitivity of discussing mental health issues, there is a possibility of intentional response bias in which participants may have felt compelled to answer the questions in a socially desirable manner to protect their image and the department's image.

Selection bias may also exist due to our sampling method that relied on voluntary participation in the study, and it is difficult to determine the direction of the bias because some may join the study, in favor, to show their efforts to lower mental health risk, while some may join the study to reveal the problems from their work.

By nature, qualitative study is not often generalizable. Thus, the findings from qualitative study should be limited in using development of study hypotheses, and the hypothesis should be tested by quantitative assessment. In our study, the conceptual causal pathway developed by our study was used to assist the next phase quantitative study in developing a questionnaire survey.

CONCLUSIONS

Firefighters are at high risk of adverse mental health problems. However, there are knowledge gaps in understanding mental health in firefighters, identifying barriers to accessing or utilizing mental health treatments, as well as the effectiveness of mental health resources and services. Our study identified the potential pathways toward mental health risk, including perceived stress of trauma, barriers toward treating mental health, and the importance of effective coping in firefighters that can provide a robust framework for future mental health prevention strategies development. Further studies are needed to confirm and generalize our study findings using quantitative assessment methods with rigorous study design to minimize biases and achieve strong causality such as temporality.

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