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Evolving Job Demands and Resources in Response to COVID-19 Among US-Based Fire Service Personnel (The RAPID Study II)

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Objective: The US fire service experienced increased demands due to COVID-19. This qualitative study explored the pandemic's impact on work-life balance and safety. **Methods:** Five interviews and 10 focus groups were conducted with 15 fire departments in the COVID-19 RAPID Mental Health Assessment. Coding and multilevel content analysis were conducted in NVivo. **Results:** Four department support themes were identified: emotional/social (33.1%), policy (28.4%), instrumental (22.9%), and informational (15.5%). Four work-life balance themes were identified: life (51.2%), children (18.1%), physiological (16.5%), and work (14.2%). We observed more departmental resources to help mitigate job demands within the work environment compared with those for work-life demands. **Conclusions:** Job resources are needed to mitigate demands and improve safety culture and mental well-being of the fire service under normal conditions, and for the next pandemic, natural disaster, or long-term emergency.

Keywords: qualitative analysis, job demands, job resources, work-life balance, first responders, COVID-19

Concern for fire service personnel health and well-being has grown in recent years, with prior research linking their unique occupational stressors with mental and physical health symptoms.¹ In 2018, the Substance Abuse and Mental Health Services Administration reported that approximately 30% of first responders, including fire, police, and emergency medical services (EMS) personnel, would develop behavioral health conditions compared with 20% in the general public.²

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LEARNING OUTCOMES

After reviewing this article, readers should be able to:

- Identify and describe the perceived job demands, work-life demands, job resources, and work-life resources that the US Fire Service experienced during the COVID-19 pandemic.
- Provide insights into the varied perceptions of job resources and work-life resources available to assist with the management of demands due to the COVID-19 pandemic.
- Summarize the differences in perceived job demands, work-life demands, job resources, and work-life resources across different job levels of the US fire service including leadership, supervisors, and rank-and-file members.

While the novel coronavirus 2019 (COVID-19) pandemic brought unique work, family, and health challenges to people around the globe, first responders were disproportionately affected, with many reporting higher levels of anxiety and depression in the early months of the pandemic than employees in other occupations.³ However, some fire, police, and health care workers reported lower levels of psychological distress and higher resilience during this time as compared with the general population.⁴ Thus, the purpose of the present study was to identify pandemic-related job demands and resources that contributed to fire service personnel health and well-being.

Across the nation, the COVID-19 pandemic altered the normal in-person working structure, with many companies forcing non-essential personnel to work from home. Frontline workers, including first responders, were still required to report in-person. Notably, the COVID-19 pandemic created greater pressure on an already strained first responder system. The National Fire Protection Association reported that in 2019, US fire departments responded to 37,272,000 calls captured by the National Fire Protection Association Fire Experience Survey.⁵ Prior to the COVID-19 pandemic, approximately 65% of these calls were for EMS or rescue services.⁵ The overall call volume from 2020 decreased slightly after the onset of the COVID-19 pandemic to 36,416,000 but the proportion of EMS or rescue services remained at 65%.⁵ These statistics underscored the increased burden felt among the EMS providers in the United States prior to the COVID-19 pandemic, which only increased the strain these individuals experienced as frontline workers of this pandemic. The departments that participated in the current RAPID study reported 72% EMS calls, on average, during the study period (May–October 2020). This number varied as some departments were volunteer departments and were taken off medical calls completely. Approximately 10% of these EMS calls were potential COVID-19 cases.

Our current research was framed according to the job demands-resources (JD-R) model of burnout,⁶ which allowed us to assess fluctuating job demands and resources during the early months of the

COVID-19 pandemic. The JD-R model maintains that every job has features that relate to employee stress; namely, job demands and job resources. Demerouti et al^{6,7} defined job demands as those aspects of a job that require prolonged cognitive, emotional, or physical effort, whereas job resources refer to physical, social, or organizational factors that alleviate job demands or contribute to goal attainment or personal growth. Research indicates that job demands positively relate to employee exhaustion, whereas job resources positively relate to employee engagement. Further, these works demonstrate how demands and resources are interrelated, such that increasing demands and decreasing resources result in employee burnout. Not only do these findings have implications for first responder mental health, but burnout can negatively impact their work performance,⁷ contributing to increases in job-related accidents, injuries, and unsafe behavior.^{8,9}

First responders contend with numerous job demands in the forms of workload, scheduling, and complex situations requiring speed, emotional sensitivity toward victims, interpersonal conflict, and physical endurance among others.^{10–12} Resources, such as role clarity, coworker or supervisor support, safety leadership, and recovery time, are critical for their safety and wellbeing.^{7,8,11,12} However, the COVID-19 pandemic brought increasing demands on first responders in the form of personal health risks and increased safety protocols. It is important to not only identify these occupational demands but to determine those that are the greatest hindrances to health, performance, and work-life balance, as some demands may motivate positive work behaviors.¹³ In addition, little is known about the availability of job resources in light of these increasing demands, and whether new resources are needed to satisfy first responder needs.

Preliminary quantitative findings from the COVID-19 RAPID Mental Health Assessment (RAPID) conducted by The Center for Firefighter Injury Research and Safety Trends (FIRST) at Drexel University indicated increases in burnout, anxiety, depression, and intention to leave the profession among participants as well as decreases in job satisfaction, work engagement, and organizational support. The top five responses to how the pandemic was impacting first responders were: fear of spreading the virus to family/friends, change in eating patterns, change in sleeping patterns, quarantine requirements by the workplace, and lack of access to personal protective equipment (PPE).¹⁴ Additionally, in the RAPID sample mandatory overtime was implemented in 33% of the participating departments and voluntary overtime was implemented in 40% of participating departments. This increased time on the job may have impacted these preliminary quantitative findings.

To better understand the reported physical and emotional challenges faced by fire service personnel during the first 6 months of the COVID-19 pandemic, qualitative data depicting firsthand accounts of the fire department's challenges were obtained and evaluated. Our primary research aim was to learn about fire department members' experiences to gain a more comprehensive understanding of the psychological and physiological threats (eg, stress, anxiety, burnout, and infection) to their work environment during the pandemic and how organizations supported first responders during this time. The data collected in this study are meant to support quantitative findings from Assessing the Mental Health Impact of the COVID-19 Pandemic on US Fire-Based EMS Responders: A Tale of Two Samples (The RAPID Study I).¹⁴ Focus groups and interviews were utilized rather than survey data to better gauge reactions to job changes and the shared experience of fire service personnel due to the COVID-19 pandemic. Specifically, the primary research questions of this study were:

Research Question 1: What are new work challenges for fire service personnel due to COVID-19?

Research Question 2: What are new work-life balance challenges for fire service personnel due to COVID-19?

Research Question 3: What new resources have emerged to mitigate the challenges due to COVID-19?

Research Question 4: To what degree are there differences between work demands and resources and between work-life balance demands and resources?

METHODS

Participants recruited from 15 fire departments located throughout the Eastern, Central, and Western regions of the United States were enrolled in either interviews or focus groups from September 2020 to October 2020. Participants (n = 32) had to be at least 18 years of age and actively serving as a career or volunteer firefighter. Five departments had only one individual participate in the form of an interview. Ten departments had several individuals each participate in the form of a focus group. In each case, the same questions were asked of each individual or group (see Table 1). The average focus group size was 2.13 (SD = 1.13) and ranged from two to five members who had differing ranks within the department. Fire departments were chosen via convenience sampling selecting individuals with a variety of experiences related to COVID-19 based on geographical location captured by the COVID-19 RAPID Mental Health Assessment (RAPID). It is worth noting that each department has unique number of stations, leadership and communication styles, challenges, resources, and effectiveness.¹⁵ These fire departments represented eight of the 10 Federal Emergency Management Agency (FEMA) regions.

Qualitative Data Collection

Qualitative interviews and focus groups were performed according to standard semistructured interview procedures.^{16–19} The protocol received institutional review board approval from Drexel University. Participants were informed that our research team was collecting this data to help further explain the variability found within the COVID-19 RAPID Mental Health Assessment survey. Researchers explained to participants that there would be one person from the research team leading the interview and focus groups while another team member would take notes. The research team also directed participants to provide personal and departmental examples or inputs. Confidentiality was assured, and verbal consent was obtained before each interview and focus group. A copy of the consent form was sent to participants for their records. Individual interviews and focus groups were conducted with both leadership and rank-and-file firefighters. These interviews and focus groups each lasted an average of 1 hour. A semistructured interview guide was developed to assist with the collection of the data (Table 1). Questions

TABLE 1. Interview Guide for Fire-Based First Responders

1. What are some unique psychological (mental/emotional) challenges in your work environment due to COVID-19? Physiological (biological/physical) challenges?
2. What is your organization (department) doing on your behalf to help you in your response to COVID-19 at your work?
 - What sorts of resources are provided to you related to PPE and COVID-19?
 - What sorts of safety leadership are provided during this pandemic?
 - What kinds of social/emotional support do you feel you have?
 - In your opinion, which of these resources is most effective?
3. What are some unique psychological (mental/emotional) challenges to balance work and family responsibilities? Physiological (biological/physical) challenges? [due to the altered work demands since the COVID-19 outbreak?]
4. What is your organization (department) doing on your behalf to help you in coping with these challenges in balancing work and family responsibilities
 - a. How is decision making in relation to your individual safety being managed during the pandemic?
 - b. What sorts of supports are provided to you from the department? From home?
 - c. In your opinion, which of these resources is most effective?

addressed the job demands and pressures experienced by fire service personnel due to COVID-19, what resources were available to them, and their experiences during the COVID-19 pandemic.

Our sample consisted primarily of those that held a supervisory role within a fire department (75%). Of those, 43.8% were in upper management and had the rank of chief (fire chief, battalion chief, training chief, or deputy chief). These leaders of the fire department are tasked with ensuring that the fire department is running to the best of its ability through administrative direction. Leaders must work with both external (ie, city governments) and internal (ie, fire station leaders) entities to coordinate resources and enact policy for their members. The other 31.2% were leaders within a station who directly managed the station and/or supervised rank-and-file responders (captain or lieutenant). These supervisory personnel run day-to-day operations at fire stations within the fire departments and are responsible for equipping their team with what is needed to respond to emergency calls. These supervisors not only manage rank-and-file members but also respond to emergency calls with them. The rest of the sample (25%) were rank-and-file members with the title of engineer, firefighter, firefighter-EMT, or firefighter-paramedic. These members are responsible for the direct care of the public. Rank-and-file members work hard to promptly respond to a variety of emergencies and continue learning and training to best serve their communities.

The individual interviews and focus groups took place over Zoom software (Zoom Video Communications, Inc.). The interviews were conducted by a team of research assistants familiar with fire service personnel, each of whom had training in qualitative methods. Interviews and focus groups were audio and video recorded with the Zoom software and then transcribed by the person who conducted the interview following a set protocol. Once transcribed, the data were quality checked and de-identified before being entered into NVivo 12 (QSR International Pty Ltd.) for analysis. To protect the anonymity of participants and uphold the confidentiality of their perspectives, all identifiable information was removed from the transcripts. Participants quoted within this article have been assigned pseudonyms. Further, their ranks within the fire service and length of experience have been categorized to protect their identities further.

Analysis

Data analysis of the 15 transcripts included thematic analysis using standard qualitative methods.²⁰⁻²² Analysis began with open coding in which research team members separately reviewed each transcript, identifying and sorting passages into broad buckets that corresponded with the main questions from the interview guide (see Table 1). Once all data from the 15 transcripts were sorted, four members of the research team paired up to identify codes within each bucket. These codes were determined based on thoughts, which could consist of a few words to a couple of sentences depending on the individual's answer. This approach was chosen to ensure the final code count was not exaggerated. In some instances, a participant would tell a story and describe the same point in multiple ways but if this was all on the same train of thought this would be coded only once. For example, the passage below touches on training and protection but the main thrust is about uncertainty so this whole passage was coded as "Uncertainty on the Job."

"There was just a lot of unknown and a lot of uncertainty. And for the most part, our job is already a lot of unknowns and uncertainty. We talked about how every call is different. Nothing's ever the same. But this added, you know, just something that we didn't know if we had correct protection for proper training for and I imagine that for all of our responders. That was incredibly difficult to deal with at the beginning. And I can tell you that, you know, six months, seven months later." In addition, we found participants covering multiple topics within a single paragraph and in these cases, each thought from that answer would be separately coded. For example, in the passage below,

a participant recounts his experience that elicited a few different codes relating to the work-family dynamic. This passage is separated to see the distinction of what pieces were coded. The first part of the passage describes the fear of exposing his family, which was coded under "Exposing One's Family to COVID-19." He then discusses difficulties in helping his children understand what is happening with COVID-19 and why they are not allowed to see their family which was coded under "Ensuring Children's Understanding." The last part of this passage describes the difficulty of not being able to go places while being stuck at home which was coded under "Loss of Leisure Activities."

"... but there was like this unknown about the kids. Like we were very concerned about our kids. And if they would get it. Luckily, we didn't, to our knowledge. So, they never did.

But she—I mean like, they were going stir crazy because where I live, my brother, who also works in the fire department, he lives next door to me, my grandparents or my parents live right up the road from us. So, we're all really close together on the same driveway. And they couldn't go play with their cousins, they didn't understand why they couldn't see their grandparents or great grandma, you know. It was hard to convince them that we just couldn't go anywhere.

... I mean, the kids just never got to really go anywhere. Now luckily, we're secluded so they could go out in the yard and play if they wanted to, because nobody was around. But that was the hardest part for them, and then my wife, she's like, I just want to go somewhere. Like, I just want to get out of the house."

Each member reviewed their assigned bucket separately and then came together with their partner to reach consensus on prominent codes. A.M.G. and S.B. were assigned to create codes for questions 1 and 3 (Q1 and Q3), EE and KC were assigned to create codes for questions 2 and 4 (Q2 and Q4). From this original data analysis, research team members AMG and SB identified 20 codes for Q1 and 15 codes for Q3, EE and KC identified 22 codes for Q2 and 15 codes for Q4. Each pair then switched questions for coding, such that AMG and SB were assigned to code Q2 and Q4, EE and KC were assigned to code Q1 and Q3. At this point, each trained pair coded 25% of the data to assess inter-rater agreement based on kappa scores. After this first round of coding 25% of the data, Q3 reached agreement at 0.894 and Q4 reached agreement at 0.908. Agreement was not achieved for Q1 and Q2 so the coding teams coded 25% more of the data within those questions. After this second round of agreement coding, Q1 reached agreement at 0.808 and Q2 reached agreement at 0.848. The remaining data were coded by a single team member, given the high level of agreement. Using an iterative approach, the authors reviewed the data and summarized key findings through a series of meetings. For complete objectivity members of the research team who did not participate in coding participated in theme creation. J.A.A., J.L., J.A.T., and A.L.D. reached a consensus on themes for each question bucket through Q-methodology.²³ This systematic approach required each participant to individually rank and sort the 72 codes found into broad categories, then come together to discuss and agree on the said categories which became the themes. Once the themes were finalized, the percentage of discussion of the codes within each theme was calculated. Each time a participant brought up a topic that related to a code, it was counted. If a participant brought up the topic more than once, the code was counted each time the participant discussed the topic. The frequency of discussion for each code was captured by adding up the counts for each code and dividing them by the total number of codes within each question bucket. The code percentages were then added up based on which theme they fell under for the total percentage of discussion per theme. Sankey diagrams were utilized to visualize the flow from codes to themes to the theoretical components, the JD-R model. To create the Sankey Diagrams, the codes were weighted based on the proportion of the discussion within the theme. The greater the proportion a topic was discussed, the thicker the line will be.

Findings

Interview participants (n = 5) primarily held a leadership role (60%) and, on average, were 43 years old and had worked as fire service personnel for 14 years. Focus group participants (n = 22) primarily held a leadership role (74%) and, on average, were 44 years old and had worked as firefighters for 20 years. A majority of our participants were men for interviews (100%) and focus groups (90%). There were five participants that did not provide demographic information. These participants were retained in the final sample for analysis.

Themes identified in this analysis fell into two categories: demands (ie, challenges) and resources (ie, support). The first two questions asked during the interviews and focus groups elicited 42 codes relating to job demands [20] and job resources [22] while the second two questions elicited 30 codes relating to work-life demands [15] and work-life resources [15]. Around 31% of all discussions surrounded job demands due to COVID-19 in the work environment and 44% of all the discussions encompassed department resources available for fire service personnel during the first wave of the COVID-19 pandemic. Around 16% of all discussions surrounded work-life demands and 9% of all discussions encompassed department resources available to mitigate work-life balance demands because of COVID-19 (Fig. 1). Our findings indicate variability among participants' perceived demands (ie, challenges) and resources (ie, support). Observing the Sankey Diagrams for work demands and resources (Fig. 2) and work-life demands and resources (Fig. 3) we observed that there are far more departmental resources to help mitigate the job demands within the work environment compared with the department resources for the work-life demands.

Work Demands

We present our thematic findings on the COVID-19–related work demands present in participating fire departments in Table 2. Five themes were identified: operational modifications (31.4%), mental/emotional challenges (26.8%), externalities (ie, challenges arising from external entities; 19.7%), organizational communication (17.2%), and physical challenges (5.0%). Within these themes, leaders including anyone with the title of chief, contributed primarily to discussions about operational modifications (33.5%) and externalities (28.0%).

Supervisors including captains and lieutenants primarily discussed challenges related to operational modification (34.4%) and organizational communication (30.3%). Rank-and-file fire service personnel discussed challenges related to operational modification (45.9%) and mental and emotional challenges (23.3%). Operational modifications included changes to daily operations and responsibilities, policies, staffing, and department culture, and received the most recognition in our interviews. One participant emphasized the change in their routine, noting:

“You’re cleaning doorknobs and buttons and services that you didn’t even know existed in your station. You are wearing the letters off the keys on your keyboard. But that’s what it takes.”Mental/Emotional Challenges were also a significant focus given these increasing work demands. Participants noted limited socialization opportunities, general frustration and COVID-related fatigue, and feelings of inadequacy relating to their work performance in light of departmental changes and restrictions. These challenges were captured in the following statements:

“By nature, we [are] doers and problem solvers. So, for parts of crews to stay outside [of the patients house] to really do nothing is pretty difficult.”

“I think one of the things we're all feeling is the weariness of everything COVID-related. Just talking to people inside and outside the fire department, everybody’s tired of all of it, whether it's wearing a mask or going through special procedures or not being able to gather socially.”

Work Resources

We present our thematic findings on department resources in response to COVID-19 challenges in Table 3. For department resources four themes were identified (percent mentioned): Emotional/Social Supports (33.1%), Policy Supports (28.4%), Instrumental Supports (22.9%), and Informational Supports (15.5%). Within these themes, leaders primarily discussed about Policy Supports (34.6%) and Emotional and Social Supports (28.2%). Supervisors primarily discussed resources related to Emotional and Social Supports (32.0%) and Instrumental Supports (31.6%). Rank-and-file fire service personnel discussed resources related to Emotional and Social Supports (46.3%) and Policy Supports (28.4%). Participants mentioned Emotional/Social Supports the most, with one participant emphasizing the importance of making these support systems known to the members of the department:

Proportion of Perceived Demands and Resources in Fire-based First Responders Due to COVID-19

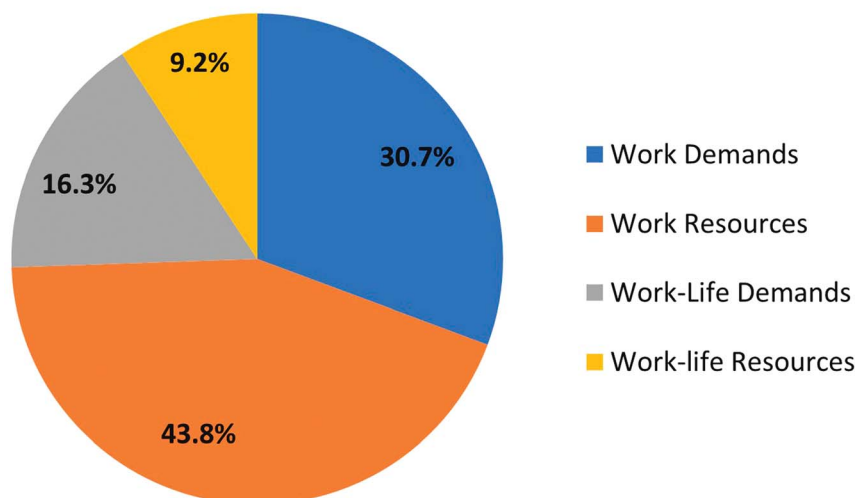


FIGURE 1. Pie chart depicting the proportion of reported demands and resources due to the COVID-19 pandemic reported by fire service personnel.

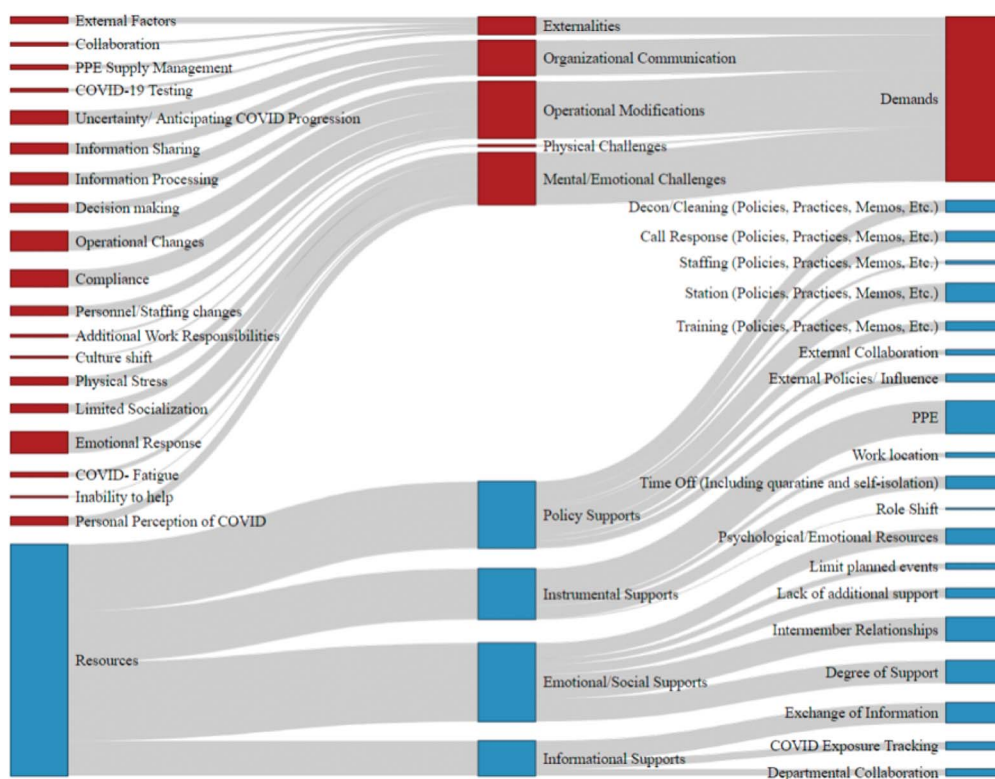


FIGURE 2. Sankey flow diagram depicting the proportion of reported job demands and department resources in fire service personnel due to the COVID-19 pandemic.

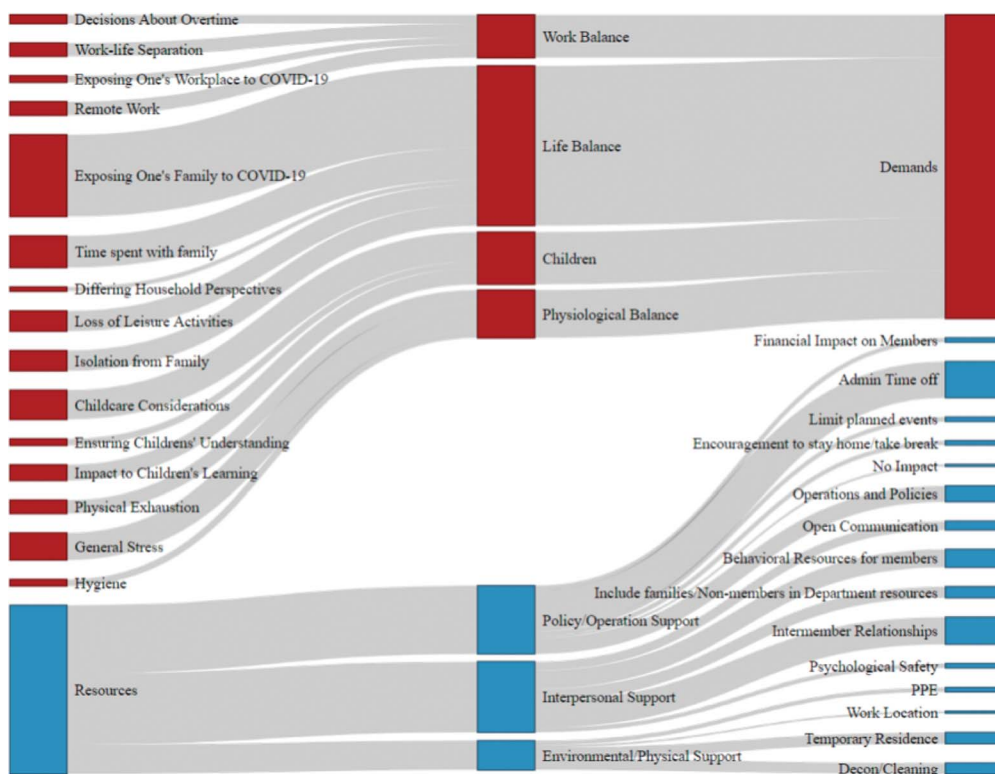


FIGURE 3. Sankey flow diagram depicting the proportion of reported work-life balance demands and department resources in fire service personnel due to the COVID-19 pandemic.

TABLE 2. Challenges in Fire Department Work Environment Due to COVID-19

Theme	Definition	Examples	% Mentioned
Operational modifications	Changes in typical day to day operations due to COVID-19.	“We haven't been able to get together as a fire department training wise” “[Implemented] minimal haul personnel involved in that patient care as possible.” “Our total time on each call is increased.”	31.4%
Mental/emotional challenges	Factors that may influence a member's emotional and mental well-being due to COVID-19.	“There was a lot of confusion, a lot of stress and worry, [which] very quickly moved into anger and just more frustration and then moved into just fatigue and then apathy.” “There's a sense of helplessness.” “I've gotten a little detached because the compounding impacts of additional responsibilities being thrown on me.”	26.8%
Externalities	Challenges regarding influences outside of the fire department.	“The [large] amount of information that was being thrown at us from the state DLC, CDC guidelines, our local medical director, and the hospital that we work very closely with.” “We were not getting accurate information from patients. We would find out afterwards that they were a possible COVID patient.” “There's no consistency between the hospital systems [and] our department, ... as far as any of the protocols regarding patient care.”	19.7%
Organizational communication	Challenges regarding communication within the fire department.	“The situation was changing sometimes hourly with information coming in. It's frustrating for everybody of at times we literally felt like we couldn't get information out fast enough, then 5 minutes later, now we have to go update it.” “It was crazy trying to keep up with everything that was coming in. There was so much unknown.”	17.2%
Physical challenges	Physical demands that have increased or decreases because of the COVID-19 pandemic.	“PPE... It's not bad but like when it was really hot and you're wearing the gowns that are not breathable and homes that aren't air conditioned, it sucks, but it's fine.” “There's a little more strain as far as like if we have to lift the patient [with minimal haul personnel]”	5.0%

“...you try to make it known that there are people out there to help you with all regards to life, whether it's money issues, health, family, whatever. And you let that be known. EAP [Employee Assistance Program], IAFF [International Association of Fire Fighters] has places to look at, professional firefighters, [large neighboring FD] fire, there are people out there that you can talk to. If you have any issues at all talk to somebody. People care about you, don't go to any drastic measures.” As expected, there were numerous changes to departmental policy as a result of COVID-19 in an effort to keep potential disease transmission down. The policy changes mentioned by participants included, but were not limited to, decontamination and cleaning, call response, staffing, station

level guidelines, training, and external influence. Policy changes regarding call response elicited this comment from a participant who described that their department:

“We changed protocols early on to say if you're going to work, you're going to wear N-95 for every patient and just kind of hit that at the forefront rather than play the guessing game.”

Work-Life Demands

We present our thematic findings on work-life balance demands due to COVID-19 in Table 4. For our study, work-life balance is defined as the balancing of work and family responsibilities. For

TABLE 3. Department Supports in Response to COVID-19 Challenges

Theme	Definition	Examples	% Mentioned
Emotional/social supports	Mechanisms within the department that influence member's social or emotional well-being.	“I tested positive for it and the support from the department as a whole is amazing. Just guys who aren't even peer support people. I had multiple guys on the peer support team that call me, check in on me, check in, ask how my family was, if we needed anything.” “We mowed lawns, we've delivered groceries. I've taken medicine. I think the people that were sick or affected firsthand really have felt a lot of support.” “Informally we confide in each other a lot. And we have a culture within the fire station of kind of a mental and emotional rehab. It's the only way I can say it. I think we're already really good at that before the COVID-19 pandemic.”	33.1%
Policy supports	Changes to departmental policy due to COVID-19.	“We also developed an SOP for COVID related decon[tamination] for our firefighters...we actually put together a kit so that they can be gross deconned on scene” “You know we cut out the station tours just did things to keep our staff is safe as safe as we could.” “We've separated training... We don't train in groups have more than 25 so when we have a large group, we have 40 or 45 people at a drill, we have to separate them.”	28.4%
Instrumental supports	Tangible aid provided by the department.	“The chief has made a commitment, you know, we have all of the supplies that we need, including shields, N95 masks, surgical masks, gowns for EMS personnel” “[We had PPE from] SARS or the bird flu, some past pandemic scare that didn't that didn't pan out... We did not run into supply issues. But we do plan on if, whenever this starts to slow down a little bit, we're going to make sure that we've got a significant stockpile for the next pandemic.”	22.9%
Informational supports	Exchange of information or facts surrounding COVID-19 around the department.	“Make sure you were sharing current, pertinent useful information as far as keeping staff safe and let them know what policies and procedures changed” “We were over communicating, and that was almost a goal because what we absolutely did not want was the folks in the field, specifically, who are out there answering calls, to feel like we were keeping any information from them.” “[If someone is exposed or showing symptoms] All their crew members are notified. If it comes back as a positive test they automatically are off for the next 10–14 days depending on when their signs and symptoms started. We're treating it as a work exposure, whether or not they were exposed at work or off duty.”	15.5%

TABLE 4. Work-Life Balance Challenges Due to COVID-19

Theme	Definition	Examples	% Mentioned
Life balance	Challenges that influence enjoying personal life.	“I do think everybody's biggest concern here is, nobody wants to take this home.” “There is a lot of like mentally draining things going on with family members of my own just because they didn't know if they could see me because I work in the environment that would be hazardous in this disease process.”	51.2%
Children	Challenges regarding children.	“It was difficult, especially when they canceled school. With us working shift work, our child care needs are a little bit different than a lot of other jobs that are, you know, more nine-to-five type jobs.” “It's definitely been a challenge [communicating with children] they're eleven and thirteen, so they're seeing the news and dealing with it at school, and seeing the political sides.”	18.1%
Physiological balance	Physical demands that have increased or decreases because of the COVID-19 pandemic.	“Feeling tired and just feeling lack of sleep. You have family responsibilities at home and that whole different set of challenges, trying to go home and relax and it's just not happening.” “Most of the stress to me came at home and work didn't really change that much with stress level, you've got the stressors in their [family's] life that reflect back to you and then they're getting stressed because they're not in school, they can't see their friends and they can't play sports. That in turn comes into work with you.”	16.5%
Work balance	Challenges that influence completing professional objectives.	“I ended up picking up more hours. On my last check I had 58 hours overtime and only maybe 10 hours of that was due to training.” “It's all hard, and in our jobs you don't want to come to work worrying about everything at home. You need to be focused on what you're doing.” “COVID is affecting us there because we you know you're not supposed to bring your home problems to work and you're not supposed to take your work problems home but that's real nice written down, it doesn't work that way.”	14.2%

work-life balance demands, four themes were identified (percent mentioned): Life Balance (51.2%), Children (18.1%), Physiological Balance (16.5%), and Work Balance (14.2%). Within these themes, leaders primarily discussed about Life Balance (36.0%) and Physiological Balance (28.6%). Supervisors primarily discussed resources related to Life Balance (67.4%) and Children (15.6%). Rank-and-file fire service personnel discussed resources related to Life Balance (44.0%) and Work Balance (38.0%).

The most prevalent theme among our participants was Life Balance, which related to the demands that influence enjoying one's personal life. Of this, many participants highlighted that it was particularly challenging to have to isolate themselves from their family members due to concerns of COVID-19 transmission as a result of on-the-job exposures.

“Isolating was probably the worst part about all this to me, as far as family stuff...the first month or two, they didn't want to see me because [they] didn't want to be infected or anything ...”

Work-Life Resources

We present our thematic findings on department resources in response to work-life balance challenges in Table 5. There were three themes were identified (percent mentioned): Policy/Operation Support (41.7%), Interpersonal Support (40.3%), and Environmental/Physical Support (18.1%). Within these themes, leaders primarily discussed Policy and Operation Support (52.2%) and Interpersonal Support (31.5%). Supervisors primarily discussed resources related to Policy and Operation Support (44.4%) and Interpersonal Support (43.8%). Rank-and-file fire service personnel discussed resources related to Interpersonal Support (52.5%) and Policy and Operation Support (32.1%).

The most mentioned theme related to the organizational modifications that provided new policies/operational support for the participants in response to COVID-19. Many departments set up new policies to support their members, especially if they were unable to come to work due to a positive test, COVID-19 exposure, or a family member's COVID-19 diagnosis.

“we do have emergency paid sick leave... like if you have your own sickness or if you have your quarantine order from the federal, state, or local level. You can take it for care of a family member that has COVID or that is quarantined.”Participants described some changes in terms of the departmental support (Environmental/Physical Support) in response to concerns about bringing COVID-19 home to their

families. Some departments provided temporary residences, which were accessed less frequently as the first wave of the pandemic lessened in some geographical areas.

“We used to fill up the hotel regularly and we had basically paid to reserve a floor at a hotel for workers if they had been exposed and we would let them stay there during their quarantine so they didn't have to go home And we haven't had anybody take advantage of that in a while, and it might be one person a month that's doing that now. So, I really think that for them, for our responders, their work-life balance has kind of gone back to normal in terms of if COVID it's affecting them [or not].”

DISCUSSION

The US fire service is a high-demand occupation that incurred additional demands in response to the COVID-19 pandemic. We observed that many of the resources available regarding psychological or emotional aid were implemented prior to COVID-19 and physical resources like PPE and operational changes were newly implemented due to COVID-19. There also appeared to be emerging challenges regarding work-life balance. This may be because nonfrontline members were sent home to work, placing them in the position to work in proximity to their families which has not happened historically on such a scale in fire service personnel. For frontline members, emerging work-life balance demands may be due to the added unknown risk they could be bringing home. Our findings highlight the emerging demands that occurred within an already strained occupational group.

Our results provide rich insights into the experiences of US fire service personnel during the COVID-19 pandemic. The primary finding being the disproportionate perception of available occupational resources for work-life demands compared with job demands. This was determined based on the frequency of discussion within each of the focus groups and interviews. Although this finding is specifically related to the changes that occurred during the COVID-19 pandemic, the contrasting perception of available resources for work-life demands may have been present prior to the pandemic. Previous literature on work-family conflict discusses the challenges with family and work role disruption due to time, strain, and role-specific behaviors as well as the dynamic of work interference with family (WIF) and family interference with work (FIW).^{24,25} Fire service personnel often have irregular schedules and differing roles at work and home that existed prior to the pandemic. As the pandemic progressed, these roles may have shifted and the way WIF and FIW may have changed as well. Research interests

TABLE 5. Department Supports in Response to Work-Life Balance Challenges

Theme	Definition	Examples	% Mentioned
Policy/Operation Support	Organizational Modifications (supportive/unsupportive).	“We met with employees to let them know that we could do some kind of unique schedule shifts and moving some hours and stuff around so that they would be able to accommodate their kids being at home.” “There was no penalty if somebody had to get tested. If they had to not be at work or isolate there was no financial impact for them, necessarily, because they didn’t have to burn vacation or sick time.”	41.7%
Interpersonal Support	Resources for psychological safety and well-being.	“Just the normal channels like HR, we have EAP, and Health and Wellness.” “Peer support that we have assigned, not only to the personnel that we quarantine but also to their family, so that they can answer questions and help provide some support from the department level.” “I didn’t struggle with it too bad because I always saw my second family every day at work.”	40.3%
Environmental/Physical Support	Resources for infectious disease containment/workplace safety.	“I mean as far as the department goes, they’ve given us the best of PPE” “We used to fill up the hotel regularly and we had basically paid to reserve a floor of a hotel for workers if they’ve been exposed and we would let them stay there during their quarantine.”	18.1%

related to firefighters preceding the COVID-19 pandemic included divorce rates, shift work, stress reduction in spouses, suicide, and peer support. This study adds to the growing literature related to identifying work-family demands in fire service personnel.

These findings relate to the Total Worker Health framework which aims to improve safety and health for workers using a holistic approach not just looking at the job hazards but all job-related factors.²⁶ This approach uses policies, programs, and practices to encourage sustained change and a healthier workplace.²⁶ The results can help inform how to improve worker wellbeing. The findings describe the perceived supports of the fire service personnel, which, if properly leveraged, can contribute to increased awareness of interrelations among work, family, psychological wellbeing, physical health, and safety. Interventions related to policies and programs to support personal life and family, led by management and supervisors, may be an avenue to improve worker well-being.^{27,28}

In addition, these results help us better understand what participating fire service personnel perceived as their most prominent demands during the pandemic and what resources could help mitigate that strain. These results provide insights into what supports are necessary in the next pandemic, natural disaster, or long-term emergency and what supports are needed on a “normal” day. These results were based on the frequency of challenges and resources discussed within the focus groups and interviews. Some demands are deemed more prominent than others when multiple departments discuss the demand following the broad questions asked by the interviewer. In contrast, if the demand was only brought up by one fire department, it may be deemed as less prominent and a unique demand to that specific department. Fire service personnel are trained to respond to immediate and generally acute emergencies. The COVID-19 pandemic created a prolonged state of emergency that required fire service personnel to shift their normal operations without reprieve. Further, given the results mentioned from the quantitative assessments,¹⁴ our current findings will help explain the variability found with the COVID-19 RAPID Mental Health Assessment sample.

Perhaps as no surprise, the variability in the onset of COVID-19 surges across communities had a dramatic impact on the nature of responses. For example, those who were in the midst of a surge expressed greater urgency regarding their psychological, emotional, and physical needs, compared with those who either already had a surge or were yet to experience high levels of COVID in their community.

This study provided insights from 15 different fire departments from eight of the 10 FEMA regions and three geographic areas in the United States. This novel approach allowed us to capture perceptions from different areas of the country that experienced the onset of COVID-19 at different points in time. Another unique aspect of this study is that it included viewpoints from various ranks, including leadership, supervisors, and rank-and-file members of the fire service.

We analyzed the frequency of what was discussed the most by each rank. There was consistency across organizational structure in the primary job demand due to the onset of the COVID-19 pandemic. All groups described operational modifications as the primary job demand. Essentially, throughout the fire department members, changes and adaptations in how they worked and did their jobs was a major job demand. For example, leaders had to obtain PPE and create new policies amidst a landscape of rapidly changing information, while supervisors and rank-and-file members had to react and adapt to these changes as they were implemented. As a means of mitigating the job demands, leadership identified policy supports as a major resource whereas supervisors and rank-and-file members both found emotional and social supports as more salient resources. These differences reflect their larger work roles, with leadership often deep in the policy generation and implementation side of the workplace while direct supervisors and rank-and-file members focused on support provided by each other to respond to the rapidly shifting policies during the COVID-19 pandemic.

In terms of work-life demands, consistency across organizational structure remained as all groups indicated life balance was the primary demand. All ranks in the fire departments were concerned with exposing their families to COVID-19, as well as navigating new aspects of having their families at home more. For example, some members had more time with their families due to COVID-19 lockdowns while others had less time as their colleagues were exposed and they had to work more shifts. Thus, the uncertainty of the life balance appears to have created new challenges for most people across the departments. The primary resources discussed to mitigate work-life demands included policy and operation supports and emotional and social supports. However, the primacy of each of these resources was opposite for leaders versus rank-and-file members. Leaders primarily discussed policy and operation supports while rank-and-file members discussed interpersonal supports. This difference reflects the varying roles these groups play across the organizational hierarchy and reminds us that a one-size-fits-all approach to leveraging organizational resources to mitigate work-life demands is not appropriate at different levels and job roles. The perspectives of the rank-and-file personnel helped us learn how the changes that leadership made impacted those responding to calls and dealing with work-life demands.

There are limitations to consider. This was an exploratory qualitative study. It describes only what demands and resources fire departments participating in RAPID and is not necessarily generalizable to the US fire service. However, this sample may be representative as it included fire departments that are geographically diverse and included a wide range of departments varying in size, call volume, and services. Leadership is primarily represented in this sample and it may not be indicative of the challenges faced by rank-and-file, boots-on-the-ground fire service members. However, we were able to capture unique challenges faced by departments and the perceptions of leadership and

those that manage rank-and-file members. Captains and lieutenants offer a broad perspective from listening and dealing with issues related to COVID-19 firsthand with their crew. Future research should address the representativeness and generalizability to assess the additional demands and resources in the US fire service brought on by COVID-19. This study captured experiences during the first wave of the COVID-19 pandemic. Future research should address the temporality of COVID-19 and the impact it has on reported demands and resources within fire departments. Another limitation may be that the interview guide did not ask specific questions regarding the personal experience with COVID-19 such as experiencing the loss of family, friends, or co-workers. Future research should include this information as it could provide additional context that contributes to the perception of job demands and resources. Additional opportunities for future research include assessing a comparison group to see how experiences differ. This could be done with the general public or with civilian employees within a fire department. One unique aspect of the fire service is that firefighters work in extended shifts usually 1 day on and 2 days off. Most other employees work 8 to 12 hours, which enables them to escape work stressors in a shorter time. Future studies should look at shift work comparisons to assess how it influences experience.

CONCLUSION

Understanding the demands and resources of fire service personnel is imperative to improving the fire service culture and health outcomes. Previous literature discusses the negative effects of having more demands than resources (ie, burnout). The current study helps us understand what new demands were identified in the fire service due to COVID-19 and how departments are supporting their members. Work-life balance demands appear to have surfaced with few resources to combat these demands. Future research should include further assessment of demands in fire service and evaluation of current resources.

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