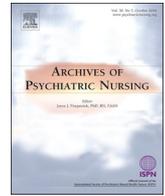




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Prevalence and correlates of psychiatric symptoms among first responders in a Southern State

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ABSTRACT

First responders (FRs) respond to critical incidents as an expectation of their profession, and after years of service, exposure to trauma can accumulate and potentially lead to mental health problems, such as posttraumatic stress disorder (PTSD). A gap persists in the research regarding duty-related risk factors and prevalence of mental health problems among FRs. Guided by existing evidence and in partnerships with the state's FR community, this study assessed the mental health needs of FRs, risk factors that may contribute to these problems, and the associations therein. A convenience sample of firefighters and emergency medical technicians/paramedics (n = 220) were recruited from across Arkansas to complete an online survey. This survey incorporated brief assessment tools to measure various mental health problems, and captured other data regarding possible risk factors. Results found that 14% reported moderate-severe and severe depressive symptoms, 28% reported moderate-severe and severe anxiety symptoms, 26% reported significant symptoms of PTSD, 31% reported harmful/hazardous alcohol use and dependence, 93% reported significant sleep disturbances, and 34% indicated high risk for suicide. Significant group differences were found across measures and gender (female), shift-structure (48 h or more), department setting (rural), relationship status (non-partnered), and having a medical history of hypertension. These findings pose significant implications for mental healthcare providers, as well as other healthcare providers and FR organizations. Findings will guide future research that will address the need for changes in decision-making, funding, and policy regarding FRs' MH and MH services available to them.

Introduction

Sentinel events such as September 11th, 2011, (9/11) in the United States (U.S.) have brought much attention to the magnitude of traumatic exposure experienced by first responders (Berger et al., 2007). In the U. S., firefighters and emergency medical technicians (EMTs)/paramedics respond to > 50 million emergency calls annually (NFPA, 2014; McCallion, 2011). While many of these first responders (FRs) can serve their entire careers without responding to event such as 9/11, each dispatch can expose firefighters and EMT/paramedics to a myriad of tragedies, such as fatal motor vehicle accidents, appalling acts of violence, and devastating natural disasters, with each having the potential of becoming one's own "sentinel event." The nature and frequency of daily, duty-related traumatic exposures put FRs at significant risk of developing mental health (MH) problems, such as posttraumatic stress disorder (PTSD) and depression (Haugen, Evces, & Weiss, 2012).

Nationally, FR organizations recognize the need for more research regarding the MH of FRs and the treatment thereof. The National Fire Service Research Agenda emphasizes the need for research to identify individuals who are at high risk for MH problems, especially those related to chronic and repeated exposures to emergency incidents. The National Fallen Firefighters Foundation (NFFF) posits that not all FRs respond the same to traumatic incidents, and due to duty-related complications, some experience emotional and psychological distress (2015). *Everyone Goes Home*, a program of the NFFF, recommends development of a new model of screening and interventions, one that better reflects the variability in the ways that FRs respond to traumatic incidents. Ultimately, data is needed to demonstrate the need for and guide the development of a MH service model that is tailored to meet the MH needs specific to FRs.

This author previously conducted a systematic review of literature to collect this data and identified various gaps in the literature as a

Abbreviations: FR, first responder; MH, mental health; EMT, emergency medical technician; EMS, emergency medical services; ADEM, Arkansas Department of Emergency Management; GHQ-28, General Health Questionnaire; PSQI, Pittsburgh Sleep Quality Index; GAD-7, Generalized Anxiety Disorder Scale; PHQ-9, Patient Health Questionnaire; AUDIT, Alcohol Use Disorder Identification Test; PCL-C, PTSD Checklist-Civilian; SBQ, Suicide Behaviors Questionnaire; APFF, Arkansas Professional Firefighters Association

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whole (Jones, 2017). For example, studies did not uniformly use the term “first responders.” In conducting a literature search using the term, results included studies with participants from many different professions, such as firefighters, law enforcement (Levy-Gigi, Richter-Levin, & Keri, 2014; Marshall, Milligan-Saville, Mitchell, Bryant, & Harvey, 2017; Stanley, Hom, & Joiner, 2016), medical examiners (Brondolo, Eftekhazadeh, Clifton, Schwartz, & Delahanty, 2017), and other rescue workers (Johnson et al., 2005). Although the MH of these professionals is important, there are differences in the types and frequency of trauma to which they are exposed. They also vary in their training and their roles when responding to an emergency. Additionally, when considering the need to develop a MH service model, the context and culture in which they work can vary significantly, which can impact the implementation and access of the service.

Another gap in the literature is that a vast amount research focused on the effects of specific sentinel events (i.e. 9/11). While these events do indeed expose FRs to intense devastation, they are single incidents at one point in time. Few researchers have explored the MH consequences of daily operations that are expected and accepted as part of a FR's job. Lastly, much of the research focused on PTSD. There are multiple other MH problems that can similarly affect FRs, such as depression, anxiety, and suicidality.

Based on these gaps, the literature review was conducted to describe the overall MH profile of firefighters and EMT/paramedics, as it related to daily-duty related trauma exposure, and not specific sentinel events (Jones, 2017). Twenty-seven studies (1998–2015) showed prevalence rates of: 4–30% for PTSD, 7–22% for depression, 4–22% for anxiety, 34–56% for binge drinking, and 58–70% for sleep problems. These problems were shown to emerge as early as during initial training and continue long after retirement, with approximately 15% of suicides among FRs occurring in retirees. A number of factors that can increase FRs' risk for MH problems were also elicited, such as: long hours at work (Clohessy & Ehlers, 1999) and high levels of work strain/stress (Corneil, Beaton, Murphy, Johnson, & Pike, 1999), particularly when there are conflicts between work and home; previous psychological treatment (Del Ben, Scotti, Chen, & Fortson, 2006), increased number of health concerns, emotional problems, and relationship status (being single; Berger et al., 2007). Risk for suicide was found to be associated with paid versus volunteer work status, and history of responding to suicide attempts or deaths (Stanley, Hom, Hagan, & Joiner, 2015). Other factors, such as age when starting the profession, years of service, rank, and military status, also demonstrated an association with risk for MH problems, although their associations varied in the literature. For example, whereas some studies found longer times in service and higher rank to be predictive of PTSD (Beaton, Murphy, Johnson, Pike, & Corneil, 1999; Corneil et al., 1999), another found fewer years and lower rank to be associated with increased risk for suicide (Wagner, Heinrichs, & Ehlert, 1998).

This evidence prompted meetings with FR stakeholders across Arkansas to assess the MH needs of state's FRs, including the State Director of Emergency Medical Services (EMS) at the Department of Health, the Fire and EMS Coordinator for the Arkansas Department of Emergency Management (ADEM), and multiple fire chiefs. Unanimously, they expressed concern with the prevalence of MH problems among the state's FRs, and anecdotally reported an increase in the number of suicides and early retirements in the past decade due to such problems. ADEM additionally reported that there were no formal methods to collect or evaluate MH-related data at the state level, and with the need unknown, there were no additional screening, intervention, or implementation strategies available to the state's FRs.

Hence, to better define the MH needs of FRs in Arkansas, the purpose of this study was to describe their MH profile, the risk factors that may contribute to their MH problems, and the associations therein. To our knowledge, this is the first study to measure multiple MH problems in a homogenous group of FRs, specifically firefighters and EMT/paramedics, within a single state. Such data is necessary to demonstrate

the need for state-level changes in decision-making, funding, and policy regarding FRs' MH and the MH services available to them.

Methods

Design

This descriptive study used a community-based approach to explore the MH needs of FRs statewide. A community-based approach engages community members in all aspects of the research process to facilitate a program of research that is well-adopted by this population (Faridi, Grunbaum, Gray, Franks, & Simoes, 2007). In this study, partnerships were established with FR stakeholders and administrative FRs across the state (as mentioned above). They collaborated with the research team throughout the time of the study and were instrumental in facilitating recruitment (described below).

Setting and sample

Participants included a convenience sample of firefighters and EMT/paramedics from across Arkansas, including volunteer and paid personnel aged 18 years and over who are active or retired. This study's operational definition of FRs included firefighters and EMTs/paramedics due to the overlap of professionals that are both firefighters and EMTs/paramedics. They also respond to similar events, such as motor vehicle accidents and medical emergencies, and provide similar services; over 60% of incidents to which the fire service responds are EMS-related (National Fire Incident Reporting System, 2014). This study excluded law enforcement due to the differences in training and job duties compared to firefighters and EMTs/paramedics.

Measures

This study used an anonymous online survey via Survey Monkey. The HIPAA-compliant version of Survey Monkey was purchased, which allowed complete anonymity, including no collection of the Internet Protocol (IP) address. The first section of the survey captured data on individual demographics, including gender, age, race, and education; it also captured department characteristics, including size and type of department (paid vs. volunteer), department setting (i.e. rural, urban), and in-house ambulance service (applicable to firehouses only). Based on previous evidence, risk factors associated with MH problems among this population were also collected (Jones, 2017), specifically: relationship status, military status (including years of service and number of deployments), rank (firehouses only), shift structure, age at which he/she started as a FR, years of service, history of responses to suicide attempts/deaths, and history of medical and mental health diagnoses.

The remainder of the survey incorporated brief screening tools to measure: general risk of developing a mental disorder, PTSD, depression, anxiety, alcohol use, sleep disturbances, and risk for suicide. These measures were selected because they were recommended by the Substance Abuse and Mental Health Services Administration (SAMHSA) or used in previous studies with FRs. Measures are briefly described below; see Table 1 for psychometric properties.

The General Health Questionnaire (28-item; GHQ-28) identifies possible MH problems in community populations, indicating need for further assessment (Goldberg & Hillier, 1979). It consists of 4 subscales: somatic complaints, anxiety and sleep, social functioning, and depression. Using a ‘GHQ method’ of scoring as recommended by the user manual, where the Likert scale is scored 0-0-1-1 (Goldberg, 1978), total scores can range from 0 to 28. For this survey, scores of 5 and above were used to identify positive cases of general psychopathology.

The Patient Health Questionnaire (9-items; PHQ-9) incorporates criteria of a depressive episode per the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV), to screen for and measure severity of depressive symptoms (APA, 2013; Kroenke et al.,

Table 1
Survey measures: Psychometric properties.

Questionnaire	Psychometric properties
General Health Questionnaire (GHQ-28)	Test-retest reliability: Cronbach's α : 0.78–0.9 Interrater reliability: excellent (α : 0.9–0.95) Internal consistency: high, correlates well with other depression and anxiety measures (Goldberg, 1978; Sterling, 2011)
Patient Health Questionnaire (PHQ-9) ^a	Diagnostic validity: well established Sensitivity (scores ≥ 10): 0.88 Specificity: 0.88 for MDD ^c (Kroenke, Spitzer, & Williams, 2001)
Generalized Anxiety Disorder 7-item (GAD-7) Scale ^a	Convergent Validity: Beck Anxiety Inventory, $r = 0.72$; Factor validity: 0.69–0.81 Sensitivity: 0.89 Specificity: 0.82 (Spitzer, Kroenke, Williams, & Lowe, 2006)
Abbreviated PTSD ^b Checklist-Civilian Version (PCL-C) ^a	Test-retest reliability: α : 0.79–0.87 Interrater reliability: α : 0.75 Sensitivity: 0.92–0.99 Convergent and discriminant validity: moderate-high; (Lang et al., 2012; Wilkins, Lang, & Norman, 2011)
Alcohol Use Disorder Identification Test (AUDIT) ^a	Test-retest reliability: good-excellent (α : 0.6–0.8); Internal consistency: high (α : 0.94) Sensitivity: 0.76 Specificity: 0.70 (de Meneses-Gaya, Zuardi, Loureiro, & Crippa, 2009)
Pittsburg Sleep Quality Index (PSQI)	Test-retest reliability: 0.87 Validity: high; Sensitivity (score > 5): 0.987 Specificity: 0.844 for sleep disturbance (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989; Backhaus, Junghanns, Broocks, Riemann, & Hohagen, 2002)
Suicide Behaviors Questionnaire-Revised (SBQ-R) ^a	Reliability: clinical sample, α : 0.75; nonclinical sample, α : 0.80 Test-retest correlations: ($r = 0.95$) (Osman et al., 2001; Cotton, Peters, & Range, 1995)

^a Screening tool recommended by Substance Abuse and Mental Health Services Administration (SAMHSA) and the Health Resources and Services Administration (HRSA), Center for Integrated Health Solutions.

^b PTSD: Posttraumatic stress disorder.

^c MDD: Major depressive disorder.

2001). Participants indicate the frequency of nine symptoms over the past two weeks, and how difficult these symptoms have made daily living (i.e. work, home life, personal relationships). Scores of 10 to 14 indicate symptoms of mild depression, 15 to 19 indicate symptoms of major depression, moderate-severe, and scores of 20 or greater indicate symptoms of major depression, severe.

The Generalized Anxiety Disorder 7-Item Scale (GAD-7) is based on the DSM-IV diagnostic criteria for GAD (Spitzer et al., 2006). Similar to the PHQ-9, participants indicate the frequency of symptoms over the past two weeks and how they have impacted daily living. Scores of 5 to 9 indicate symptoms of mild anxiety, 10 to 14 indicate symptoms of moderate anxiety, and scores 15 and greater indicate symptoms of severe anxiety.

The Abbreviated PTSD Checklist-Civilian Version (PCL-C) includes 17-items that measure symptoms of PTSD per the DSM-IV (APA, 2013; Weathers et al., 2013). This version screens for symptoms in relation to generic stressful experiences and can be used with any population. Participants indicate to what degree they have experienced symptoms over the past month, with total scores ranging from 5 to 85; a cut-off score of 43 was used in this study (Freedly et al., 2010; Spont et al., 2013).

Alcohol use and misuse were assessed using the Alcohol Use Disorder Identification Test (AUDIT). This 10-item questionnaire covers the domains of alcohol consumption, drinking behavior, and alcohol-related problems, and total scores can range from 0 to 40 (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). A score of 8 or greater is associated with harmful or hazardous drinking, and a score of 15 or more indicates symptoms likely of alcohol dependence.

The Pittsburg Sleep Quality Index (PSQI) is used to measure the quality and patterns of sleep in adults (Buysse et al., 1989). This tool measures seven components of sleep and generates scores for each that are summed to obtain a maximum score of 21. A score of 5 or greater is indicative of poor sleep quality; the greater the score, the greater the sleep disturbance.

The Suicide-Behaviors Questionnaire-Revised (SBQ-R) has 4 items that assess for different dimensions of suicidality: life time ideation and/or attempt, frequency of ideation in past 12 months, threat for

attempt, and self-report likelihood of suicidal behavior in the future (Osman et al., 2001). Intended to identify at-risk populations and risk behaviors, the cutoff score for general adult populations is a 7 or greater.

Procedure

Recruitment was facilitated with the help of our community partners, including the State EMS Director, Fire/EMS Coordinator for ADEM, President of the Arkansas Professional Firefighters Association (APFF), and multiple fire chiefs across the state. Via email and site visits, the PI distributed flyers that provided study information and Quick Response (QR) codes to the study web- and social media pages. Additionally, the PI was invited to recruit and present preliminary findings at the annual APFF conference.

Initially, the PI sent an email to all community partners to distribute throughout their company/department/organization. This email provided brief study information and invitation to participate, along with a link to the study webpage for further information. Once at the study webpage, individuals interested in participating could follow another link to the survey page which included informed consent information. (Documentation of consent was waived and approved by the Institutional Review Board). By clicking another link, individuals verified that they had read the form and consented to participate, and started the survey. Reminder emails were sent every other month. As the study progressed, data were needed from sub-groups of the population, such as female and volunteer FRs; an additional statement to recruit these groups was included in the emails. Additionally, some community partners further promoted the study at local meetings, in their monthly newsletters, and on their web and social media pages.

Data analysis

We calculated the prevalence of MH problems in our sample, as well as descriptive statistics for all participant demographics, department characteristics, and MH risk factors. Total scores from measures of general risk of developing a mental disorder, PTSD, depression, anxiety,

alcohol use, sleep disturbances, and risk for suicide were dichotomized using the cut points described above. The correlation between raw scores on each measure were quantified using Spearman's rank order correlation, and significance tests of correlation coefficients were adjusted for multiple comparisons using the Bonferroni correction. We constructed bivariate logistic regression models to examine the association between the dichotomous indicators of MH status and individual and department characteristics. Model coefficients were exponentiated to yield odds ratios. Lastly, we modeled the association between MH conditions, shift type, and practice setting using multivariable logistic regression, with models adjusted for age, race, gender, relationship status, and military status. We selected these socio-demographic covariates based on several criteria, including previous literature, univariate relationship with MH outcomes, and theoretically plausible confounding. All analyses were conducted using Stata15 (StataCorp. 2017. Stata Statistical Software: Release 15. College Station, TX: StataCorp LLC).

Ethical considerations

This study was approved by the University of Arkansas for Medical Sciences Institutional Review Board (IRB) and designated as minimal risk. For additional participant protection, the PI compiled a list of currently available MH resources, including the local employee assistance program and other mental healthcare providers that have agreed to be included (e.g. clinics, therapists, and nurse practitioners). Participants could access the list on the study webpage and were encouraged to utilize services if they experienced distress during, or because of, the survey.

Results

Sample characteristics

A total of 220 FRs initiated the survey. Of those, 86% completed the entire survey; the other 14% completed some sections, but skipped others, which is reflected in the “N” in the results below. Also important to note is that participants could be both a firefighter and certified as an EMT or EMT/paramedic. A total of 67.4% ($n = 147$) of participants were active firefighters, 44% ($n = 96$) were currently certified EMTs, and 40.4% ($n = 80$) were currently certified EMT/paramedics. Additionally, 5.5% ($n = 12$) were retired firefighters and 2.3% ($n = 5$) were retired EMT/paramedics. Table 2 includes the other variables that were included in data collection and analysis, including demographics, department characteristics, and risk factors.

Mental health and risk factors

See Table 3 for frequencies of MH problems indicated by the assessment measures, and Table 4 for the bivariate correlations found between measures. In brief, 50% of participants indicated need for further MH assessment, 14% indicated symptoms of moderate-severe and severe depressive symptoms, and 28% indicated moderate-severe and severe anxiety symptoms. Twenty-five percent indicated significant symptoms of PTSD, 20% indicated harmful/hazardous alcohol use, and an additional 10.6% indicated alcohol dependence. Significant sleep disturbances were reported for 93%, and more than one third reported high risk for suicidality. There were moderate ($r_s = 0.5–0.7$) to strong ($r_s > 0.7$) positive correlations found between several measures.

Variables that were significantly associated with positive scores across measures included: gender (female compared to male), shift-structure (48 h or more compared to 12/24 h), department setting (rural compared to suburban, urban, and mixed), relationship status (partnered compared to non-partnered), and having a medical history of hypertension (see Table 5). Previous or current MH diagnosis and MH treatment were correlated with positive scores across all measures;

Table 2
Participant demographics, department characteristics, and risk factors (n = 220).

Variable (n)	Category	n (%)
Gender	Male	189 (85.9)
	Female	31 (14.1)
Age (years)	18–24	13 (5.9)
	25–34	64 (29.1)
	35–44	79 (35.91)
	45–54	49 (22.3)
	55 and older	15 (6.8)
Race/ethnicity	White	209 (95)
	Other ^a	11 (5)
Education (n = 219)	High School diploma (or equivalency)	17 (7.7)
	Some college, no degree	115 (52.5)
	College degree	87 (39.7)
Department Type (n = 218)	Paid	192 (88)
	Volunteer/combined	26 (12)
Size ^b	Small	52 (23.6)
	Medium	89 (40.5)
	Large	79 (35.9)
Setting (n = 217)	Rural	30 (13.8)
	Suburban	15 (6.9)
	Urban	71 (32.7)
	Mixed	101 (46.5)
Shift Structure (n = 206)	12-hour shifts	15 (7.3)
	24-hour shifts	167 (81)
	48-hour shifts	21 (10.2)
	Other	3 (1.5)
Relationship status ^c	Partnered	177 (80.5)
	Non-partnered	43 (19.5)
Military status (n = 218)	None	180 (81.6)
	Current or veteran	38 (17.4)
Response to suicide (n = 219)	Never	7 (3.2)
	Once (attempt or death)	15 (6.8)
	Multiple (attempts and deaths)	197 (90)
Fire-house only Ambulance In-house (n = 162)	Yes	50 (30.9)
	No	112 (69.1)
Rank (n = 157)	Firefighter	60 (38.2)
	Lieutenant	22 (14)
	Captain	44 (28)
	Battalion chief	15 (9.6)
	Assistant chief/chief	16 (10.2)
	Medical history	Hypertension
	Diabetes	9 (4.1)
	Cardiac	12 (4.5)
	COPD ^d /emphysema	3 (1.4)
	Cancer (current/in remission)	12 (5.5)
	Other	15 (6.8)
Mental health history (n = 216)	Previous diagnosis	50 (23.2)
	Previous treatment	53 (24.5)
Start age (years; n = 216)		M = 22.68
Years of service (years; n = 154)		M = 16.06

^a Other: African American, Native American, and Multiple ethnicities; individuals from other races were collapsed into a single category due to relatively small number of individuals.

^b Small: < 3 stations; Medium: > 3 stations, < 150 personnel; Large: > 150 personnel.

^c Partnered: Married, in domestic relationship, living with partner; Non-partnered: divorced, separated, widowed.

^d COPD: Chronic obstructive pulmonary disease.

there were also no significant differences between study variables and the AUDIT and PSQI. As such, these variables and measures are not included in Table 5.

There were statistically significant associations between two other study variables and measures. In the firehouse, rank of Captain (compared to Firefighter) was associated with less severe anxiety symptoms (OR 0.236; 95% CI 0.08–0.699; $p < 0.01$). While there were similar

Table 3
Mental health measures: Frequencies.

Mental health measure (N)	Score and indication	n (%)	M ± SD
General Health Questionnaire (GHQ-28; N = 206)	5 or more positive symptoms; indicates need for further assessment	104 (50.5)	M = 6.30 ± 6.23
Patient Health Questionnaire (PHQ-9; N = 198)	Score ≥ 15; indicates moderate-severe and severe depressive symptoms	28 (14.2)	M = 7.62 ± 6.28
General Anxiety Disorder (GAD-7; N = 200)	Score ≥ 10; indicates moderate-severe and severe anxiety symptoms	56 (28)	M = 7.51 ± 5.99
Abbreviated PTSD ^a Checklist-Civilian Version (PCL-C; N = 195)	Score ≥ 43; indicates significant symptoms of PTSD	50 (25.6)	M = 35.27 ± 15.56
Alcohol Use Disorder Identification Test (AUDIT; N = 198)	Score ≥ 8; indicates harmful/hazardous alcohol use Score ≥ 15; indicates alcohol dependence	40 (20.2)	M = 6.37 ± 6.49
Pittsburg Sleep Quality Index (PSQI; N = 204)	Score ≥ 5; indicates significant sleep disturbance	21 (10.6)	M = 10.82 ± 4.36
Suicide Behaviors Questionnaire-Revised (SBQ-R; N = 195)	Score ≥ 8; indicates high risk for suicidality	190 (93)	M = 6.4 ± 3.07

^a PTSD: Posttraumatic stress disorder.

Table 4
Intercorrelation of measures.

	GHQ ^a	PSQI ^b	GAD ^c	PHQ ^d	AUDIT ^e	PCL-C ^f	SBQ ^g
GHQ	1						
PSQI	0.483 ^h	1					
GAD	0.729 ^h	0.485 ^h	1				
PHQ	0.739 ^h	0.573 ^h	0.795 ^h	1			
AUDIT	0.07	-0.01	0.21	0.115	1		
PCL-C	0.647 ^h	0.53 ^h	0.765 ^h	0.761 ^h	0.196	1	
SBQ	0.383 ^h	0.257	0.387 ^h	0.472 ^h	0.15	0.425 ^h	1

^a GHQ-28: General Health Questionnaire.

^b PSQI: Pittsburgh Sleep Quality Index.

^c GAD-7: Generalized Anxiety Disorder Scale.

^d PHQ-9: Patient Health Questionnaire.

^e AUDIT: Alcohol Use Disorder Identification Test;

^f PCL-C: Posttraumatic Stress Disorder (PTSD) Checklist-Civilian.

^g SBQ: Suicide Behaviors Questionnaire.

^h Statistical significance; Moderate correlation = 0.5–0.7; Strong correlation > 0.7.

reduced odds of anxiety among lieutenants (OR 0.34; 95% CI: 0.088–1.32, p = 0.12) and chiefs (OR 0.567; 95% CI: 0.16–1.99, p = 0.38) compared to firefighters, the differences were not statistically

Table 5
Significant group differences: Bivariate logistic regression.

	GHQ-28 ^a (OR; 95% CI)	PHQ-9 ^b (OR; 95% CI)	GAD-7 ^c (OR; 95% CI)	PCL-C ^d (OR; 95% CI)	SBQ ^e (OR; 95% CI)
Gender: Female (n = 31)	0.46 0.20–1.03	0.23** 0.09–0.56	0.38* 0.17–0.83	0.21** 0.09–0.48	0.30* 0.14–0.68
Setting:					
Rural (n = 30) compared to...					
Suburban (n = 15)	0.71 0.2–2.58	0.31 0.57–1.73	0.89 0.23–3.42	0.12* 0.2–0.66	0.21* 0.51–0.87
Urban (n = 71)	0.36* 0.14–0.91	0.06** 0.01–0.3	0.29* 0.1–0.81	0.09** 0.03–0.26	0.21** 0.08–0.56
Mixed (n = 101)	0.82 0.34–1.99	0.35* 0.13–0.94	0.75 0.3–1.85	0.30** 0.12–0.73	0.23** 0.09–0.57
Relationship: Non-partnered (n = 43)	0.70 0.35–1.41	0.45 0.19–1.2	0.46* 0.22–0.94	0.51 0.24–1.09	0.44* 0.21–0.91
Shift: 48 h/ fixed (n = 24)	3.0* 1.12–8.04	4.57** 1.61–12.97	2.15 0.85–5.39	3.57** 1.43–8.93	2.14 0.87–5.25
Medical: Hypertension (n = 65)	1.95* 1.06–3.57	3.02** 1.33–6.82	1.68 0.88–3.22	1.33 0.68–2.63	1.24 0.66–2.33

^a GHQ-28: General Health Questionnaire.

^b PHQ-9: Patient Health Questionnaire.

^c GAD-7: Generalized Anxiety Disorder Scale.

^d PCL-C: Posttraumatic stress disorder (PTSD) Checklist-Civilian.

^e SBQ: Suicide Behaviors Questionnaire.

* p < 0.05.

** p < 0.01.

significant. Additionally, small department size was correlated with higher risk for suicide (OR 0.399, 95% CI: 0.184–0.864; p = 0.02) when compared to medium size (> 3 stations, < 150 personnel), but not when compared to large size (> 150 personnel; OR 0.777; 95% CI: 0.367–1.656; p = 0.51).

Since department setting and shift structure showed the most significant associations with positive scores on multiple assessment measures, multivariable logistic regression was conducted for each variable, controlling for age, race, gender, relationship status, and military status (see Table 6). When controlling for these factors, setting was no longer associated with positive GHQ-28 or GAD-7 scores; significant group differences remained for the PHQ-9, PCL-C, and SBQ. Shift structure was still significantly associated with positive scores on the GHQ-28, PHQ-9, and PCL-C, but not the SBQ.

Discussion

When considering the number of traumatic incidents that FRs are exposed to as an anticipated part of their job, significant MH consequences should be expected. However, despite the frequency and severity of traumatic exposure, these consequences are often ignored. In addition, perhaps due to the culture of strength and the stigma associated with mental illness within the FR culture, FRs themselves are

Table 6
Setting and shift structure: Multivariable logistic regression.

		GHQ-28 ^a (AOR; 95% CI)	PHQ-9 ^b (AOR; 95% CI)	PCL-C ^c (AOR; 95% CI)	SBQ ^d (AOR; 95% CI)
Setting: Rural (n = 30) compared to	Suburban (n = 15)	0.75 0.18–3.09	0.23 0.22–2.4	0.08* 0.01–0.8	0.26 0.05–1.3
	Urban (n = 71)	0.36 0.13–0.96	0.85** 0.02–0.24	0.94** 0.03–0.31	0.27* 0.1–0.76
	Mixed (n = 101)	0.89 0.34–2.19	0.37 0.13–1.06	0.31* 0.11–0.82	0.24** 0.09–0.65
	Shift: 48 h/fixe (n = 24)	3.23* 1.17–8.94	4.67** 1.5–12.54	3.9* 1.39–10.96	1.99 0.76–5.24

AOR: Adjusted odds ratio, controlling for age, gender, race, relationship status, military status.

^a GHQ-28: General Health Questionnaire.

^b PHQ-9: Patient Health Questionnaire.

^c PCL-C: Posttraumatic stress disorder (PTSD) Checklist-Civilian.

^d SBQ: Suicide Behaviors Questionnaire.

* $p < 0.05$.

** $p < 0.01$.

rarely cognizant of the state of their own mental health (Erich, 2014; NVFC, 2008). It can be difficult to ascertain how great the MH needs of this population are. For example, previous studies have found prevalence rates for PTSD to range from 4 to 30% among FRs (Dudek & Koniarek, 2000; Alexander & Klein, 2001). In this study, one quarter of participants reported clinically significant symptoms of PTSD. This alone is noteworthy when considering that prevalence rates among military veterans are estimated at 10–31%, and at 8.7% for general populations (APA, 2013; NIH, 2009). In addition, over one third of this sample demonstrated high risk for suicide. Such rates pose significant implications for mental healthcare providers, as well as other healthcare providers and FR organizations.

As a mental healthcare provider, inquiry about a client's profession is prudent practice; this study's finding particularly emphasize the importance of this inquiry. However, being a FR alone is not the only duty-related factor that can contribute to risk for MH problems. Providers need to be aware of other variables that are specific to FRs that can amplify the risk. For example, this study showed significant associations between working 48-hour shifts and multiple MH problems, including depression and PTSD. However, many providers are unaware that FRs work this type of shift-structure. Healthcare providers must be aware that it is not uncommon for FRs to be at work for days at a time, particularly if they work for more than one department/company. They can also volunteer or be mandated to work overtime due to short-staffing or multiple call-ins, which can result in working up to 96 h straight. While they have the option to sleep overnight, this sleep can be disrupted by the call of the bell at any time, multiple times a night.

This type of shift structures, commonly known as “shift work,” has been associated with decreased sleep quality, which can negatively affect health, quality of life, and work performance, particularly in FRs (Billings & Focht, 2016; Culpepper, 2010). Previous studies have also found sleep disturbances to be associated with increased MH problems, such as depression and hazardous drinking (Carey, Al-Zaiti, Dean, Sessanna, & Finnell, 2011; de Barros, Martins, Saitz, Bastos, & Ronzani, 2013). However, it can be difficult to identify the causation: are sleep disturbances symptomatic of a MH condition, or are sleep disturbances contributing to the development of a MH problem? Particularly in this study, with 93% of the sample reporting significant sleep disturbances per the PSQI, the correlation between sleep disturbances and other MH problems would be difficult to ascertain. Nonetheless, long-term, these problems can lead to less effective emergency response and increased safety risk among FRs (Barger et al., 2015). Early recognition and treatment of sleep disturbances can reduce overall risk for harm and MH problems in this susceptible population.

Work setting also demonstrated to be a significant risk factor for MH problems in this study, which poses interesting implications in light of

current evidence. A recent study explored differences in psychiatric symptoms in volunteer and paid firefighters, and found that volunteers reported higher levels of depression, PTSD, and risk for suicide (Stanely, Boffa, Hom, Kimbrel, & Joiner, 2017). Volunteer departments are typically located in areas that are more rural due to the nature of funding for fire and EMS services. This study found no significant MH differences between volunteer and career FRs, but this may be due to the majority (88%) of the sample being from a paid department (discussed in Limitations). Still, there were significant group differences in work setting; specifically, working in a rural setting compared to an urban setting increased risk for depression, PTSD, and suicidality, even when controlling for multiple variables. Volunteer and rural departments are quite similar in nature, in that they are smaller (fewer stations, less personnel) and typically receive less funding support, which can affect the standards of equipment and services they provide. Synthesizing this evidence, it is clear that department type and setting can impact a FR's mental health.

Just as there are risk factors specific to the profession, one must also be mindful of other risk factors that are associated with MH problems in the general population, such as being female. This study's findings showed significantly greater severities of depression, anxiety, PTSD, and risk for suicide among female FRs. Nationally, in a study of general populations ($n = 43,093$), women showed significantly greater prevalence of what the authors called “internalizing” disorders, such as mood and anxiety disorders, while men showed higher rates of “externalizing” disorder, such as substance use and personality disorders (Eaton et al., 2012). (It is important to note that prevalence rates of PTSD were not specifically assessed in the Eaton et al., 2012.) Such MH problems can be further exacerbated for female FRs, as they are the minority in a male-dominated profession. Female FRs can experience increased physical demands, negative attitudes from their male counterparts (Sinden et al., 2013), and even harassment, which has the potential to put them at higher risk for MH problems (Hom, Stanley, Spencer-Thomas, & Joiner, 2017). While efforts are needed to decrease these discrepancies, providers should assess for these occurrences and be aware that female FRs' may be at higher risk for MH problems.

Previous studies have found that FRs with a history of military service, or of responding to multiple suicide attempts or deaths, experience more significant MH symptoms. However, that was not supported in this study. There were no significant associations between military status ($n = 40$), including years of service and number of deployments, and prevalence of MH problems in this sample. Even on the PTSD measure (PCL-C), while there was a difference, it was not statistically significant ($p = 0.059$). It is also important to note that 90% of all participants had responded to 2 or more suicide attempts/deaths. Considering that the average length of service for this sample was just

over 16 years, such a large number of responses to suicides is common.

Unfortunately, despite the overall prevalence of MH problems, few, if any, FR departments inquire about or monitor the MH status of their personnel. This is also a population that is not as forthcoming with such problems. Granted, < 40% of general populations seek MH care when experiencing symptoms (Institute of Medicine, 2015; Sareen et al., 2007); the percentage of FRs that seek help is expected to be significantly lower due to stigma, perceived possibility of confidentiality loss, and the culture of self-reliance that is common among FRs (Erich, 2014; National Volunteer Fire Council (NVFC), 2008). Mental healthcare providers may be aware of the effects of trauma on mental, emotional, and even physical health, but these implications may not be well understood by other healthcare providers. Since many FRs may never seek mental health-specific services, MH screenings should be considered by all health care providers when caring for FRs. For example, FRs in this study who reported a medical history of hypertension (29.5%) were at increased risk for general MH problems and depression. Knowing a patient is a FR, providers can further inquire about other known risk factors, assess for associated symptoms, and make referrals as appropriate. This evidence may even support the need for regular psychiatric evaluations of FRs, similarly to the annual medical physicals that are required annually by most FR departments.

Finally, in speaking with all of our community partners, they verbalized motivation to address FRs' MH problems, but were limited by the lack of resources and expertise to do so. Fortunately, simply recruiting for this study opened up the conversation about MH at the department level. State FR organizations, such as APFF and the Local Police and Fire Retirement System, have reported that legislation to address MH issues has been pushed for many years, but without a clear need, they have been unsuccessful. These study findings support the dire need for better resources at the state level, and with continued efforts, can be integrated into policy and funding-related decision making regarding the MH of FRs.

Limitations

There were some limitations to this study which will be considered and addressed in future studies. First, although this study aimed to recruit participation from both paid and volunteer FRs across the state, there was not an even distribution across these factors. At the initiation of this project, due to how community engagement snowballed, partnerships were better established in regions of the state in which there were an abundance of paid departments. This resulted in 88% of the participants being from paid departments, and the remaining participants were from volunteer and combined departments. This may limit the generalizability of the findings, and continuation of this program of research will include increased efforts to recruit these populations.

Additionally, the personal demographic and department characteristic questions were derived from data collected in other studies. Although these data were comprehensive in nature, there were oversights in how two questions were posed. Specifically, the question about current relationship status neglected to inquire about previous divorces. It is common belief within fire and EMS services that divorce rates are higher among FR populations than in the general population (Gagliano, 2009). However, other empirical studies find divorce rates of male FRs to be similar to those found in general populations, although divorce rates among female FRs are higher (Haddock, Jahnke, Poston, Jitnarin, & Day, 2015). Either way, knowing that relationship stress and status can affect an individual's MH (Kyung-Sook, SanqSoo, Sanqjin, & Young-Jeon, 2018), knowledge of previous divorces may have added to this data set. Additionally, the question about department setting offered options of rural, suburban, urban, and mixed. However, these setting types were not defined within the question. Responses would have been based on how the participants defined their settings, which may not have been accurate reflections. Future studies will include revisions to these questions.

Lastly, this study was promoted through various venues across the state, and hence, we do not know how many potential participants were aware of it. This limits our knowledge about the strength of the sample size. Additionally, there may have been bias among those that self-selected to participate. These factors have potential to limit the generalizability of the study findings. Still, a nationwide study of firefighters that used a web-based mental health survey resulted in $n = 1027$ (Stanley et al., 2015). When considering an $n = 220$ within a single state, these findings demonstrate the MH needs of the state's FRs and will be useful in affecting treatment and policy change.

Conclusions

Firefighters and EMT/paramedics respond to critical incidents as an expectation of their profession, and after years of service, trauma exposure can accumulate and potentially lead to MH problems; this is demonstrated by previous research and supported by this study. Although it may not be clear if duty-related trauma causes or exacerbates pre-existing problems, it is a matter of the public's and FRs' safety to address these problems. As psychiatric nurses, we must be cognizant of the risks among this population, and provide the proper screening, education, and referrals when caring for FRs. Additionally, with this knowledge, both FR and healthcare communities need further educated about factors that may contribute to increased risk and symptomology. Ultimately, further research is needed to decrease stigma related to mental illness and promote help-seeking among this at-risk population. Another arm of this study is using individual interviews to explore methods to do this, and, together with this paper's findings, will be used to inform the development of a MH service model that will address the culture surrounding MH and improve the overall MH of FRs. With continued efforts, this program of research aims to affect policy and funding changes at the department and state-level regarding FRs' MH and MH services available to them.

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