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Original Research

Evaluation of Posttraumatic Stress Disorder Screening Measures of Emergency Medical Services Clinicians in Urban and Suburban New York During the Coronavirus Disease 2019 Pandemic



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A B S T R A C T

Objective: The objective of this study was to assess the psychological impact of the coronavirus disease 2019 (COVID-19) pandemic on the self-reported rates of posttraumatic stress disorder (PTSD) among emergency medical services (EMS) clinicians in urban and suburban settings that were one of the primary epicenters during the first wave of the COVID-19 pandemic.

Methods: Anonymous surveys containing the PTSD Checklist–Specific (PCL-S) were sent electronically between November 2020 and April 2021 to EMS clinicians working in 2 EMS agencies. A threshold score ≥ 36 was considered a positive screen for PTSD symptomology; a score ≥ 44 was considered a presumptive PTSD diagnosis.

Results: Of the 214 surveys sent, 107 responses were returned. The total PCL-S scores suggested PTSD symptoms were present in 33% of responding EMS clinicians (95% confidence interval [CI], 24.1%–42.5%), and 25% (95% CI, 17.6%–34.7%) met the criteria for a presumptive diagnosis of PTSD. Regression revealed increasing PCL-S scores were associated with thoughts of job resignation (+3.8; 95% CI, 1.1–6.4; $P = .006$), whereas lower PCL-S scores were related to the degree that respondents believed emotional support was available at their institution (−3.6; 95% CI, −6.8 to −0.4; $P = .03$).

Conclusion: Six months after the first wave of the COVID-19 pandemic, one third of participating EMS clinicians screened positive for PTSD symptoms. Pandemic planning must address the mental health of EMS clinicians to reduce subsequent burnout and maintain a healthy workforce.

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Emergency medical services (EMS) clinicians are routinely exposed to physical and psychological stressors as they care for patients in dynamic and often uncontrolled environments.¹ Unmitigated exposure to occupational stressors, which can be divided into chronic operational stressors and acute critical incident stressors, likely strongly contributes to the higher rates of posttraumatic stress disorder (PTSD) described in EMS clinicians compared with the general public.^{2,3} The severity of PTSD symptoms in first responders is

significantly associated with subsequent alcohol and substance abuse,^{4,5} depression,⁶ and increased lifetime suicide risk.^{6–8}

The coronavirus disease 2019 (COVID-19) pandemic has transformed what have historically been acute critical incident stressors into chronic operational stressors. For example, although exposure to infectious disease has always been a possibility for EMS clinicians, at the onset of the pandemic, the uncertainty about viral transmission and the effectiveness of personal protective equipment, the lack of available personal protective equipment, and the fear of bringing the virus home were major operational stressors^{2,9,10} and direct insults to the basic human need of feeling safe.^{11–15} Additionally, bearing witness to the suffering and death of patients is a known risk factor for developing PTSD; death notifications were markedly increased during the beginning of the pandemic.^{9,16–23} Because of an increased

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overall call volume and decreased available workforce due to quarantines,⁹ the resulting reduction in time between jobs at work and downtime between shifts placed EMS clinicians at additional risk of burnout and job dissatisfaction.^{11–13,22,24–26} Furthermore, the constantly changing operational and clinical guidelines in the early days of the pandemic disrupted familiar routines and left EMS clinicians with guilt and feelings of inadequacy,⁹ sentiments known to harbor PTSD.^{18,19,27} Finally, the concomitant loss of socialization due to early lockdowns and physical distancing mandates further amplified the risk of PTSD.^{2,14,28}

To date, the literature describing the impact the COVID-19 pandemic had on the self-reported rates of PTSD among EMS clinicians in the United States has been limited to studies involving mixed populations of various first responder and health care worker roles. These aggregate data suggest that anywhere from 9% to 20% of front-line health care workers are screening positive for symptoms concerning for PTSD.^{29–32} Given the known relationship between EMS clinician stress and burnout and the resultant increased intentions to leave the EMS workforce,^{33,34} the scarcity of data specific to EMS clinicians is of great concern, especially given the pre-existing workforce shortage, which has been further exacerbated by the pandemic.

The primary objective of this study was to assess the psychological impact of the COVID-19 pandemic on the self-reported rates of PTSD among EMS clinicians in urban and suburban settings, which occurred at one of the primary epicenters of the first wave of the COVID-19 pandemic. Secondly, we examined the experiences and opinions of EMS clinicians during the COVID-19 pandemic regarding health fear, social isolation, confidence in personal protective equipment, satisfaction with operational guidelines, and perceived job stress.

Methods

Study Design

This multicenter, prospective, observational study was reviewed and approved by the Jamaica Hospital Medical Center Institutional Review Board and the Stony Brook University Institutional Review Board.

Population and Setting

This study was conducted with Stony Brook University Hospital EMS (SBEMS) and Jamaica Hospital Medical Center EMS (JHMC EMS). Stony Brook University Hospital is a suburban, academic, level 1 trauma and tertiary care center with an annual emergency department census of approximately 110,000 patients. In addition to critical care interfacility transport, SBEMS provides 911 response to the surrounding county via ambulances, air medical helicopters, paramedic intercept vehicles, and mobile stroke units. SBEMS receives approximately 12,000 services requests per year and comprises approximately 80 paramedics, 20 emergency medical technicians, and 12 administrative personnel. Situated within the New York City metro area, Stony Brook University Hospital was among the hardest hit hospitals during the first wave of the COVID-19 pandemic.³⁵

Jamaica Hospital Medical Center is an urban, level 1 trauma center and tertiary care center with an annual emergency department census of 140,000 patients. JHMC EMS provides emergency medical response with advanced life support for John F. Kennedy International Airport, interfacility transfers with basic life support, and 911 emergency response out of Jamaica Hospital Medical Center with advanced life support and basic life support capabilities. The department responds to approximately 60,000 requests for services annually and has 120 full-time uniformed emergency medical technicians and paramedics, 191 part-time and per diem uniformed paramedics, and 14 administrative personnel.

Timeline

With regard to the COVID-19 pandemic, New York State issued a “stay at home” mandate on March 22, 2020. By March 24, 2020, the New York City 911 system reported 5,700 calls, the most in recorded history.⁹ By March 30, 2020, this number peaked at 6,500 calls.⁹ This study was conducted via surveys distributed between November 2020 and April 2021.

Measurements

The PTSD Checklist is a 17-item self-report measure reflecting the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* symptoms of PTSD.^{36–40} The PTSD Checklist–Specific (PCL-S) has a variety of clinical and research purposes, including screening individuals for PTSD and aiding in the diagnostic assessment of PTSD in response to a specific stressor. The PCL-S questionnaire along with other questions on health fear, social isolation, doubt about protection, satisfaction with hospital guidelines and procedures, and job stress were used in this study to assess PTSD symptomatology.

The PCL-S was used to screen EMS clinicians in 2 level 1 trauma centers (1 urban and 1 suburban) that were COVID-19 epicenters in New York using SurveyMonkey (SurveyMonkey Inc, San Mateo, CA) and REDCap (Vanderbilt University, Nashville, TN) between November 2020 and April 2021. Added questions gauged respondent sentiment surrounding the COVID-19 pandemic and collected respondent demographics. The COVID-19 pandemic was specified as the traumatic event to be considered when responding to the questions in the PCL-S. As such, positive screens should result from the pandemic itself and not other/pre-existing stressful life events.

Analysis

Response options for the PCL-S are as follows: “not at all” (1 point), “a little bit” (2 points), “moderately” (3 points), “quite a bit” (4 points), and “extremely” (5 points). The PCL-S screen yields a total score ranging from 17 to 85, with higher scores indicating more severe PTSD. A total symptom severity score for each respondent was determined by summing the scores for each of the 17 questions. A threshold score ≥ 36 (sensitivity > 85%) was considered a positive screen for PTSD symptomatology, and a score ≥ 44 was considered a presumptive PTSD diagnosis.

R statistical software (v4.0.2; R Foundation, Vienna, Austria) was used for statistical analysis. Respondents were stratified into groups based on whether they were from the suburban or urban EMS system and having a PCL-S score < 36 or ≥ 36 . Categorical variables are expressed as count (n) and percent; proportions were compared using the Fisher exact test, whereas linear regression was used to examine factors associated with increasing PCL-S scores.

Results

The survey was sent to 214 EMS clinicians (105 urban and 109 suburban). In total, 107 complete responses were obtained (response rate = 50%), with most responses from suburban EMS (64/107 [59.8%], $P = .04$). The sample was primarily male (80/107 [75%], $P < .0001$), the median age was 35 years (interquartile range, 28–43.5 years), and the median years of experience was 10 years (interquartile range, 5–18 years). Most respondents (68/107 [63.5%], $P = .007$) were paramedics, and 89 of 107 (83.2%, $P < .0001$) always had direct patient contact. There were no demographic differences between the 2 institutions.

The total PCL-S scores revealed that PTSD symptoms were present in 35 of 107 (32.7%; 95% confidence interval [CI], 24.1%–42.5%), and 27 of 107 (25.2%; 95% CI, 17.6%–34.7%) met the criteria for a presumptive diagnosis of PTSD. Regression revealed increasing PCL-S scores were associated with avoiding COVID-exposed coworkers (4.6; 95% CI, 1.5–7.8; $P = .004$) and thoughts of job resignation (3.8; 95% CI, 1.1–

6.4; $P = .006$), whereas lower PCL-S scores were related to the degree that respondents believed institutional emotional support was available at their institution (-3.6 ; 95% CI, -6.8 to -0.4 ; $P = .03$).

The majority ($n = 83$ [74%], $P < .0001$) feared infection with COVID-19, and nearly all respondents were concerned about exposing their loved ones ($n = 108$ [96%], $P < .0001$). Forty percent ($n = 45$, $P = .04$) reported mitigating exposure risk by avoiding coworkers, and most believed that handwashing ($n = 104$ [93%], $P < .0001$) and face covering ($n = 92$ [82%], $P < .0001$) were effective means of protection against COVID-19.

Clinical decision making was largely unaffected by fear of contracting COVID-19 ($n = 68$ [61%], $P = .02$) despite caring for patients with presumed COVID-19 being perceived as more stressful than caring for patients without COVID-19 ($n = 70$ [64%], $P = .008$) and with overall workloads noted to be increased ($n = 101$ [92%], $P < .0001$) during the pandemic. Shifts in job responsibilities were reported by most ($n = 73$ [66%], $P = .001$), and suburban EMS (50/64 [78%]) more frequently reported changes in job duties than their urban counterparts (23/48 [48%], $P = .03$).

Signs of emotional struggle were present among respondents, with 33.9% ($n = 38$, $P = .01$) considering quitting their job, 34.8% ($n = 39$, $P = .004$) avoiding telling people the nature of their job, and suburban EMS being more likely not to disclose their profession (Relative Risk [RR] = 2.6; 95% CI, 1.5–4.1). After the first wave of the pandemic, many perceived less “togetherness” in their hospital ($n = 65$ [58%], $P = .0002$) and community ($n = 61$ [50%], $P = .007$), with suburban EMS reporting less “togetherness” in their hospital (RR = 2.1; 95% CI, 1.5–2.4) and community (RR = 2.2; 95% CI, 1.7–2.5).

Discussion

Approximately 6 months after the first wave of the COVID-19 pandemic, in a population of EMS clinicians in urban and suburban areas of the New York City metro area, 74% of EMS clinicians feared becoming infected with severe acute respiratory syndrome coronavirus 2, and 96% of EMS clinicians were most concerned about exposing their loved ones to the virus. Of the participating respondents, 33% of EMS clinicians screened positive for posttraumatic stress symptomology, with 25% meeting the criteria for a presumptive diagnosis of PTSD. In comparison, the prevalence of PTSD among EMS clinicians in North America before the COVID-19 pandemic was estimated to be between 4% and 11%,^{23,41} with the prevalence of PTSD in the general population of the United States estimated to be 3.5%.⁴²

The number of EMS clinicians meeting the criteria for a presumptive diagnosis of PTSD within our population is consistent with what sparse literature is available for the EMS clinician population during the pandemic. Earlier in the pandemic than our epoch, 14% of emergency personnel in the Rocky Mountain region of the United States (firefighters, law enforcement officers, and EMS clinicians) screened positive for a probable stress-related disorder.³² Also predating our epoch was a cross-sectional analysis of EMS clinicians in Spain, which reported that 31% of respondents potentially had PTSD based on the Davidson Trauma Scale.⁴³ During an epoch similar to ours, Gustafson et al²⁹ observed that 18% of clinical health care workers, inclusive of EMS clinicians, in an emergency department in Brooklyn, NY, met the screening criteria for PTSD.²⁹ Although they noted that EMS clinicians tended to have higher PTSD scores, the precise number of EMS clinicians screening positive for PTSD was not available.²⁹ Finally, during an epoch similar to ours, EMS clinicians in Korea who cared for patients with COVID-19 were significantly more likely to screen positive for PTSD based on the primary care PTSD screening for the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* scale than EMS clinicians with minimal exposure to caring for patients with COVID-19 (11% vs. 7%, respectively).⁴⁴

It is important to emphasize that unlike many other prior disasters, the COVID-19 pandemic does not consist of a single discrete event but is a perpetual series of waves in illness diagnoses, thereby requiring a sustained vigilance and response that is now spanning several years. Given this, it is challenging to extrapolate trends in clinician mental health following other catastrophic events to predict the course likely created by the COVID-19 pandemic. Because our study population consists of EMS clinicians in the New York City metropolitan area, data from the World Trade Center responders are particularly salient. Longitudinal observations suggest that rates of PTSD among rescue and recovery workers increased significantly over the first 6 years after the 9/11 terrorist attack, increasing from an 8% prevalence rate immediately after the attack to a 20% to 22% prevalence rate 5 to 6 years later,^{45–49} with nearly half of all PTSD cases occurring as delayed onset.⁴⁸ Longitudinal PTSD score trajectory has also been associated with the duration of work at Ground Zero, witnessing horrific events, being injured, bereavement, perceived threat to life or safety, and impaired social support.¹⁵ It is hopeful to see that perhaps this PTSD rate may eventually begin to decline because an overall PTSD prevalence of 7% was observed in New York City Fire Department EMS clinicians 12 years after the 9/11 terrorist attack.⁵⁰ When considering the psychological aftermath of the 2003 severe acute respiratory syndrome coronavirus 1 outbreak, quarantine and high exposure to patients with severe acute respiratory syndrome coronavirus 1 were significantly predictive of depressive symptoms in health care workers 3 years later.⁵¹

Within our cohort, increasing PTSD screening scores were associated with avoiding COVID-exposed coworkers, thoughts of job resignation, and believing that institutional psychological support was not available. This suggests that an opportunity to intervene that is likely to be achievable is improving awareness of and access to psychological support for EMS clinicians. Previous studies have suggested that of EMS clinicians who meet the diagnostic criteria for PTSD, only 20% to 40% have received any sort of professional treatment.^{23,52} This may be secondary to a lack of awareness of the available resources; a 2016 survey by the National Association of EMS reported that only 46% of respondents believed their EMS agency provides mental health resources, with only 59% of respondents knowing where to go for help if they need it.⁵³ The EMS Code Lavender program has been shown to be an effective way to improve EMS clinicians' awareness of resources from which to receive help, and may attenuate the impact of work-related stressors on compassion satisfaction, secondary traumatic stress, and burnout of EMS clinicians.^{54–56} Given that EMS clinicians who have access to psychological support in the workplace have been shown to have less severe PTSD, ways to improve EMS clinician awareness of these resources are crucial.⁵⁷ Studies have also echoed the importance of reducing social isolation to attenuate PTSD risk, which can be accomplished by strengthening workplace social support.^{4,10,14} Examples of such programming could include the EMS Code Lavender program.^{54,55}

Limitations

Although the PCL-5 screening tool is well validated, confers reasonable diagnostic accuracy for first responders within the United States,⁵⁸ and is widely used, the results obtained from it are dependent on an individual's willingness to answer the prompts honestly and only measure self-reported behavior.³⁷ Additionally, as a screening tool, some degree of overestimation is inherent; however, there may be instances in which recognition and treatment of subclinical PTSD may be beneficial to the individual.^{37,58} Additionally, we recognize the response rate of 50% and acknowledge some degree of response bias is likely present, as is also inherent with convenience sampling. Finally, we do not know the baseline PTSD prevalence of this population before the onset of the COVID-19 pandemic.

Conclusions

The “front lines” of health care have been lauded in the media, but our understanding of the impact of the pandemic on EMS clinicians is poor. Sixth months after the first wave of the COVID-19 pandemic, 33% of EMS clinicians within our cohorts in the urban and suburban New York City metro area screened positive for posttraumatic stress symptomology, with 25% meeting the criteria for a presumptive diagnosis of PTSD. Therefore, pandemic planning must address the mental health of EMS clinicians during all phases of disaster response, with the goal of reducing subsequent burnout and thus maintaining a healthy workforce. Further investigations should include additional practice settings, such as rural EMS, as well as trend PTSD screening rates over time as the phases of the disaster response progress.

CRedit authorship contribution statement

Lauren M. Maloney: Conceptualization; Study design; Data collection; Data analysis; Writing—Original draft preparation; Writing—Reviewing, Editing. **R. Jonathan Robitsek:** Conceptualization; Study design; Data collection; Data analysis; Writing—Reviewing, Editing. **Katherine McKenzie:** Conceptualization; Study design; Data collection; Writing—Reviewing, Editing. **Edder Peralta:** Data collection; Writing—Reviewing, Editing. **Julie Y. Valenzuela:** Conceptualization; Study design; Data collection; Writing—Reviewing, Editing.

Declaration of Competing Interest

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