

COVID-19 Personal Experiences and Posttraumatic Stress in National Guard Service Members

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ABSTRACT

Introduction:

The National Guard (NG) was an important component of the U.S. emergency response for the coronavirus (COVID-19) pandemic. Understanding how the personal COVID-19 experiences of NG members may be associated with post-traumatic stress symptoms (PTSS) and disorder (PTSD) can inform approaches to identifying and sustaining service members' mental health.

Materials and Methods:

We surveyed 3,993 NG service members (75% Army; 79% enlisted; 33% 30-39 years old; 81% male) during the pandemic. Forty-six percent of participants were activated in response to COVID-19. Surveys were administered between August and December 2020. We defined personal COVID-19 experiences as having COVID-19, a family member(s) having COVID-19, and/or having a close relationship with someone who died from COVID-19. In addition, using a 4-item form of the PTSD Checklist for DSM-5 (PCL-5), current posttraumatic stress symptoms (PTSS) and probable PTSD were assessed. Linear and logistic regression analyses were conducted to examine the relationship of COVID-19 experiences to PTSS and probable PTSD, respectively.

Results:

Approximately 32% of participants reported at least one personal COVID-19 experience. Univariable linear regression analyses indicated that NG service members who had a personal COVID-19 experience reported more PTSS than those with no personal experience ($B = 0.53$, $SE = 0.12$, $P < .001$). After adjusting for demographics and service-related characteristics, having a personal COVID-19 experience continued to be associated with higher PTSS ($B = 0.48$, $SE = 0.12$, $P < .001$). When examining the relationships of distinct types of personal COVID-19 experiences to PTSS and PTSD together in multivariable models, those who had a close relationship with someone who died from COVID-19 had higher levels of PTSS ($B = 1.31$, $SE = 0.22$, $P < .001$) and were almost 3 times more likely to have PTSD ($OR = 2.94$ [95%CI = 1.93-4.47], $P < .001$).

Conclusions:

Personal COVID-19 experiences are associated with increased PTSS and PTSD risk in NG service members. Such knowledge may aid in selection of service members for activation and identifying those in need of care.

National Guard (NG) service members are routinely activated as first responders during national and state emergencies. In this role, the NG served as an important component of

the United States response to the coronavirus (COVID-19) pandemic. The NG performs state as well as federal functions,¹ which is unique among the U.S. armed forces. NG service members regularly transition from their responsibilities in civilian life and work to military activation. During the pandemic, individuals were exposed to significant adversities/stressors, including social isolation, child care and financial challenges, and risk of job loss. Such stressors have been shown to be associated with posttraumatic stress symptoms (PTSS) and increased risk for posttraumatic stress disorder (PTSD).²⁻⁵ Importantly, for NG service members, stressors that they may carry in to service, including personal COVID-19 experiences (i.e., having COVID-19, having a family member with COVID-19, and/or having a close relationship with someone who died from COVID-19) meet the *Diagnostic and Statistical Manual of Mental Disorders* (5th Edition; DSM-5)⁶ Criterion A1 for PTSD diagnosis, as a reminder or experience of significant life threat, and can be directly associated with PTSS and PTSD. Determining the relationship

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between personal COVID-19 experiences and posttraumatic stress response among NG service members can aid disaster planners and leaders in identifying the toll of future disasters on the nation's first line of defense, the NG, develop strategies to minimize adverse mental health consequences, and promote well-being in the face of future threats.

Relationship of COVID-19 experiences to PTSD in health care workers

Much of our understanding of PTSD responses to COVID-19 experiences is informed by studies of health care workers. During the pandemic, these individuals were routinely exposed to patients infected with and dying from COVID-19⁷ and had increased risk of being infected themselves, with prevalence rates of PTSD symptoms in medics reaching 32% following their emergency response to the pandemic.⁸ Rates of PTSD were found to be higher among health care workers who were themselves infected during the pandemic as compared to those who worked with patients and were not infected,^{9,10} indicating the distinctly strong impact of personal COVID-19 experience.

The risk of exposure to and experience of COVID-19 has been shown to be stressful in many ways. Being infected by COVID-19 or developing long COVID (i.e., having symptoms lasting at least 12 weeks)¹¹ have been associated with PTSD in 10 to 38% of individuals,^{12–15} with PTSD often lasting months after infection. Experiencing COVID-19 in a family member or the loss of someone close as a result of COVID-19 have also been strongly associated with subsequent PTSD.^{14,16–18} In fact, health care workers express more concern about infecting others than having COVID-19 themselves.^{9,19} It is estimated that every COVID-19-related death in the United States has an extensive impact, with 9 individuals expected to grieve each loss.^{20,21} Response to COVID-19-related loss is often further exacerbated and prolonged by the unexpected nature of the loss, experience of multiple deaths and losses, and diminished support, social isolation, and the inability to attend the funeral, particularly in the early phase of the pandemic.^{17,18,20,22}

Personal COVID-19 experiences and PTSD in NG service members

Although previous studies, as noted above, have identified COVID-related loss as a risk factor for PTSD among health care workers in the civilian community, it is important to establish risk factors for the NG as well, given that the U.S. health system relies on the functioning of NG personnel during times of extreme and sudden emergency. Notably, most NG service members are not specifically trained for health care emergency work. Given that their military NG and civilian life experiences may not prepare them for responding to health emergencies, it is important to identify the degree to which their own experiences related to the pandemic may specifically increase risk for posttraumatic stress, to sustain their mental health and well-being.

The current study examines NG service members who served in a state identified by the Centers for Disease Control and Prevention²³ as an early epicenter of the pandemic, and assesses their personal COVID-19 experiences. Understanding the contribution of specific personal experiences to PTSD in this population can inform preparedness efforts that recognize stressors that NG service members carry with them into service, and protect the health of NG responders during and following subsequent epidemics, natural disasters, and other threats. Further, this understanding can extend previous findings to help determine whether NG service members have unique psychological responses to personal COVID-19 experiences, in comparison to civilian populations, such as health care workers, during the pandemic.

METHODS

Participants and Procedures

Online survey invitations were distributed by email to all NG service members in the state. A total of 3,993 Army and Air Force NG service members participated in the study between August and December 2020, with the majority of survey participation (75%) completed by mid-October. The analytic sample ($n = 3,221$) was based on those who responded to at least the Military Affiliation item (categorizing affiliation with the Army or Air Force), which received the highest number of responses across participants. Study respondents represented approximately 25% of the total state NG population (23% of the Army NG and 14% of the Air NG).

NG participants were predominantly Army NG (74.9%; $n = 2,414$) and enlisted (79.2%; $n = 2,543$), and almost half (46.0% $n = 1,478$) were activated in response to the pandemic (Table 1). The majority of participants were male (81.4%; $n = 2,605$), White (74.6%; $n = 1,906$), and approximately half were not married (50.5%; $n = 1,421$). The modal age category was the 30 to 39 year group (33.4%; $n = 944$).

Unit leaders informed NG service members of the opportunity to participate in the study via an email that included a link to the survey. Service members indicated agreement to participate by completing the online survey. Study participants were informed that the survey was voluntary, anonymous, and included items regarding the COVID-19 pandemic. Personally identifiable information was not collected; all transmitted and stored data were nonidentifiable. All procedures involving human subjects/patients were approved by the Institutional Review Board of the Uniformed Services University of the Health Sciences in Bethesda, Maryland.

Measures

Demographic and service-related characteristics

Demographic (current age [< 25 years, 25–29 years, 30–39 years, 40+ years], gender [male, female], race [non-White,

Table 1. Demographics and COVID-19 Experiences in National Guard (NG) Service Members

	COVID-19 NG service members	
	<i>N</i>	%
Demographics		
Gender		
Male	2,605	81.4
Female	596	18.6
Race		
White	1,906	74.6
Non-white	650	25.4
Marital status		
Not married	1,421	50.5
Married	1392	49.5
Age, years		
<25	501	17.7
25–29	534	18.9
30–39	944	33.4
40+	845	29.9
Service-related characteristics		
Military affiliation		
Army National Guard	2,414	74.9
Air National Guard	807	25.1
Rank		
Enlisted	2,543	79.2
Officer	668	20.8
COVID-19 activation		
No	1,735	54.0
Yes	1,478	46.0
Personal COVID-19 experiences		
Any personal experience		
No	1,860	67.1
Yes	884	31.9
Posttraumatic stress responses		
PTSD (Past month)		
No	2,517	90.3
Yes	269	9.7
Posttraumatic stress symptoms	1.59 (M)	2.85 (SD)
Total	3,993	100%

White], and marital status [not married, married]) and service-related characteristics (rank [enlisted, officer], military affiliation [Army, Air Force], and COVID-19 activation [no, yes]) were assessed.

Personal COVID-19 experiences

Three items assessed whether, during the pandemic, NG service members tested positive for COVID-19 themselves (COVID_Self; no/yes), had a family member who tested positive for COVID-19 (COVID_Family), or had a close relationship with anyone who died from COVID-19 (COVID_Close Relation Died). Items were treated as individual risk factors, and also combined to reflect any personal COVID-19 experience. In addition, types of personal COVID-19 experiences were assessed in different combinations: (1) COVID_Self and COVID_Family; (2) COVID_Self and COVID_Close

Relation Died; (3) COVID_Family and COVID_Close Relation Died; and (4) participant had all of the three identified COVID-19 experiences (Figure 1).

PTSD

A 4-item form of the PTSD Checklist for DSM-5 (PCL-5)²⁴ measured PTSS and probable PTSD diagnoses.²⁵ Items assessed the presence and severity of past-month DSM-5 PTSD symptoms. Response options for each item ranged from 0 (not at all) to 4 (extremely), with a possible total symptom score range of 0 to 16. For probable PTSD diagnosis, we adopted a conservative threshold of 6+, because past research has found it to accurately identify a higher proportion of cases (sensitivity = 0.982) with a lower false positive rate ([1-specificity] = 0.059) than the 5+ cut-off score.²⁵

Statistical Analysis

NG service members' sociodemographic and service-related characteristics, presence of any personal COVID-19 experiences and specific types of experiences, and posttraumatic stress responses (PTSS and PTSD) were examined using descriptive statistics. A series of univariable linear regression analyses then examined sociodemographic and service-related characteristics, and personal COVID-19 experiences (any [no/yes] and specific types of COVID-19 experiences [COVID_Self, COVID_Family, COVID_Close Relation Died]) as predictors of PTSS. A multivariable linear regression model that included all predictor variables together (i.e., socio-demographics, service-related characteristics, COVID-19 activation, any personal COVID-19 experiences [no/yes]) was then conducted. A final model examined the relationship of all of the specific types of personal COVID-19 experiences, adjusting for all covariates, to PTSS. An additional logistic regression was conducted to examine whether specific types of personal COVID-19 experiences were related to PTSD. Logistic regression coefficients were exponentiated to obtain odds-ratios (OR) and 95% confidence intervals (CI). Statistical analyses were conducted using SPSS software Version 29.0.2.0.²⁶

RESULTS

Among the NG service members in the total sample, 9.7% ($n = 269$) were identified as having PTSD in the past month (Table 1). The total PTSS score $M(SD)$ was 1.59(2.85), with a range of 0–16. Approximately 32% (31.9%; $n = 884$) of the NG service members reported a personal COVID-19 experience (Table 1; Figure 1). Among those who had a personal COVID-19 experience, the most frequently reported experiences were that a family member tested positive for COVID-19 (52.3%; $n = 462$) and both a family member tested positive and they had a close relationship with someone who died from COVID-19 (13.8%; $n = 122$). Further, among participants with a personal experience, the categories that were associated with the highest rates of PTSD included those who had all three COVID-19 personal experiences (27.6% with PTSD),

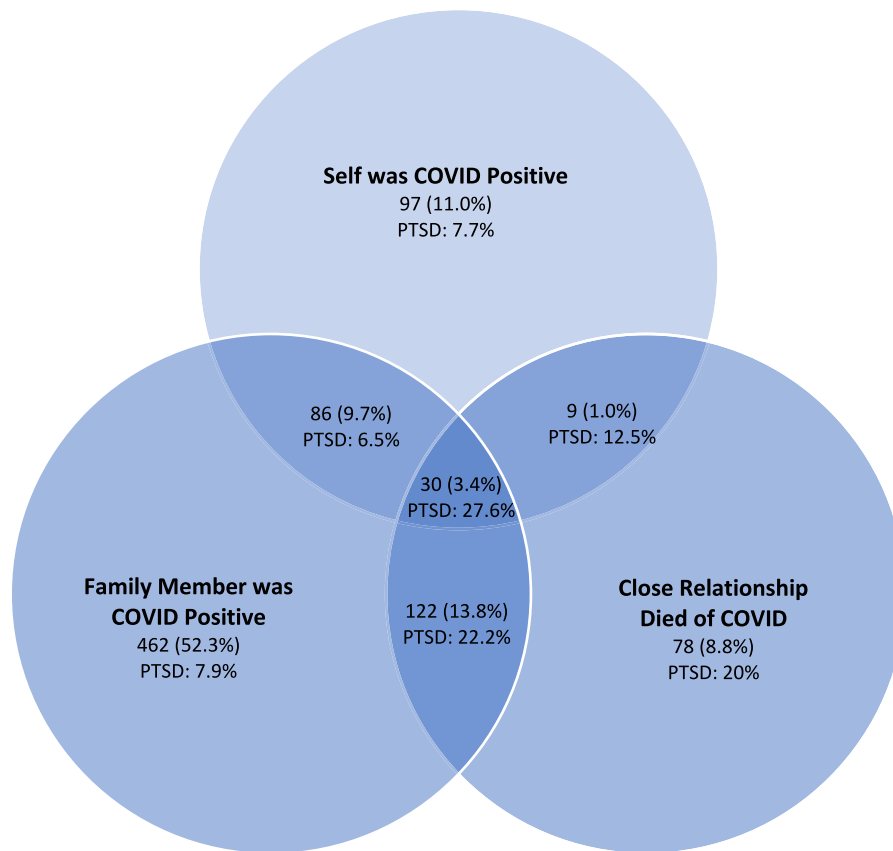


Figure 1. Types of COVID-19 personal experiences among National Guard service members and associated rates of posttraumatic stress disorder (includes only those who reported a COVID-19 experience; $n = 844$).

those with COVID_Family and COVID_Close Relation Died experiences (22.2%), and those in the COVID_Close Relation Died category (20%).

PTSD: Univariable and Multivariable Analyses

In univariable linear regression models predicting PTSS in the past month, female respondents ($B = 0.70$, $SE = 0.14$, $P \leq .001$) and those who had personal COVID-19 experience ($B = 0.53$, $SE = 0.12$, $P \leq .001$) reported higher levels of PTSS (Table 2). In a multivariable model, adjusting for demographics, service-related characteristics, and COVID-19 activation, any personal COVID-19 experience continued to be associated with PTSS ($B = 0.53$, $SE = 0.12$, $P \leq .001$). In order to further examine whether specific types of personal COVID-19 experiences may be related to PTSS, we conducted a final model that included all COVID-19 experiences (COVID_Self, COVID_Family, COVID_Close Relation Died). In this model, COVID_Close Relation Died was the only personal COVID-19 experience that was significantly associated with PTSS ($B = 1.31$, $SE = 0.22$, $P \leq .001$). A similar pattern was found when examining the association of specific types of COVID-19 experiences with PTSS (Table 3). Only NG service members with a COVID_Close

Relation Died personal experience were more likely to have PTSS ($OR = 2.94$, $95\%CI = 1.93-4.47$, $\chi^2 = 25.1$, $P \leq .001$).

DISCUSSION

The NG was an important component of the U.S. COVID-19 pandemic response. Understanding the extent to which individuals' personal COVID-19 experiences may contribute to their psychological response can help identify those who are at risk for PTSS, and inform policies to promote the health and support of responders. In this study, nearly 10% of NG service members had probable PTSS in the past month. One-third of participants experienced at least one personal COVID-19 experience. Among those who reported having all three types of personal experiences (i.e., participant had COVID-19, had a family member with COVID-19, and had a close relationship with someone who died from COVID-19), 28% had PTSS.

In the current study, of the three personal COVID-19 experiences assessed, two were associated with higher levels of PTSS and elevated risk of PTSS (i.e., having a family member with COVID-19 or having a close relationship with someone who died from COVID-19). Having COVID-19 oneself was not associated with PTSS nor PTSS. When all of the personal COVID-19 experiences were considered together, loss of a

Table 2. Personal COVID-19 Experiences and Posttraumatic Stress Symptoms in National Guard Service Members

Risk factors	PTSS ^a					
	Univariable		Multivariable 1		Multivariable 2	
	B	SE	B	SE	B	SE
Demographics ^b						
Age	-0.001	0.05	0.08	0.07	0.07	0.07
Gender	0.70***	0.14	0.60***	0.15	0.61***	0.15
Race	0.07	0.13	0.13	0.14	0.17	0.14
Marital status	-0.12	0.11	-0.20	0.14	-0.22	0.14
Service-related characteristics ^c						
Rank	-0.03	0.13	0.01	0.15	0.04	0.15
Military affiliation	0.08	0.12	0.11	0.15	0.06	0.15
COVID-19 activation	-0.18	0.11	-0.11	0.12	-0.11	0.12
Any personal COVID-19 experience ^d	0.53***	0.12	0.48***	0.12		
COVID_Self ^d	0.07	0.20			0.02	0.23
COVID_Family ^d	0.49***	0.13			0.27	0.14
COVID_Close relation died ^d	1.38***	0.19			1.31***	0.22

Univariable models: Age $n = 2,778$; Gender $n = 2,770$; Race $n = 2,522$; Marital status $n = 2,772$; Rank $n = 2,775$; Military affiliation $n = 2,783$; COVID-19 activation $n = 2,786$; Any personal COVID-19 experience $n = 2,598$; COVID_Self $n = 2,483$; COVID_Family $n = 2,581$; COVID_Close relation died $n = 2,776$; Multivariable model 1 $n = 2,328$; Multivariable model 2 $n = 2,293$.

^aTotal posttraumatic stress symptoms: Total brief PCL-5 score.

^bAge: 18–24 years = 1, 25–29 years = 2, 30–39 years = 3, 40+ years = 4; Gender: Male = 0, Female = 1; Race: Non-White = 0, White = 1; Marital status: Unmarried = 0, Married = 1.

^cRank: Enlisted = 0; Officer (includes Warrant Officer) = 1; Military affiliation: Air NG = 0; Army NG = 1.

^dAny personal COVID-19 experiences: 0 = No, 1 = Yes; COVID_Self: Participant tested positive for COVID-19; COVID_Family: Family member tested positive for COVID-19; COVID_Close Relation Died: Had close relationship with someone who died from COVID-19.

* $P \leq .05$, ** $P \leq .01$, *** $P \leq .001$.

close relation because of COVID-19 remained uniquely associated with PTSS and PTSD. The significant psychological impact of personal COVID-19 experiences is comparable to that previously observed among civilian populations, particularly health care workers. Traumatic loss, which may result from disaster exposure, such as a pandemic, and is typically sudden, unexpected, and often untimely, is the most frequently identified type of traumatic event worldwide.²⁷ Traumatic loss is also commonly associated with vulnerability to complicated and prolonged grief responses, which include PTSD.²⁸ Our findings are comparable to those of a previous study²⁹ that examined the impact of different types of traumatic experiences among service members being treated for PTSD. In that study, traumatic loss, in particular, was associated with higher levels of re-experiencing, guilt, and sadness than life threat to oneself, highlighting the especially potent and complex impact of traumatic loss in this population. Personal COVID-19 experiences in the current study, specifically loss of a loved one, may contribute or heighten the sensitivity to other pandemic-related adversities that NG service members face, adding to their psychological burden.

As noted above, having COVID-19 oneself was not associated with PTSD, either when examined alone or with other personal COVID-19 experiences. COVID-19 infection has been previously associated with increased risk of first mental health disorder diagnosis, and specifically anxiety disorders and PTSD, in an electronic health record study of 69.8 million

patients, with over 60,000 receiving a COVID-19 diagnosis.³⁰ However, the absence of a significant association of having COVID-19 oneself with PTSD among our sample of NG service members may be due in part to their roles as first responders, their unique characteristics and training, and previously serving as responders to other disasters. Given that health care workers have reported higher levels of concern about infecting others than being infected with COVID-19 themselves,^{9,19} this experience would benefit from closer examination in future studies that distinguish among groups that test positive for COVID-19.

Several limitations should be considered in the interpretation of the study findings. This study is cross-sectional and causal relationships cannot be determined. Although the current study focuses on NG service members, participants consisted of NG service members in one state, limiting generalization to other NG, military, and civilian populations. However, our analyses controlled for demographic characteristics, which allowed us to address any differences between our sample and that of the total state NG population. In addition, the higher proportion of males in this military sample may limit generalizability to wider non-military populations. Further, our sample was predominantly enlisted, which is a group that has been associated with increased risk of PTSD, among those exposed to potentially traumatic events, compared with officers.³¹ In the current study, being infected with COVID-19 is considered a stressor, given that it was conducted before vaccine access, which may increase risk

Table 3. Personal COVID-19 Experiences and Probable Posttraumatic Stress Disorder in National Guard Service Members

Risk factors	PTSD ^a							
	Univariable				Multivariable 1			
	OR	95% CI	χ^2		OR	95% CI	χ^2	
Demographics ^b								
Age	0.91	0.81–1.03	2.35		0.98	0.84–1.15	0.04	
Gender	1.67***	1.24–2.23	11.65		1.49*	1.07–2.07	5.53	
Race	1.06	0.77–1.45	0.13		1.16	0.83–1.63	0.78	
Marital status	0.84	0.65–1.08	1.89		0.82	0.59–1.13	1.48	
Service-related characteristics ^c								
Rank	0.78	0.56–1.08	2.23		0.80	0.55–1.17	1.32	
Military affiliation	1.04	0.78–1.39	0.07		1.01	0.71–1.43	0.002	
COVID-19 activation	0.87	0.67–1.12	1.26		0.88	0.65–1.18	0.75	
Any personal COVID-19 experience ^d	1.29	0.99–1.68	3.55		1.23	0.92–1.65	1.87	
COVID_Self ^d	0.99	0.62–1.58	0.002					
COVID_Family ^d	1.24	0.93–1.65	2.16					
COVID_Close relation died ^d	2.84***	2.03–3.97	37.06					

Univariable models: Age $n = 2,778$; Gender $n = 2,770$; Race $n = 2,770$; Gender $n = 2,778$; Rank $n = 2,772$; Marital status $n = 2,772$; Military affiliation $n = 2,783$; COVID-19 activation $n = 2,786$; Any personal COVID-19 experience $n = 2,598$; COVID_Self $n = 2,483$; COVID_Family $n = 2,581$; COVID_Close relation died $n = 2,776$; Multivariable model 1 $n = 2,328$; Multivariable model 2 $n = 2,293$.

^aPTSD: Total brief PCL-5 scores (range 0–16) dichotomized; 0 = 0–5; 1 = 6+.

^bAge: 18–24 years = 1, 25–29 years = 2, 30–39 years = 3, 40+ years = 4; Gender: Male = 0, Female = 1; Race: Non-White = 0, White = 1; Marital status: Unmarried = 0, Married = 1.

^cRank: Enlisted = 0; Officer (includes Warrant Officer) = 1; Military affiliation: Air NG = 0; Army NG = 1.

^dAny personal COVID-19 experiences: 0 = No, 1 = Yes; COVID_Self: Participant tested positive for COVID-19; COVID_Family: Family member tested positive for COVID-19; COVID_Close relation died: Had close relationship with someone who died from COVID-19.

* $P \leq .05$, ** $P \leq .01$, *** $P \leq .001$.

of severe illness and death. However, some individuals who contract COVID-19 and do not experience symptoms may perceive their experience as protective, as a result of increased natural immunity. Future studies would benefit from distinguishing individuals' experiences and the perceptions of threat and risk related to infection. In addition, although the current study did not assess the impact of treating patients with COVID-19, instead focusing on personal COVID-19 experiences, examining the distinct influence of this type of disaster work-related exposure among NG service members would be important to consider in future research.

CONCLUSIONS

Awareness of the impact of personal COVID-19 experiences among NG service members on posttraumatic stress symptoms and PTSD has important implications for military leadership and clinicians. Identifying those NG service members who may be at increased risk based on experiences that they carry in to their service, and the specific challenges associated with each, can help determine elements important for selecting service members for deployment and target those who may benefit from prevention efforts. This will help to support these first responders' ability to sustain their mental health and function during public health crises. Effective intervention may involve leadership decisions, such as limiting time that NG service members work in particular roles, including working with the dead and families of patients with COVID-19, which may exacerbate adverse responses to their own personal experiences.³² Elevated risk of behavioral health problems was found among NG service members who had less preparation for their mortuary affairs work and lower unit support during the pandemic,³³ highlighting the importance of leadership role modeling and promoting opportunities for routine check-ins and peer support programs. Before activation, prevention planning that includes bolstering mental health skills in individual service members, teammates, and leaders, and offering appropriate support, can directly benefit NG service members.

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CONFLICT OF INTEREST STATEMENT

None declared.

DATA AVAILABILITY

The data underlying this article cannot be shared publicly for the privacy of individuals who participated in the study. The data will be shared on reasonable request by the corresponding author.

INSTITUTIONAL REVIEW BOARD (HUMAN SUBJECTS)

This study was identified as a Public Health Surveillance Activity, as defined by 32 CFR 210.102(I)(2) and applicable DoD policy guidance, by the Uniformed Services University of the Health Sciences (USU) Institutional Review Board (IRB). As such, it was determined by the USU IRB that the protocol does not require IRB review.

INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE (IACUC)

Not applicable

INSTITUTIONAL CLEARANCE

Institutional clearance approved.

INDIVIDUAL AUTHOR CONTRIBUTION STATEMENT

H.B.H.M., C.S.F., J.C.M., and R.J.U. collected and analyzed the data and drafted the original manuscript. H.B.H.M., C.S.F., J.C.M., Q.M.B., and R.J.U. designed this research. H.B.H.M., C.S.F., A.B.A., J.C.M., D.R.R., Q.M.B., C.L.C., A.B., and R.J.U. reviewed and edited the manuscript. All authors read and approved the final manuscript.

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