


# Patterns of Potential Moral Injury in Post-9/11 Combat Veterans and COVID-19 Healthcare Workers



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**BACKGROUND:** Moral injury has primarily been studied in combat veterans but might also affect healthcare workers (HCWs) due to the COVID-19 pandemic.

**OBJECTIVE:** To compare patterns of potential moral injury (PMI) between post-9/11 military combat veterans and healthcare workers (HCWs) surveyed during the COVID-19 pandemic.

**DESIGN:** Cross-sectional surveys of veterans (2015–2019) and HCWs (2020–2021) in the USA.

**PARTICIPANTS:** 618 military veterans who were deployed to a combat zone after September 11, 2001, and 2099 HCWs working in healthcare during the COVID-19 pandemic.

**MAIN MEASURES:** Other-induced PMI (disturbed by others' immoral acts) and self-induced PMI (disturbed by having violated own morals) were the primary outcomes. Sociodemographic variables, combat/COVID-19 experience, depression, quality of life, and burnout were measured as correlates.

**KEY RESULTS:** 46.1% of post-9/11 veterans and 50.7% of HCWs endorsed other-induced PMI, whereas 24.1% of post-9/11 veterans and 18.2% of HCWs endorsed self-induced PMI. Different types of PMI were significantly associated with gender, race, enlisted vs. officer status, and post-battle traumatic experiences among veterans and with age, race, working in a high COVID-19-risk setting, and reported COVID-19 exposure among HCWs. Endorsing either type of PMI was associated with significantly higher depressive symptoms and worse quality of life in both samples and higher burnout among HCWs.

**CONCLUSIONS:** The potential for moral injury is relatively high among combat veterans and COVID-19 HCWs, with deleterious consequences for mental health and burnout. Demographic characteristics suggestive of less social empowerment may increase risk for moral injury. Longitudinal research among COVID-19 HCWs is needed. Moral injury prevention and intervention efforts for HCWs may benefit from consulting models used with veterans.

**KEY WORDS:** moral injury; COVID-19; veterans; healthcare workers; burnout.

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Moral injury has been defined as the “psychological, biological, spiritual, behavioral and social impact of perpetrating, failing to prevent, or bearing witness to acts that transgress deeply held moral beliefs and expectations.”<sup>1</sup> Since this definition was introduced in 2009, the subsequent decade of research focused almost exclusively on military veterans. Among military personnel, the killing of civilians or enemy combatants is frequently cited as an example of a potentially morally injurious experience,<sup>2–4</sup> though the range of phenomena that could be experienced as morally injurious is quite broad. Research with veterans has consistently found higher levels of moral injury to be related to greater psychiatric symptomatology on measures of posttraumatic stress disorder (PTSD), depression, alcohol and substance abuse, and suicidality.<sup>5–9</sup> Other research among veterans has demonstrated that the distinguishing features of moral injury (e.g., guilt, shame, feeling betrayed) are not just conceptually distinct from other psychiatric problems but are neurologically distinct from symptoms of PTSD.<sup>10</sup> With the onset of the COVID-19 pandemic, numerous observers have suggested that moral injury as observed within veterans might be operative among healthcare workers (HCWs).<sup>11–17</sup>

Moral injury was initially conceptualized as resulting from betrayal by an authority figure in a high-stakes situation.<sup>18,19</sup> This view emphasizes the other-induced nature of moral injury, while subsequent definitions have emphasized the potential for self-induced moral injury emanating from perceived individual transgressions.<sup>1,20</sup> In lived experience, other-induced and self-induced moral injury are frequently intertwined.<sup>19</sup> The dynamic interplay between perceiving oneself as a victim and/or perpetrator of moral wrongs illustrates the social, interpersonal, and interconnected nature of moral experiences.<sup>21</sup> It

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also highlights the significance of contextually determined social status (e.g., enlisted vs. officer status in a military context or physician vs. administrative staff in healthcare) as potentially relevant for moral injury development. While there are important differences between military and healthcare contexts, both combat and the COVID-19 pandemic have placed individuals in high-stakes situations with the potential for moral harm.

Throughout the COVID-19 pandemic, substantial mental health struggles have been noted in HCWs. A recent systematic review reported depression, anxiety, and PTSD prevalence of 22% each.<sup>22</sup> Burnout rates among HCWs have been reported above 50%.<sup>23,24</sup> Although the extent to which these challenges may be clinical manifestations of moral injury is not well understood, emerging research suggests that experiences of moral distress among HCWs may be relatively common. An April 2020 study of 114 Romanian HCWs found that nearly half reported high levels of exposure to potentially morally injurious events.<sup>25</sup> In another survey among HCWs at a Baltimore-based medical center ( $n = 219$ ) from March to April 2020, higher scores on a moral injury measure were significantly related to spending more time on an inpatient unit.<sup>26</sup> More recently, a March–April 2021 study of 1933 UK-based doctors found that 68% of those working with COVID-19 patients said the concept of moral injury resonated with their experiences during the pandemic.<sup>17,27</sup>

Though the construct of moral injury developed from research with military veterans and has only recently been applied to HCWs, the potential for moral challenges in healthcare is not new. The nursing literature especially has been attuned to “moral distress,”<sup>28,29</sup> finding higher levels to be associated with greater burnout, compassion fatigue, and a poorly perceived ethical climate.<sup>30–32</sup> One recent attempt at merging terminology proposes a continuum of moral stressors, ranging from highly common but modestly distressing “moral frustration” to less common but more distressing “moral distress” to quite uncommon and highly distressing “moral injury.”<sup>33</sup> The notion of a continuum is helpful, as firm operational boundaries are elusive and substantial overlap exists between categories of moral stressors. Thus, uniform questions about potential moral injury across different populations will help elucidate similarities and differences in prevalence, etiologies, and intervention possibilities. To date, no studies have compared a veteran sample and a sample of HCWs.

The objective of the present study was to examine patterns of potential moral injury (PMI) among post-9/11-era veterans and COVID-19 HCWs. We sought to evaluate whether socio-demographic characteristics and military-/healthcare-related experiences increase risk for PMI, as well as examine the extent to which PMI in these samples is related to depression and quality of life. Given the origination of moral injury from research with military veterans and the parallels suggested with HCWs during COVID-19, our intention was to elucidate potential similarities and differences with respect to moral injury in these two populations.

## METHODS

### Design

Survey data came from two studies: the Post-Deployment Mental Health Moral Injury (PDMH-MI) study<sup>5,34</sup> and the Healthcare Worker Exposure Response and Outcomes (HERO) study.<sup>35</sup> The PDMH-MI study is derived from a data repository collected by the VA Mid-Atlantic Mental Illness Research, Education, and Clinical Center (MIRECC). This multi-site study examines post-deployment mental health in US veterans and military personnel who have served since September 11, 2001.<sup>34</sup> The repository consists of over 3600 participants, 94% of whom consented to recruitment for follow-up studies and to allow previously collected data to be connected to new studies. For the present PDMH-MI study, repository data were used to determine study eligibility, with having served in a war/operation zone as an inclusion criterion and schizophrenia or other psychotic disorder as an exclusion criterion. Participants were recruited between April 2015 and February 2019. Letters were sent to 2156 eligible participants, followed by phone conversations with study staff. Of the 1029 who were reached by phone, 878 consented, 875 surveys were sent (3 were excluded after consent), and 628 surveys were returned (72% response rate).

The Healthcare Worker Exposure Response and Outcomes (HERO) Registry was launched in April 2020 to characterize COVID-19 risk factors and outcomes among US HCWs and to support enrollment into clinical trials. The HERO Registry leverages PCORnet®, the National Patient-Centered Clinical Research Network. The HERO Registry is administered by the Duke Clinical Research Institute. Participants enroll using a secure online portal and complete periodic electronic questionnaires capturing data including demographics, medical history, employment characteristics, COVID testing/diagnosis, and quality of life. The registry comprises participants from all 50 states and recruitment is ongoing. Given the broad population definition and limited inclusion/exclusion criteria, the registry supports enrollment of a diverse population and promotes greater generalizability of results.

### Participants

Of the total 625 participants from the PDMH-MI study, data are included for the 618 who answered both moral injury items. The HERO Registry participants included  $n = 2099$  who completed an online survey about moral injury from March 11 to 19, 2021.

**Personal Characteristics.** We included demographic variables that could be compared across groups and that were thought to potentially relate to experiencing moral injury. All demographic data were self-reported. Age (based on date of birth) and gender were similarly determined in both

studies. For race, Hispanic ethnicity was reported separately from race in the PDMH-MI study and was reported as part of race for the HERO study.

In the PDMH-MI study, we used participants' self-reported highest rank during military service to determine officer vs. enlisted service member status. Number of total deployments was collected, including location for post-9/11 deployments. Pre-deployment life stressors (e.g., death of loved one, divorce, witnessing or experiencing violence), exposure to combat, and post-battle experiences (e.g., seeing dead bodies, caring for injured or dying people, handling human remains) were measured using subscales from the Deployment Risk and Resilience Inventory-2 (DRRI-2), with the subscales comprised of 20, 15, and 13 items respectively.<sup>36</sup>

In the HERO study, diagnosing and treating providers included physicians, nurse practitioners/physician assistants, and others. HCWs were categorized into three groups according to COVID-19 contact risk: high risk (primary work setting in the intensive care unit, emergency department, COVID-19 unit/ward or testing unit, respiratory services, emergency medical services, post-critical care, and anesthesia); medium risk (laboratory, pharmacy, skilled nursing facility, outpatient clinic, rural health clinic, speech/language pathology, dietary/food services, and environmental services); and low risk (all other facilities). A modified Charlson index was calculated as the sum of comorbidities, with more severe conditions assigned greater scores (full index details in the appendix). Participants self-reported known COVID-19 exposures, testing, and diagnoses with corresponding dates on each survey.

## Outcome Measures

**Potential Moral Injury.** We refer to "potential moral injury" (PMI) as the primary outcome in the present study due to the non-diagnostic nature of moral injury, the lack of agreed-upon thresholds for having it, and the nature of the moral injury items used. PMI was assessed with two items from the Moral Injury Events Scale (MIES)<sup>37</sup>: other-induced PMI by the item "I am troubled by having witnessed other's immoral acts" and self-induced PMI by the item "I am troubled by having acted in ways that violated my own morals and values." Agreement was rated on a 1–6 Likert scale. These items were selected because they represent two major etiological understandings of moral injury (other-induced and self-induced), assess ongoing distress related to a perceived moral violation (rather than solely the perception of a moral violation), and are widely used in other moral injury research. Participants in the PDMH-MI study completed these items as part of the full MIES scale and with the instruction to rate agreement with respect to their military experiences. Participants in the HERO study completed the two above-noted items with the instruction to rate agreement in the context of their experiences as a HCW during the COVID-19 pandemic.

**Depression.** The PDMH-MI study assessed depression with the Beck Depression Inventory-2 (BDI-2),<sup>38</sup> a 21-item self-report measure of depressive symptom severity that has demonstrated excellent test-retest reliability and high criterion validity.<sup>39</sup> The HERO study assessed depression with four items from the PROMIS Emotional Distress-Depression scale.<sup>40</sup> This measure has previously demonstrated good internal reliability and convergent validity.<sup>41</sup>

**Quality of Life.** The PDMH-MI study assessed quality of life with the 36-item Short Form Survey (SF-36).<sup>42</sup> The SF-36 has demonstrated high internal consistency, reliability, construct validity, and criterion validity.<sup>43,44</sup> The HERO study assessed quality of life with ten items from the PROMIS Global Health scale.<sup>45</sup> This measure evaluates global, social, mental, and physical health.

**Burnout.** Burnout was measured only in the HERO study using a single-item, self-defined measure of burnout with a score ranging from 0 (no burnout) to 5 (completely burned out).<sup>46,47</sup> This item has been found to have low response burden and good convergent validity while potentially underestimating prevalence.<sup>48</sup>

## Statistical Analysis

For analyses, scores on the two MIES items were dichotomized to indicate either absence (strongly disagree, moderately disagree, slightly disagree) or presence (strongly agree, moderately agree, slightly agree) of PMI. Logistic regressions were conducted separately in each sample to evaluate which variables significantly contributed to variance in scores on the PMI items. For the veteran sample regressions, continuous predictor variables included age, number of deployments, prior life stressors, combat experiences, and post-battle experiences. Categorical variables included gender (female/male), race (non-White/non-Hispanic White), and highest rank (enlisted/officer). For the HCW sample regressions, continuous variables included age and comorbidities. Categorical variables included gender (female/male or other), race (non-White/non-Hispanic White), type of HCW (diagnosing/non-diagnosing), healthcare setting contact risk (high/medium/low), reported COVID-19 exposure (yes/no), and COVID-19 positive from tests or diagnosis (yes/no). Independent-sample *t* tests were conducted to examine differences on measures of depression and quality of life depending on whether participants endorsed either PMI type. All analyses for the PDMH-MI study were conducted using IBM SPSS Statistics for Windows, Version 27.0.<sup>49</sup> All analyses for the HERO study were conducted using SAS version 9.4 (SAS Institute, Inc., Cary, NC).<sup>50</sup> PROMIS T-scores were calculated using the estimated IRT parameters Firestar program in R version 4.0.5 (R Core Team, Vienna, Austria).<sup>51</sup>



## Patient and Public Involvement

A research consultation panel consisting of military veterans and VA patients was twice consulted on the topic of moral injury as part of the PDMH-MI study implementation and interpretation of findings. Numerous HCWs were involved in the development of the HERO study, particularly regarding inclusion of moral injury items. In neither study were participants directly involved in setting the research question or outcome measures, nor were they involved in developing plans for recruitment, design, or writing up results.

## RESULTS

Table 1 displays demographic characteristics of each sample. Mean age was similar (veteran sample: 47.3 years; HCWs: 44.5 years). The veteran sample had a lower proportion of female participants (16.5% vs. 77.0% in the HCW sample) and a higher proportion of non-White participants (49.3% vs. 14.5%). During their military service, most of the veteran sample was enlisted (84.6%), the average number of deployments was

1.95, and scores on measures of pre-deployment life stressors ( $M = 3.67$ ), combat exposure ( $M = 30.0$ ), and post-battle experiences ( $M = 29.5$ ) were slightly higher but comparable to those of post-9/11 veterans in the initial validation study of these DRRI-2 measures.<sup>52</sup> At the time they were surveyed, 42.0% of HCWs were diagnosing providers, 22.2% worked in high-risk settings, 45.3% reported exposure to COVID-19, and 6.1% reported being a positive test or diagnosis of COVID-19.

Among the veteran sample, 46.1% endorsed experiencing other-induced PMI and 24.1% endorsed experiencing self-induced PMI during their military service. For the HCWs, 50.7% endorsed experiencing other-induced PMI and 18.2% reported self-induced PMI in the context of their work during the COVID-19 pandemic.

Table 2 displays results from the two logistic regressions examining factors associated with PMI among veterans. Female gender, non-White race, enlisted status, and more post-battle experiences were significantly associated with other-induced PMI. Only non-White race and post-battle experiences were significantly associated with self-induced PMI. Compared to veterans who did not endorse other-induced PMI,

**Table 1 Demographic Characteristics of Two Samples**

Characteristic	Post-9/11 veterans ( $n = 618$ )		COVID-19 HCWs ( $n = 2099$ )	
	Category	<i>M (SD) or n (%)</i>	Category	<i>M (SD) or n (%)</i>
Age		<i>47.3 (10.7)</i>		<i>44.5 (11.9)</i>
	26–29	14 (2.3)	18–29	217 (10.3)
	30–49	319 (51.6)	30–49	1137 (54.2)
	50–64	251 (40.6)	50–64	654 (31.2)
	65+	34 (5.5)	65+	91 (4.3)
Gender	Female	102 (16.5)	Female	1616 (77.0)
	Male	516 (83.5)	Male	473 (22.5)
Race/ethnicity	Non-White (incl. Hispanic)	304 (49.3)	Non-White (incl. Hispanic)	304 (14.5)
	Black	251 (40.6)	Black	58 (2.8)
	Asian/Pacific	10 (1.6)	Asian/Pacific	96 (4.6)
	Other/multiple	22 (3.6)	Other/mixed/PNTA	55 (2.6)
	Hispanic (any race)	30 (4.9)	Hispanic/Latino (any race)	95 (4.5)
	White (non-Hispanic)	313 (50.7)	White (non-Hispanic)	1795 (85.5)
Highest rank/HCW type	Enlisted	523 (84.6)	Diagnosing HCW	878 (42.0)
	E-3	9 (1.4)	Physician	418 (20.0)
	E-4 to E-6	367 (58.8)	PA/NP	153 (7.3)
	E-7 to E-9	153 (24.5)	Other dx HCW	307 (14.7)
	Officer	95 (15.4)	Non-diagnosing HCW	1213 (58.0)
	W-1 to W-5	16 (2.6)	Nurse	551 (26.4)
	O-2 to O-4	44 (7.0)	Paramedic/EMT	77 (3.7)
	O-5 to O-7	36 (5.8)	Technologist/support	55 (2.6)
			Support/admin	205 (9.8)
			Other	325 (15.5)
No. and location of post-9/11 deployments/healthcare setting	# of deployments	<i>1.95 (1.34)</i>	High-risk setting	466 (22.2)
	Afghanistan	161 (25.9)	Medium-risk setting	150 (7.15)
	Iraq	432 (69.1)	Low-risk setting	1483 (70.7)
	Kuwait	198 (31.7)		
Preexisting factors	Pre-deployment life stressors	<i>3.67 (3.21)</i>	Comorbidities index	<i>0.68 (1.65)</i>
	Exposure to combat/COVID-19	<i>30.0 (15.6)</i>	Report COVID-19 expose	951 (45.3)
	Post-battle experiences	<i>29.5 (14.8)</i>	Positive for COVID-19	129 (6.1)

"*M (SD)*" in original submission was italicized as a heading, indicating that corresponding italicized numbers are means and standard deviations (i.e., for age, # of deployments, pre-deployment life stressors, comorbidities index, combat experiences, and post-battle experiences)

All other non-italicized numbers correspond to the originally nonitalicized "n (%)" heading

Other gender includes PTNA, transgender, gender expansive, and not listed. Valid percentages reported, with missing values for categories ranging from 0 to 8

PTNA prefer not to answer

**Table 2 Factors Associated with Potential Moral Injury (PMI) Among Post-9/11 Veterans**

Variable	Other-induced PMI			Self-induced PMI		
	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>
Age	1.01	0.99–1.02	.442	0.99	0.97–1.01	.238
Gender (female)	1.72	1.08–2.75	.023*	0.80	0.46–1.39	.431
Race (non-White)	1.61	1.14–2.28	.006*	1.61	1.09–2.39	.018*
Rank (enlisted)	1.77	1.06–2.95	.029*	1.58	0.84–2.99	.160
Number of deployments	0.94	0.83–1.08	.389	1.00	0.86–1.16	.998
Pre-deployment life stressors	1.05	0.99–1.11	.097	1.06	0.99–1.12	.082
Combat experiences	1.00	0.98–1.01	.703	0.99	0.97–1.01	.307
Post-battle experiences	1.03	1.01–1.05	.001*	1.02	1.00–1.05	.020*

\*Indicate significance at *p* < .05

veterans who did endorse it had significantly higher levels of depression (mean score = 22.34 vs. 13.61, *p* < .001) and lower self-reported quality of life (*M* = 46.70 vs. 59.98, *p* < .001). Similarly, compared with veterans who did not endorse self-induced PMI, those who did had significantly higher levels of depression (*M* = 24.55 vs. 15.44, *p* < .001) and lower self-reported quality of life (*M* = 45.71 vs. 55.73, *p* < .001).

Table 3 displays results from the two logistic regressions examining factors associated with PMI among HCWs. Other-induced PMI was significantly related to younger age and reported COVID-19 exposure. Self-induced PMI was significantly related to younger age, non-White race, working in a high-risk setting, and reported COVID-19 exposure. Compared with HCWs who did not endorse other-induced PMI, those who did had higher levels of depression (*M* = 54.43 vs. 50.67, *p* < 0.001) and lower quality of life (*M* = 3.98 vs. 4.16, *p* < 0.001). Similarly, compared with HCWs who did not endorse self-induced PMI, those who did had significantly higher levels of depression (*M* = 55.67 vs. 51.75, *p* < 0.001) and lower quality of life (*M* = 3.88 vs. 4.12, *p* < 0.001). Burnout was significantly higher among HCWs who endorsed other-induced (*M* = 2.65 vs. 2.28, *p* < .001) or self-induced PMI (*M* = 2.77 vs. 2.39, *p* < .001).

**DISCUSSION**

This is the first study to compare rates and patterns of PMI between veterans and HCWs. The overall prevalence rates of PMI were similar across samples, with veterans endorsing

other-induced PMI slightly less often than HCWs and self-induced PMI slightly more often. Other-induced PMI was related to female gender, non-White race, enlisted status, and more post-battle traumatic experiences within the post-9/11 veteran sample, and in the HCW sample was related to younger age and reported COVID-19 exposure. Self-induced PMI was related only to post-battle traumatic experiences in the post-9/11 veteran sample. In the HCW sample, it was related to younger age, non-White race, working in a high-risk setting, and reported COVID-19 exposure. In both samples, participants endorsing either type of PMI self-reported significantly higher levels of depression, lower quality of life, and, among HCWs, higher levels of burnout. The use of different outcome measures for depression and quality of life in the two samples prevents direct comparison of effect sizes, but generally, the differences between those with and without PMI appeared more pronounced for veterans than for HCWs.

Previous research has assessed moral injury with different measures, complicating direct comparisons of prevalence. Even so, experiences of PMI appear to be common in both veterans and HCWs. Numerous prior studies with veterans have reported on the same moral injury items as the current study.<sup>9,53–55</sup> Compared to the veteran samples in those studies, veterans in the present study were 1.5–2 times as likely to endorse other-induced and self-induced PMI. This may be partially accounted for by the present study’s substantially higher proportions of female and non-White veterans—characteristics that were found in the current study to be related to higher rates of PMI.

**Table 3 Factors Associated with Potential Moral Injury (PMI) Among HCWs**

Variable	Other-induced PMI			Self-induced PMI		
	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>
Age	0.98	0.97–0.99	< .001*	0.98	0.97–0.99	< .001*
Gender (female)	1.08	0.88–1.34	.457	0.95	0.72–1.25	.700
Race (non-White)	1.18	0.92–1.52	.185	1.51	1.12–2.03	.006*
HCW type (diagnosing provider)	0.92	0.77–1.10	.343	0.80	0.64–1.02	.068
Healthcare setting contact risk (high, medium, low)	0.97	0.87–1.08	.613	1.17	1.02–1.33	.022*
Comorbidities index	1.03	0.98–1.09	.243	0.98	0.91–1.06	.575
Reported COVID-19 exposure	1.54	1.28–1.85	< .001*	1.34	1.05–1.69	.017*
COVID-19 positive from tests or dx	1.04	0.71–1.52	.834	0.78	0.48–1.26	.310

\*Indicate significance at *p* < .05

HCWs in the present study also had higher rates of PMI compared to prior research with veterans, especially other-induced PMI. HCWs were nearly three times more likely to report other-induced PMI as self-induced PMI. Veterans also are more likely to endorse other-induced than self-induced PMI, in both the present study and prior research, but not to as pronounced a magnitude. This may be attributable to HCWs feeling betrayed by members of society, government, and/or healthcare colleagues/leaders, observing patient care practices interpreted as substandard, and perceiving that persons internal or external to healthcare systems are behaving individualistically instead of pro-socially in a time of crisis.

Findings from the present study indicate the significance of social power and authority for moral experiences, particularly experiences of betrayal. In both the veteran and HCW samples, there were indications that experiencing moral injury may be related to less social empowerment (e.g., female gender, non-White race, enlisted rank, younger age). These findings suggest the importance of continuing to attend to betrayal-based moral injury and associated implications for leadership, as embodied in early work on moral injury.<sup>18,19,56</sup> Additionally, it is important to understand the extent to which these demographic characteristics function as independent preexisting risk factors for moral injury versus as intertwined elements of moral injury experiences. Meta-analyses of PTSD risk factors have demonstrated that demographic characteristics are risk factors for developing PTSD but that factors operating during a traumatic experience are stronger predictors of future symptomatology.<sup>57–59</sup>

Consistent with prior research,<sup>5–9</sup> the present study found that both other-induced and self-induced PMI were related to higher levels of psychological distress, both for veterans and HCWs. Additionally, the higher burnout rates among HCWs with PMI not only suggest an important relationship between these constructs but also invite consideration of interventions. Others have noted that burnout is often conceived as a problem residing within the individual, whereas moral injury involves a broader appreciation of social and contextual factors that facilitate it.<sup>60</sup> The elevated rates of distress among HCWs with PMI indicate that interventions targeting HCWs may be merited—and could be adapted from emerging interventions for veterans<sup>4</sup>—while broader efforts that address the underlying social, contextual, and systemic issues potentially facilitating moral injury also deserve attention.

Among limitations of this study is the current lack of a threshold for moral injury, which is one reason why we refer to *potential* moral injury (PMI). The PMI prevalence rates reported in this study reflect endorsement of slight to strong agreement on two moral injury items; thus, the rates likely overestimate the proportion of veterans and HCWs who might be experiencing functionally impairing levels of moral injury. More robust measurement is desirable, as is determining the degree to which current measures of moral injury are appropriate for adaptation among non-military/veteran samples. Potential differences in the understanding and lived

experience of moral injury were not captured in the present study due to utilization of established quantitative measures of the construct. Future research should use mixed-method approaches to understand the nuances of moral injury across diverse samples. Longitudinal follow-up is needed for HCWs affected by COVID-19 to examine the persistence of moral injury over time. The samples used in this study are somewhat different than the general population of US veterans and HCWs. Both samples drew heavily from the southeastern USA, African American and female participants were over-represented in the veteran sample, and White and female participants were overrepresented in the HCW sample. The veteran sample relied on recall of past events, introducing potential recall bias. Finally, the concept of infection risk has changed throughout the pandemic, calling into question the accuracy of the risk stratification categories used. Despite factors that contributed to variability, the risk categorization employed detected a useful signal to be examined further in times and places with less variability.

While the construct of moral injury was developed based on work with combat veterans, it has applicability for other populations, including HCWs affected by the COVID-19 pandemic. There are many differences between military conflicts and working in healthcare during a pandemic, yet both contexts have clearly presented many individuals with morally injurious experiences, which in turn are related to substantial psychological distress. Further research is needed to better understand the persistence of moral injury among HCWs as well as to evaluate approaches to prevention and intervention. Intervention efforts targeting veterans/military personnel may be instructive in attending to the needs of HCWs in the aftermath of the COVID-19 pandemic.

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**Declarations:**

**Conflict of Interest:** The authors declare that they do not have a conflict of interest.

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