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Associations between psychosocial stressors at work and moral injury in frontline healthcare workers and leaders facing the COVID-19 pandemic in Quebec, Canada: A cross-sectional study

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ARTICLE INFO

Keywords:

Moral injury
Psychosocial stressors at work
Healthcare workers
Mental health
COVID-19 pandemic

ABSTRACT

Healthcare workers (HCWs) on the frontline of the COVID-19 pandemic exhibit a high prevalence of depression and psychological distress. Moral injury (MI) can lead to such mental health problems. MI occurs when perpetrating, failing to prevent, or bearing witness to acts that transgress deeply held moral beliefs and expectations. Since the start of the pandemic, psychosocial stressors at work (PSWs) might have been exacerbated, which might in turn have led to an increased risk of MI in HCWs. However, research into the associations between PSWs and MI is lacking. Considering these stressors are frequent and most of them are modifiable occupational risk factors, they may constitute promising prevention targets. This study aims to evaluate the associations between a set of PSWs and MI in HCWs during the third wave of the COVID-19 pandemic in Quebec, Canada. Furthermore, our study aims to explore potential differences between urban and non-urban regions. The sample of this study consisted of 572 HCWs and leaders from the Quebec province. Prevalence ratios (PR) of MI and their 95% confidence intervals (CI) were modelled using robust Poisson regressions. Several covariates were considered, including age, sex, gender, socio-economic indicators, and lifestyle factors. Results indicated HCWs exposed to PSWs were 2.22–5.58 times more likely to experience MI. Low ethical culture had the strongest association (PR: 5.58, 95% CI: 1.34–23.27), followed by low reward (PR: 4.43, 95% CI: 2.14–9.16) and high emotional demands (PR: 4.32, 95% CI: 1.89–9.88). Identifying predictors of MI could contribute to the reduction of mental health problems and the implementation of targeted interventions in urban and non-urban areas.

1. Background

Several studies have demonstrated alarming increases in mental health problems among healthcare workers (HCWs) during the COVID-19 pandemic (Asaoka et al., 2020; Batra et al., 2020; Bell and Wade, 2021; Carmassi et al., 2020; Chou et al., 2020; de Pablo et al., 2020; Luo et al., 2020; Pappa et al., 2020). Moral injury (MI) was reported as a contributor to these increases (Williamson et al., 2021). The current

COVID-19 crisis has created excessive demands upon the healthcare system and specifically upon HCWs (Shreffler et al., 2020). As the pandemic waves unfolded, health priorities, care provision, procedures, and policies rapidly changed, and resources available to HCWs tended to decrease. Evidence from the front-line of the COVID-19 pandemic showed that HCWs have been suffering extreme psychological, cognitive, and emotional responses, including guilt and shame, which placed them at increased risk of MI (Talbot and Dean, 2018). MI arises from

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events that contradict individuals' personal moral beliefs, causing dissonance and inner conflict (Brett T. Litz et al., 2009). Shay (2014) stated that MI occurs from a betrayal of what is right, either by someone who holds a position of authority (one's leader or trusted authority) or by oneself in a high-stakes situation. Exposure to morally injurious events can be self- or other-oriented. Self-oriented MI occurs when the individual perpetrates the transgression themselves, while other-oriented MI occurs when the individual witnesses or hears about someone else's transgression (Currier et al., 2018; Schorr et al., 2018). MI has profound existential, spiritual, psychological, and social manifestations, which can lead to the disruption of one's core moral framework and beliefs. MI can also change how one views oneself, others, and the world (Jinkerson, 2016; Molendijk, 2018b). Molendijk (2018) refers to MI as a socially shaped phenomenon, and suggests public perception plays an important role in one's experience of MI (Molendijk, 2018a).

Although literature predominantly focuses on MI in military service members and veterans (Brett T. Litz et al., 2009), this concept also applies to broader occupational contexts, including HCWs (Čartolovni et al., 2021; Hall et al., 2022; Kröger, 2020; Stovall et al., 2020). One study reported that the severity of MI scores among HCWs was similar to the severity of scores measured in military members exposed to 7 months of deployment in warzones (Hines et al., 2020). Furthermore, the prevalence of MI was as high as 41–50% among HCWs in the COVID-19 pandemic (Maftei and Holman, 2021; Wang et al., 2022). MI has been separated from moral distress, which has been discussed in the nursing literature as a growing concern among HCWs (Deschenes et al., 2021; Epstein et al., 2019; Giannetta et al., 2020; Morley et al., 2021; Whitehead et al., 2015). Moral distress refers to psychological distress arising from the feeling of doing something ethically wrong, while simultaneously having little power to change the situation. Moral injuries, however, are individual manifestations, such as moral emotions (e.g., shame, guilt, anger, disgust) and cognitions (e.g., self- or other condemnation) (Currier et al., 2018; Drescher et al., 2011; Jamieson et al., 2020; Brett T Litz and Kerig, 2019), resulting from a prolonged distress (Ducharlet et al., 2021; Falcó-Pegueroles et al., 2021; Harper et al., 2020; J. Huang et al., 2020; Khan et al., 2021; Litam and Balkin, 2021; Marten et al., 2021; Rushton et al., 2020). Among HCWs, MI has been linked to low work satisfaction, intention to quit one's profession, burnout, anxiety, depression, post-traumatic stress disorder (PTSD), and even suicidal ideation (Čartolovni et al., 2021; Lamb et al., 2021; Nazarov et al., 2018; Williams et al., 2020).

The World Health Organization (WHO) and public health authorities have stated that hospital employees working on the frontline have faced unprecedented challenges that could influence their mental health and psychosocial well-being (World Health Organization, 2020). Prospective epidemiological studies demonstrated that working conditions called psychosocial stressors at work (PSWs) increase the risk of developing mental health problems by 50%–80% (Aronsson et al., 2017; Bonde, 2008; Madsen et al., 2017; Theorell et al., 2015). The four most documented PSWs are high psychological demands (i.e., workload and conflicting demands), low control, low social support, and low rewards (J. Johnson and Hall, 1988; Karasek Jr, 1979; Siegrist et al., 1996). PSWs are generally defined by two validated theoretical models; the demand-control-support model (J. V. Johnson et al., 1989; Karasek Jr, 1979) and the effort-reward imbalance model (Siegrist et al., 1996). Combinations of these stressors have been shown to have a more deleterious adverse effect on mental health when compared to separate exposures (Gilbert-Ouimet et al., 2018; J. V. Johnson et al., 1989; Karasek Jr, 1979; Siegrist et al., 1996). A few studies suggested an adverse association between these stressors (high workload (Choudhary et al., 2022; Kreh et al., 2021; Williamson et al., 2020), lack of support (Ashwal-Malka et al., 2022; Ferrajão and Oliveira, 2014), low reward (French et al., 2022)) and MI. However, more evidence is needed, as most studies cited did not measure PSWs using the recommended validated tools.

Given the severity and complexity of the pandemic, emergent work-

related stressors might have been exacerbated and also be linked to MI, such as ethical culture and emotional demands. Ethical culture has been defined as a set of "experiences, assumptions, and expectations of managers and employees relating to how an organization encourages them to behave ethically" (Kaptein, 2008). Ethical culture can involve the resolution of ethical issues by management, the reprimand of unethical behaviors and the absence of pressure to act in a way that offends one's professional conscience (Manon Truchon, 2019). Ethical culture might be a key tenet in the prevention of MI, as it was associated with reduced misconduct, increased willingness to report misbehavior (Cabana and Kaptein, 2019), and an improvement in employees' health (Huhtala et al., 2011; Kangas et al., 2017; Newman et al., 2017; Manon Truchon, 2019). Emotional demands at work refer to sustained emotional efforts from employees (Vegchel et al., 2004; Zapf, 2002). Healthcare professionals are frequently exposed to emotionally demanding situations while treating and caring for patients as well as their relatives, especially in the context of a pandemic (Rose et al., 2021), which may have placed them at increased risk of MI. An important contribution of this study is the evaluation of these emerging stressors. To our knowledge, there has been no study assessing simultaneously all the PSWs (most documented and emerging) and their associations with MI.

Since there are potential differences between urban and non-urban settings regarding healthcare and social services, PSWs perceived by HCWs in urban and non-urban regions leading to MI might be different. The COVID-19 pandemic has disproportionately affected certain regions. Despite considerable global attention to the impacts of the COVID-19 pandemic on non-metropolitan settings, these areas were often not top priorities in research. However, disparities were observed between urban and non-urban areas in terms of sociocultural, economic and environmental factors, as well as health care capacities (Liu et al., 2021). The lack of healthcare resources and facilities (e.g., hospital closures, and shortages of equipment and specialized physicians) would have led to outbreaks hard to tackle and higher mortality rates in non-urban areas, (Q. Huang et al., 2021; Mueller et al., 2021).

Considering PSWs are frequent, modifiable through workplace interventions, and may improve the prevention of MI, evidence on the most documented and emergent PSWs is needed. The principal objective of this cross-sectional study is to evaluate the associations between a set of modifiable PSWs and MI in HCWs during the third wave of the COVID-19 pandemic in Quebec, Canada (Mid-February 2021–June 2021 (Wu et al., 2021)) and document these associations to develop interventions. This study also aims to explore potential differences between urban and non-urban regions. Our hypotheses are: i) PSWs will be associated with MI and ii) the prevalence of some PSWs, and their associations with MI, might differ across regions.

2. Methods

2.1. Study design and population

A cross-sectional, correlational study design was used in this study. This study focuses on HCWs (physicians, nurses, orderlies, respiratory therapists, dental centers and ambulance services, etc.) as well as leaders (head nurses, managers) of hospitals and long-term care centers treating patients with COVID-19. The required sample size was predetermined to ensure a statistical power of 80% to detect at least moderate correlations (Suresh and Chandrashekhara, 2012), comparable to those observed in previous studies on PSWs and mental health problems (Aronsson et al., 2017; Madsen et al., 2017). Our sample consisted of 572 HCWs and leaders from urban (Quebec City, Montreal and Laval) and non-urban regions (7 regions, located away from large urban centers) of the Quebec province in Canada. There were no specific criteria to include a type of facility over another, aside from being located in the province of Quebec.

2.2. Eligibility criteria

Inclusion criteria included: 1) being a HCW or leader involved in the care of patients with COVID-19 (e.g. hospitals and long-term care centers); 2) aged 18 years or older; 3) understanding French to complete the questionnaire, and 4) living in the province of Quebec.

2.3. Data collection and measurement of psychosocial stressors at work and moral injury

All documents and procedures had been prepared (questionnaires, action plan, and key project deliverables) and approved scientifically and ethically in February of 2021. Participants were contacted and invited to participate by the project's partners through an online recruitment strategy (emails, Web sites, social networks). This strategy was chosen for logistic and pragmatic reasons, as the target population consisted of HCWs from several urban and non-urban regions, and the sanitary restrictions imposed by the pandemic prevented us from recruiting and collecting data on-site. If participants consented to participate, they were directed to complete a self-administered, online questionnaire. As of June 2021, 572 people have completed the questionnaire. Participants were asked about PSWs, MI, as well as their socio-demographic characteristics (region, age, sex at birth, gender identity, gender roles: masculine or feminine personality traits, minority status: race/ethnicity, education level and number of years worked), employment characteristics (occupation and type of facility), obesity (Body Mass Index (BMI)) and lifestyle factors (alcohol consumption, smoking, physical inactivity).

2.3.1. Independent variables: psychosocial stressors at work

A set of most documented, driven from the demand-control-support and effort-reward imbalance models, and emergent PSWs (10 PSWs in total) were measured using the Occupational Health and Well-being Questionnaire (OHWQ) (Truchon et al., 2021a, 2021b). The OHWQ demonstrated satisfactory psychometric properties and the measurement scales had good reliability and validity. The scales indicated good internal consistency on psychological demands (Cronbach's $\alpha = 0.85$), job control (Cronbach's $\alpha = 0.73$), social support from colleagues (Cronbach's $\alpha = 0.89$), social support from supervisor (Cronbach's $\alpha = 0.93$), reward (Cronbach's $\alpha = 0.89$), emotional demands (Cronbach's $\alpha = 0.78$), incivility (Cronbach's $\alpha = 0.76$), quality of work (Cronbach's $\alpha = 0.75$), management of organizational changes (Cronbach's $\alpha = 0.91$), and ethical culture (Cronbach's $\alpha = 0.93$) (Truchon et al., 2021b). The PSWs included quality of work, management of organizational changes, social support from supervisor, social support from colleagues, reward, incivility, psychological demands, job control, emotional demands, and ethical culture. Items were rated on a 5-point Likert scale. Exposures to PSWs were examined in three categories-high, moderate and low, based on the cut-off methods applied by a public health agency specializing in these occupational risk factors (Tissot et al., 2021).

2.3.2. Dependent variable: moral injury

Self- and other-oriented MI were measured using the Expressions of Moral Injury Scale-Military Version (EMIS-M) developed by Currier et al. (2018). Translation of this questionnaire, from English to French, was carried out using a recognized method (Vallerand, 1989). We adapted the questionnaire to capture MI events in HCWs in the context of the COVID-19 pandemic. In the present study, the items concerning self-oriented MI were associated with shame, a sense of being unworthy of love, self-punishment, inability to self-forgive, guilt, isolation, frustration, anger, and self-sabotaging behaviors. Items for other-oriented MI were associated with betrayal, moral disgust, beliefs related to mistrust of others, bearing witness to others' moral failures, loss of faith in previous beliefs, seeking revenge and sadness. MI items were rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree) and mean scores were computed for self-oriented MI (8 items),

others-oriented MI (10 items) and the total MI (18 items). The range of these scores were between 1 and 5. The cut-off points on these scores are the following: low MI: score <2.5 , moderate MI: $2.5 \leq \text{score} <3.5$, and high MI: $3.5 \leq \text{score}$. Internal consistency of the MI scale in the current sample was excellent (Cronbach's $\alpha = 0.92$ for total MI scale; 0.89 for others-oriented MI scale; 0.90 for self-oriented MI scale).

2.4. Statistical analyses

The prevalence of MI was compared in two groups: individuals exposed to PSWs, and unexposed individuals (reference). Prevalence ratios (PR) of MI and their 95% confidence intervals (CI) were modelled using robust Poisson regressions. Poisson regression was developed to overcome the convergence problems of the log-binomial models (Barros and Hirakata, 2003; skove et al., 1998; Zou, 2004). Models were sequentially adjusted for socio-demographic factors, lifestyle factors and obesity. There were three models. Model 1 provided the unadjusted analysis. Estimates were sequentially adjusted for sex, gender identity, gender roles, ethnic minority status, age, education, and years of experience (socio-demographic factors) (in model 2), alcohol consumption, smoking, physical inactivity, and BMI (in model 3). Since these last cofactors (lifestyle factors and BMI) may be confounders or part of causal pathways (intermediate factors) linking PSWs to MI, they were adjusted separately. Statistical analyses were conducted by SAS 9.5 software.

3. Results

3.1. Demographics and preliminary analyses

From the 572 participants, 55% were from urban regions, and 45% were from non-urban regions; 88.64% were women; 80.77% did not defined themselves as ethnic minority; 65.21% described their personality traits with feminine characteristics, 20.10% as androgynous, and 14.69% with masculine characteristics; 42.66% had working experience more than 15 years; with average age of 40 years (SD = 10.45), and 58.39% were university educated. For occupation, 60.5% were nurses, 11.1% worked in management or administration, 2.9% were healthcare support workers, 1% were physicians, 25% held alternative clinical positions, 45.45% worked in hospitals, 29% worked in long-term care centers, and 25.52% worked in other facilities. Regarding the lifestyle risk factors, 63.81% were smokers or ex-smokers, 28.15% had BMI ≥ 30 , 29.37% had low physical activity, and 50.7% had moderate to high alcohol intake (Table 1).

3.2. Prevalence of PSWs and MI, overall and stratified by regions

A large percentage of the study participants were exposed to psychosocial stressors at work. Table 2 presents the prevalence of the main PSWs and three dimensions of MI reported by participants. The prevalence of PSWs ranged between 10.66% and 83.39%, with highest prevalence observed for low ethical culture (83.39%), and high psychological demands (71.50%). Regarding MI, 10.14% reported moderate to high self-oriented MI, 29.19% moderate to high others-oriented MI, and 13.81% total MI.

To explore potential regional differences for PSWs and MI, the results in Table 2 were stratified according to urban and non-urban regions. Increased rates of high psychological demands (73.73% versus 69.72%), low supervisor support (35.29% versus 31.86%), low management of organizational changes (45.49% versus 39.43%) and low ethical culture (85.10% versus 82.02%) were observed in non-urban settings. On the other hand, HCWs in urban areas reported a higher prevalence of low reward (27.44% versus 20%) and low job control (53.63% versus 51.37%). Regarding MI, workers from non-urban regions were less likely to report them (11% versus 16%).

Table 1
Regional, socio-demographic and employment characteristics of study participants.

Characteristics whole sample (N = 572)	N (%) or Mean (SD)
Regions	
Urban	317 (55)
Non-urban	255 (45)
Sex	
Male	65 (11.36)
Female	507 (88.64)
Gender	
Men	65 (11.36)
Women	507 (88.64)
Self-identify otherwise	0 (0)
Personality traits	
Masculine characteristics	84 (14.69)
Androgynous	115 (20.10)
Feminine characteristics	373 (65.21)
Ethnic minority	
No	462 (80.77)
Yes	110 (19.23)
Years of experience	
Less than one years	43 (7.52)
1–5 years	110 (19.23)
6–15 years	175 (30.59)
More than 15 years	244 (42.66)
Age, Mean (SD)	
40.30 (10.45)	
Completed education^a	
Less than collegial	25 (4.37)
Collegial	213 (37.24)
University	334 (58.39)
Smoking status	
Non-smoker	207 (36.19)
Ex-smoker	311 (54.37)
Smoker	54 (9.44)
Body mass index	
<25	246 (43.01)
25–29.9	165 (28.85)
≥30	161 (28.15)
Leisure-time physical activity (tertile)^b	
Low	168 (29.37)
Moderate	171 (29.90)
High	233 (40.73)
Alcohol intake^c	
Low	282 (49.30)
Moderate	263 (45.98)
High	27 (4.72)
Occupational category	
Nurse	346 (60.5)
Patient support workers	16 (2.9)
Physician	3 (1.0)
Managers	64 (11.1)
Others	143 (25.0)
Type of facility	
Hospital	260 (45.45)
Long-term care centers	166 (29)
Other	146 (25.52)

Abbreviation: SD = Standard Deviation.

^a College in the Province of Quebec generally provides a 2-y preuniversity or a 3-y technical school program after termination of high school.

^b Scores between 0 and 15 (low), 16–34 (medium) and 35–182 (high).

^c In women: less than one drink per week (low), one to 10 drinks per week (moderate) and 11 and more drinks per week (high). In men: less than one drink per week (low), one to 15 drinks per week (moderate) and 16 and more drinks per week (high).

3.3. Associations between PSWs and MI

Table 3 presents the associations between PSWs and MI in sequentially adjusted models. Low ethical culture had the strongest association with MI (PR = 5.58; 95% CI: 1.34–23.27). Significant associations with MI were also observed for all PSWs except psychological demands (PR = 2.19; 95% CI: 0.52–9.24). Workers exposed to incivility (PR = 4.95% CI: 2.54–6.30), low reward (PR = 4.43, 95% CI: 2.14–9.16) and high

Table 2
Prevalence of psychosocial stressors at work and moral injuries among health-care workers, overall and stratified by regions.

Psychosocial stressors at work	Overall (n = 572)	Urban (n = 317)	Non-urban (n = 255)
	N (%)	N (%)	N (%)
Psychological demands			
High	409 (71.50)	221 (69.72)	188 (73.73)
Low or moderate	163 (28.5)	96 (30.29)	67 (26.28)
Job control			
Low or moderate	301 (52.62)	170 (53.63)	131 (51.37)
High	271 (47.38)	147 (46.37)	124 (48.63)
Social support from colleagues			
Low or moderate	61 (10.66)	35 (11.04)	26 (10.2)
High	511 (89.34)	282 (88.96)	229 (89.80)
Social support from supervisor			
Low or moderate	191 (33.4)	101 (31.86)	90 (35.29)
High	381 (66.61)	216 (68.14)	165 (64.71)
Reward			
Low	138 (24.13)	87 (27.44)	51 (20)
Moderate or high	434 (75.87)	230 (72.56)	204 (80)
Emotional demands			
High	295 (51.57)	165 (52.05)	130 (50.98)
Low or moderate	277 (48.42)	152 (47.94)	125 (49.02)
Incivility			
High	116 (20.28)	67 (21.14)	49 (19.22)
Low or moderate	456 (79.72)	250 (78.86)	206 (80.79)
Quality of work			
Low	285 (49.83)	156 (49.21)	129 (50.59)
Moderate to high	287 (50.17)	161 (50.79)	126 (49.41)
Management of organizational changes			
Low	241 (42.13)	125 (39.43)	116 (45.49)
Moderate to high	331 (57.87)	192 (60.57)	139 (54.51)
Ethical culture			
Low	477 (83.39)	260 (82.02)	217 (85.10)
Moderate to high	95 (16.61)	57 (17.99)	38 (14.91)
Moral injuries			
Self-oriented moral injury			
Moderate to high	58 (10.14)	38 (12.30)	19 (7.45)
Low	514 (89.86)	278 (87.70)	236 (92.55)
Others-oriented moral injury			
Moderate to high	167 (29.19)	102 (32.17)	65 (25.49)
Low	405 (70.80)	215 (67.82)	190 (74.51)
Total moral injury			
Moderate to high	79 (13.81)	51 (16.08)	28 (10.98)
Low	493 (86.19)	266 (83.91)	227 (89.02)

emotional demands (PR = 4.32, 95% CI: 1.89–9.88) had a prevalence of MI more than 4 times higher than unexposed workers. In addition, being exposed to low social support from supervisor (PR = 2.84, 95% CI: 1.84–4.38), low job control (PR = 2.81, 95% CI: 1.40–5.64), low management of organizational changes (PR = 2.81, 95% CI: 1.68–4.69), low social support from colleagues (PR = 2.61, 95% CI: 1.45–4.70), and low quality of work (PR = 2.58, 95% CI: 1.44–4.61) led to a 2.22- to 2.84-fold increased risks of MI.

3.4. Associations between PSWs and MI stratified by regions

The associations between PSWs and MI were stratified for urban and non-urban areas. These associations were comparable between regions in terms of directions and strength. HCWs exposed to PSWs had a 1.49 to 4.79 times increased prevalence of experiencing MI in urban regions. HCWs exposed to PSWs in non-urban regions had a 1.13 to 5.40 times increased risk of MI (Appendix A, Tables S1 and S2).

4. Discussion

The COVID-19 pandemic has created a turbulent working environment, especially in healthcare systems, causing an exacerbation of

Table 3
Prevalence ratios and 95% confidence intervals for associations between psychosocial stressors at work and moral injuries among Canadian healthcare workers (N = 572).

		Model 1	Model 2	Model 3
Psychosocial stressors at work	n ^a	PR (95% CI)	PR (95% CI)	PR (95% CI)
Psychological demands				
Low (ref)	25	1.00	1.00	1.00
Moderate	138	1.18 (0.28–4.90)	1.39 (0.33–5.93)	1.44 (0.31–6.65)
High	409	1.96 (0.51–7.53)	2.15 (0.55–8.39)	2.19 (0.52–9.24)
Job control				
High (ref)	271	1.00	1.00	1.00
Moderate	265	1.73 (1.10–2.73)	1.88 (1.18–3.01)	1.97 (1.23–3.14)
Low	36	2.61 (1.33–5.11)	2.83 (1.45–5.50)	2.81 (1.40–5.64)
Social support from colleagues				
High (ref)	511	1.00	1.00	1.00
Moderate	34	1.94 (1.01–3.71)	2.05 (1.10–3.82)	2.17 (1.17–4.04)
Low	27	2.75 (1.53–4.92)	2.54 (1.44–4.50)	2.61 (1.45–4.70)
Social support from supervisor				
High (ref)	381	1.00	1.00	1.00
Moderate	53	1.90 (0.97–3.74)	2.04 (1.04–3.99)	2.00 (1.01–3.99)
Low	138	2.92 (1.91–4.48)	3.00 (1.93–4.66)	2.84 (1.84–4.38)
Reward				
High (ref)	160	1.00	1.00	1.00
Moderate	274	2.14 (1.05–4.36)	2.21 (1.07–4.54)	2.10 (1.01–4.37)
Low	138	4.77 (2.39–9.52)	4.77 (2.34–9.71)	4.43 (2.14–9.16)
Emotional demands				
Low (ref)	119	1.00	1.00	1.00
Moderate	158	1.13 (0.41–3.09)	1.20 (0.43–3.33)	1.24 (0.45–3.44)
High	295	4.30 (1.92–9.67)	4.42 (1.93–10.13)	4.32 (1.89–9.88)
Incivility				
Low (ref)	368	1.00	1.00	1.00
Moderate	88	2.02 (1.11–3.66)	2.08 (1.16–3.75)	2.03 (1.13–3.67)
High	116	3.94 (2.53–6.13)	4.04 (2.59–6.32)	4.00 (2.54–6.30)
Quality of work				
High (ref)	172	1.00	1.00	1.00
Moderate	115	1.15 (0.52–2.53)	1.19 (0.55–2.60)	1.22 (0.56–2.63)
Low	285	2.60 (1.47–4.61)	2.70 (1.51–4.82)	2.58 (1.44–4.61)
Management of organizational changes				
High (ref)	259	1.00	1.00	1.00
Moderate	72	2.60 (1.34–5.05)	2.57 (1.33–4.96)	2.81 (1.45–5.42)
Low	241	2.87 (1.72–4.78)	2.76 (1.65–4.64)	2.81 (1.68–4.69)
Ethical culture				
High (ref)	60	1.00	1.00	1.00
Moderate	35	4.29 (0.88–20.93)	5.67 (1.14–28.26)	5.98 (1.13–31.58)
Low	477	4.53 (1.14–17.98)	5.69 (1.41–22.89)	5.58 (1.34–23.27)

Abbreviations: PR = prevalence ratio; CI = confidence interval; ref = reference category.

Model 1: crude model

Model 2: adjusted for sex, gender identity, gender roles, minority status, age,

education, years of experience

Model 3: Model 2 + alcohol consumption, smoking, physical inactivity, and BMI.

^a n in crude model.

stressful working conditions. Early evidence suggested that frontline healthcare workers (HCWs) have faced unprecedented challenges (World Health Organization, 2020) that resulted in an increased risk of moral injury (MI). Such challenges included the increase of confrontation with ethically challenging and emotionally demanding situations (Vizheh et al., 2020; Sato et al., 2022). The current study examined the associations between an extensive set of modifiable occupational stressors, named psychosocial stressors at work (PSWs), and MI among HCWs in the COVID-19 context, in order to pinpoint potential prevention targets. Workers exposed to PSWs, such as low ethical culture, incivility, low reward, and high emotional demands, had a 2.22 to 5.58 higher prevalence of MI. These stressors may therefore constitute promising prevention avenues.

In the present study, 13.81% of HCWs reported moderate to high MI, of which 10.14% were self-oriented MI, and 29.19% were others-oriented. While there existed little previous findings differentiating between self- and others-oriented MI, a recent study observed, in line with our findings, a larger prevalence of others-oriented MI compared to self-oriented MI (59% vs. 17%) (Khan et al., 2021). However, in our study, the prevalence of MI was lower than rates observed in several other countries during the pandemic. The prevalence of MI has ranged between 32% and 59% in previous studies (Khan et al., 2021; Maftei and Holman, 2021; Nelson et al., 2022; Rushton et al., 2021; Wang et al., 2022). Direct comparisons of the rates observed in our study with those of other studies is limited as MI was measured using different questionnaires. A commonly used questionnaire, the Moral Injury Symptom Scale–Health Professionals (MISS-HP) (Mantri et al., 2020), does not differentiate between self- and others-oriented MI, and includes religious components less transposable to the culture of Quebec. Our MI prevalence rates are also hard to compare because of the heterogeneity of our study sample, with participants holding a variety of healthcare occupations in both urban (62%) and non-urban (48%) settings. Prevalence rates of MI were higher in urban than non-urban regions in our study. In Quebec, the density of the population in non-urban regions is low. Moreover, major governmental efforts had been put in place before the second wave of the pandemic to protect the more vulnerable non-urban regions (Prime Minister’s Office, 2020). These efforts contributed much less severe COVID-19 outbreaks in these regions (Institut national de santé publique du Québec (INSPQ), 2022).

A large percentage of participants of the present study were exposed to the PSWs that were most documented by previous studies before and during the pandemic, namely high psychological demands, low job control, low social support and low reward. Before the pandemic, these PSWs were already common risk factors, with approximately one quarter of the working population being exposed to at least one PSWs in various countries such as Canada, the USA, EU countries and Japan (Brisson et al., 2011; Dragano et al., 2017). In line with our findings, other studies performed on HCWs after the onset of the COVID crisis showed much higher prevalence rates ranging between 50% and 75% (Carazo et al., 2021; Tzenetidis et al., 2021). Continuing, in our sample, HCWs working in non-urban areas were more likely than those working in urban areas to report PSWs such as low ethical culture and high psychological demands. Similar results were found in previous studies before and during the pandemic (Cosgrave et al., 2019; Waddell-He-nowitch et al., 2021). It is possible that these stressors were already more prevalent in non-urban regions before the pandemic considering long-lasting shortage of HCWs, challenges in accessing supports or specialized care in non-urban communities, and limited infrastructure and amenities (Cosgrave et al., 2019). However, little differences were observed in the associations between PSWs and MI in urban and non-urban regions. These findings still need to be replicated, due to the limited statistical power found for several associations. Replication is

also needed in other regions and countries, where resources are considerably different from Canadian regions.

The results of the present study demonstrated that HCWs exposed to PSWs were more likely to experience MI (self-oriented or others-oriented) than unexposed workers. Results are as follows:

- 1) Low ethical culture (PR = 5.58; 95% CI: 1.34–23.27): This PSW was the strongest predictor of MI, highlighting the potential relevance of improving ethical culture in future workplace interventions aiming to reduce MI. In ethical research, the efforts of management (or CEO (s)) has been shown as crucial in promoting and maintaining an ethical culture (Branson and Gross, 2014; Langlois and Lapointe, 2010; Lapointe et al., 2020; Wrolstad, 2017). Organizations in which leaders at all levels are encouraged to act ethically seem to possess important tools for enhancing workers' motivation, resiliency and preventing the onset of MI (Buechner, 2020; Shay, 2011). Furthermore, D'Alessandro et al. (2022) highlighted the importance of providing an optimal workplace culture and ethical standards to bolster against the deleterious impacts of MI on HCWs at both individual and organizational levels. Moreover, Eikenaar (2022) has suggested that preventing MI begins with the creation of an occupational culture that allows for the address of ethical issues as they arise, for example, by making dilemmas debatable. It is important to note that, to our knowledge, no quantitative study before ours investigated the association between ethical culture (or other aspects of organizational culture) and MI.
- 2) Low reward (PR = 4.43, 95% CI: 2.14–9.16): Dishonesty or lack of transparency from leaders at work has manifested both as a lack of respect (i.e. a dimension of low reward), and feelings of betrayal and loss of trust that might lead to an incidence of MI (French et al., 2022). In morally challenging situations, there are several possible reactions, including disengagement (detachment, disillusion, resignation) with one's profession. An unbalanced work environment (e.g., poor recognition for efforts invested at work) could lead to a desensitization in employees towards moral wounds (Poisson et al., 2014). In a systematic review including 46 qualitative studies, Billings et al. (2021) reported a lack of recognition (financial reward and trust) was frequently cited by HCWs, and may cause potentially morally injurious events.
- 3) High emotional demands (PR = 4.32, 95% CI: 1.89–9.88): Since the beginning of the pandemic, several studies have shown that highly emotionally demanding situations can lead to ethical conflicts and MI in healthcare providers (Blake et al., 2020; Greenberg et al., 2020; Litam and Balkin, 2021; Shale, 2020). A 3-year prospective study demonstrated that workers facing such demands and conflicting roles were 38% more likely to report problematic levels of psychological distress (Johannessen et al., 2013). However, the prevalence of psychological distress and depressive symptoms was halved when exposure to emotionally demanding work was accompanied by high level of decision latitude (job control) and social support at work (Vézina and Saint-Arnaud, 2011).
- 4) Incivility (PR = 4.95% CI: 2.54–6.30): Incivility violates norms for mutual respect at work (Schilpzand et al., 2016), and if left unaddressed, may result in psychological distress and injury (Clark, 2017). Our findings are consistent with previous research, which has demonstrated exposure to workplace violence was significantly correlated with MI symptoms ($B = 4.16$, 95% CI = 3.21–5.10, $p < 0.001$) (Zhizhong et al., 2020). As described in several other studies, the COVID-19 pandemic has resulted in heightened incivility from patients and families, alongside lower resilience levels (El Ghaziri et al., 2021; Urban et al., 2021). Exposure to workplace violence and incivilities inflict damage upon the moral belief systems of HCWs, and might lead to feelings of betrayal and loss of trust. These feelings might lead to MI, especially in HCWs risking their lives to help (Brett T. Litz et al., 2009; Zhizhong et al., 2020).
- 5, 6) Low social support from supervisor (PR = 2.84, 95% CI: 1.84–4.38) and colleagues (PR = 2.61, 95% CI: 1.45–4.70): Research on HCWs' needs during the pandemic highlighted a desire for social support and acknowledgment offered by colleagues and managers (e.g. clear guidance, team building). Increasing these sources of support can mitigate the effects of COVID-19-related MI (D'Alessandro et al., 2022). For example, as seen in a longitudinal study, social support at work was a significant predictor to prevent or minimise MI and associated mental health concerns in HCWs during the pandemic (Hines et al., 2021).
- 7) Low job control (PR = 2.81, 95% CI: 1.40–5.64): Low decisional autonomy impacted HCWs during COVID-19 due to a scarcity of critical resources (Carazo et al., 2021). Based on the evidence, a reduced autonomy for healthcare professionals might contribute to MI (British Medical Association, 2021).
- 8) Management of organizational changes (PR = 2.81, 95% CI: 1.68–4.69): Recent literature in organizational studies has focused on strategic ambiguity, intentional equivocality in management decisions, communication and organizational change (Abdallah and Langley, 2014), and MI (McGahan, 2019; Shadnam, 2013; Shay, 2014). Kalkman and Molendijk (2019) argued that ambiguity at work may contribute to the emergence of moral challenges. Ambiguity resulting from the absence of convincing managerial meanings during organizational changes can raise ethical questions and members might be more likely to feel that they have to choose between unclear or conflicting norms, potentially resulting in moral conflict (Kälvemark et al., 2004) and all of these events may eventually lead to MI (Kalkman and Molendijk, 2019).
- 9) Low quality of work (PR = 2.58, 95% CI: 1.44–4.61): While little evidence is available, it has been suggested contributing work of high quality may improve outcomes in morally injured veterans (Shay, 2014).
- 10) Surprisingly, the positive association between high psychological demands and MI was not significant (PR = 2.19, 95% CI: 0.52–9.24). This result suggests that MI might not have exactly the same set of risk factors as moral and psychological distress, which are known to be influenced by psychological demands (Shoorideh et al., 2014; Smallwood et al., 2021; Theorell et al., 2015), including among Quebec HCWs during the pandemic (Carazo et al., 2021). The work overload that HCWs faced during the pandemic might not, by itself, increase MI prevalence. However, our finding should be interpreted with caution because of its imprecision (wide confidence intervals).

Interventions designed to support HCWs facing morally injurious situations have been suggested as effective in mitigating the risk of mental health problems and distress (Ducharlet et al., 2021; Greenberg et al., 2020). However, interventions were mainly focused on individuals' coping skills, for example preparing HCWs mentally to respond to challenges and conflicts at work. Although some workplace level interventions have proved effective in providing strong and long-lasting benefits for workers' mental health in a non-pandemic context (Corbière et al., 2009; Kompier and Kristensen, 2001; Montano et al., 2014; Parkes and Sparkes, 1998), little is known about the impact of these interventions when applied during a pandemic. The results of the present study provide valuable insights for future studies and is helpful for the design of workplace interventions aiming to mitigate MI exposure. Our findings also suggest the risk of potentially morally injurious events could be minimized with the diminution of PSWs to which HCWs are exposed. A study including of 35,571 European employees reported that 14% of new cases of mental illnesses could have been prevented by eliminating work-related stressful situations (Harvey et al., 2018). In a recent study, the overall fractions of depression and cardiovascular diseases attributable to psychosocial work exposures ranged between 17%–35% and 5%–11% (Niedhammer et al., 2022). It is, however, important to add that, in the context of a health crisis, reducing the level of emotional demands, a PSW particularly

associated with MI, in frontline HCWs might be difficult. However, interventions focused on enhancing ethical culture, social supports and recognition the efforts of HCWs could help prevent and manage MI. Moreover, understanding the regional differences in the prevalence of MI and associated PSWs is essential for planning and implementing targeted interventions in urban and non-urban areas.

One of the main strengths of the current study is the consideration of a comprehensive set of PSWs as predictors of MI. The questionnaires used were derived from theoretical models that have been internationally recognized and used in national surveys, which is one of the strengths of the current study. The study was also conducted during the third pandemic wave, and so, the results presented reflect the reality of the long-term implications of the pandemic in Quebec, Canada. Finally, our paper is the first, to our knowledge, to study the prevalence of MI, and the associations between PSWs and MI, separately in urban and non-urban contexts. While most of the studies aimed at preventing MI have been conducted in urban areas, our study sample consisted of both urban and non-urban regions and our results explored potential differences between these areas.

Despite these strengths, our study also has limitations. The online recruitment strategy made it impossible to calculate the participation rate. Considering that more than two thousand eligible HCWs received an email invitation, and more might have seen the recruitment poster on social media, the participation rate was low. Participation might have been affected by working conditions or by the psychological states of HCWs. Therefore, we cannot rule out the introduction of a selection bias. For example, participants exposed to challenging working conditions might have felt the need to denunciate them (overestimating the prevalence of PSWs). However, considering that data collection took place during a COVID-19 wave, it is also possible that HCWs with better conditions (underestimation the prevalence of PSWs) may have been more inclined to participate, due to less fatigue or a surplus of free time. It is also noteworthy that participants with MI may have felt unfit to participate due to the severity of their symptoms (underestimating the prevalence of MI). Moreover, an observational cross-sectional survey cannot determine causality in associations between PSWs and MI. However, our findings are consistent with several published studies. Descriptive studies, even if they cannot establish causal links, still make it possible to find “clues” that can be used to identify environments or groups at risk. In our study, PSWs and MI events were self-reported, which could have led to a common method bias overestimating the estimates. Concerning the external validity, the generalization of the findings might be limited to Quebec or Canada due to the healthcare protocols, availability of resources and sanitary measures imposed during COVID-19. Finally, the results of this study may need to be replicated among physicians, as they were underrepresented in our sample. This was because the recruitment partners involved in our study were mainly HCWs networks of HCWs of which physicians were not members. Finally, the current study did not look specifically at societal and health stressors as such, especially with the COVID-19 pandemic. Further qualitative studies are needed to capture the views of HCWs when considering COVID’s influence on the potential exacerbation of the PSWs measured in this study.

5. Conclusion

The current study provided novel insights into MI and PSWs in HCWs. Our results demonstrated that several PSWs were associated with MI among actors of the healthcare system, who provided care and services in urban and non-urban areas of Quebec, Canada, during the COVID-19 crisis. Identifying predictors of MI could contribute to the well-being of workers and the reduction of mental health problems, which are disabling, increasingly frequent health problems and primary cause of sickness absence and presenteeism (i.e. working while sick). PSWs might be key prevention targets. Moreover, prevention efforts deployed to reduce these issues could promote the retention of

professionals specializing in health, a category of workers extremely in demand. Linking these occupational risk factors to moral injury in a pandemic context is expected to help the government, public health authorities and other stakeholders to better respond to future pandemics and unexpected outbreaks of diseases.

Declaration of competing interest

The authors declare no conflict of interest.

Authors’ contributions

Azita Zahiriharsini: Conceptualization, Literature review, Methodology, Writing – original draft preparation, Writing- Reviewing and Editing. Mahée Gilbert-Ouimet: Principal investigator of the project, Conceptualization, Literature review, Methodology, Writing – original draft preparation, Writing- Reviewing and Editing. Lyse Langlois: Reviewing, Providing critical comments. Caroline Biron: Reviewing, Providing critical comments. Jérôme Pelletier: Reviewing, Providing critical comments. Marianne Beaulieu: Reviewing, Providing critical comments. Manon Truchon: Principal investigator of the project, Conceptualization, Writing – original draft preparation, Writing- Reviewing and Editing.

Ethics approval and consent to participate

Ethical approval was granted by the ethics committee of the ‘Centre intégré universitaire de santé et de services sociaux de la Capitale-Nationale’ in Quebec, Canada. All participants provided written consent for the study, were made aware that data is anonymised, securely stored, will be analysed for publication, participation is voluntary, and they are free to leave the study at any time.

Funding

This study was funded by Ministry of National Defense of Canada, le Réseau intersectoriel de recherche en santé de l’Université du Québec (RISUQ) and le réseau de recherche en santé des populations du Québec (RRSPQ).

Acknowledgements

The research team would like to acknowledge the generous contribution of all participants of the study.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jpsychires.2022.09.006>.

Abbreviations

Body Mass Index (BMI)
 Confidence intervals (CI)
 Healthcare workers (HCWs)
 Moral injury (MI)
 Occupational Health and Well-being Questionnaire (OHWQ)
 Prevalence ratios (PR)
 Psychosocial stressors at work (PSW)
 Standard Deviation (SD)
 World Health Organization (WHO)

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