

Psychological Distress of Healthcare Workers in Québec (Canada) During the Second and the Third Pandemic Waves

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Objective: We aimed to measure the prevalence of psychological distress among Quebec healthcare workers (HCWs) during the second and third pandemic waves and to assess the effect of psychosocial risk factors (PSRs) on work-related psychological distress among severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infected (cases) and non-infected (controls) HCWs. **Methods:** A self-administered survey was used to measure validated indicators of psychological distress (K6 scale) and PSR (questions based on Karasek and Siegrist models, value conflicts, and work-life balance). Adjusted robust Poisson models were used to estimate prevalence ratios. **Results:** Four thousand sixty eight cases and 4152 controls completed the survey. Prevalence of high work-related psychological distress was 42%; it was associated with PSRs (mainly work-life balance, value conflicts, and high psychological demands) but not with SARS-CoV-2 infection. **Conclusion:** Primary prevention measures targeting PSRs are needed to reduce mental health risks of HCWs.

Keywords: COVID-19, healthcare worker, K6 scale, occupational risk, psychological distress, workplace psychosocial risk

Healthcare workers (HCWs) have been at high risk of exposure to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) since the beginning of the pandemic. In Québec, Canada, their risk of infection was 10 times higher than the general working age population during the first pandemic wave and four times higher during the second wave.^{1,2} Several studies have shown that the pandemic has had a negative impact on the mental health of HCWs

but did not assess the specific contribution of the risk of infection.³⁻¹¹ Psychosocial risk factors (PSR) such as high psychological demand, low support at work and low recognition, have strong links with psychological distress and other indicators of mental disorders.¹²⁻¹⁶ Conflicts of value and difficulty in balancing work and personal life are less traditional PSR that have also been associated with psychological distress.^{17,18} During the COVID-19 pandemic, care providers have faced multiple moral conflicts in a context of stretched health systems and strict control infection rules.¹⁹ Balancing work and personal life was difficult with the additional enormous workload caused by the pandemic.

Despite the robust knowledge about high prevalence of psychological distress in HCWs during the pandemic and the established association between PSR and psychological distress in the workplace in general, there has been no integrated analysis assessing simultaneously all these factors. In the context of a larger study assessing the risk factors for SARS-CoV-2 infection in Quebec HCWs during the second and third pandemic waves, this sub-study was conducted with the objective of estimating the independent contribution to psychological distress of each PSR, including conflicts of values and work-life balance, and the risk of SARS-CoV-2 infection among HCWs.

METHODS

Study Population

This test-negative case-control study was conducted among HCWs tested for SARS-CoV-2 by PCR between November 15, 2020 and May 29, 2021. HCWs with a positive result were cases and controls were those with a negative result.² Inclusion criteria included: (1) being a HCW, defined as someone working in the health field or in a health facility; (2) having worked during the 14 days before symptom onset or testing; (3) aged 18 years or older; (4) able to communicate in French or English; (5) living in Québec. Eligible cases were identified from the provincial reportable disease database that includes all confirmed COVID-19 cases, while controls were identified from the provincial laboratory database which record all PCR tests done for SARS-CoV-2. These individuals were contacted by phone and invited to participate to the study between December 3, 2020 and July 31, 2021. Consenting participants had to complete a questionnaire which was mostly (98%) self-administered online or, for those not at ease with electronic questionnaire, completed during the call with the research assistant (2%).

Data Collection and Measurement of Psychosocial Risk and Psychological Distress

Participants were asked about their socio-demographic characteristics (age, sex, race/ethnicity, and household composition [only cases]), employment characteristics (occupation and type of facility), and infection prevention and control measures in their workplace.

In addition, PSRs were measured by validated indicators from the two main internationally recognized models, that is, Karasek and Theorell “demand-control-support” model and Siegrist “effort-reward imbalance” model.^{20,21} The indicators associated with these two models are: the psychological demands (pressure to do a heavy workload,

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Ethical considerations: The study was approved by the research ethics committee of the CHU (University Hospital Center) de Québec-Université Laval and all participants gave oral or written informed consent before inclusion.

Clinical significance: Pandemic healthcare workers have a high prevalence of high and very high work-related psychological distress. Occupational health must focus on prevention and rehabilitation measures targeting work-life balance, value conflicts at work and high psychological demands in order to reduce work-related mental health problems among these essential workers.

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conflicting demands, work that requires working very quickly, not enough time to do the job, work that requires hard work), decision authority (one of the two components of decision autonomy, based on the questions asking the choice over the way the job is done, and the influence in the decisions about his/her job), job strain (combination of high psychological demands and low or moderate decision authority), reward (job insecurity, job promotion prospects, satisfaction about salary, receiving the respect and prestige deserved), support from coworkers (help and support from coworkers, feeling of being part of a team), and supervisor support (help and support from the immediate superior, willing to listen of the immediate superior). The questions retained were those used in the Québec Population Health Survey 2014/15 (QPHS). The validity of the abbreviated questionnaire to measure the indicators had been previously assessed and showed a good internal consistency for psychological demands (Cronbach $\alpha = 0.69$), decision authority (Cronbach $\alpha = 0.69$), reward (Cronbach $\alpha = 0.64$), coworker support (Cronbach $\alpha = 0.71$), and superior support (Cronbach $\alpha = 0.80$).^{22,23} The construction of each indicator is detailed in Supplemental Digital Content (SDC)—Annex 1, <http://links.lww.com/JOM/B59>. Three questions were added to measure PSRs in the context of COVID-19. Two questions from surveys in France related to value conflicts assessed: (1) the perception of having the means to do quality work and, (2) the perception of having to work in a way that offends one's professional conscience (never, sometimes, often or always).^{17,24,25} The third question was about work-life balance (very easy, easy, neither easy nor difficult, difficult, very difficult) (SDC—Annex 1, <http://links.lww.com/JOM/B59>).²⁶

Psychological distress during the 30 days prior to completing the questionnaire was measured with the Kessler (K6) scale.²⁷ It includes six questions scored between 0 and 4 for a maximum of 24 points. A score of more than or equal to 7 is considered indicative of high psychological distress: distress is high with a score of 7 to 12 and very high with more than or equal to 13 (SDC Annex 1, <http://links.lww.com/JOM/B59>).²⁸ Even though K6 is not a diagnostic tool, psychological distress is an early indicator of mental health illness, particularly of two of the most frequent syndromes: depression and anxiety.^{27,29,30} Psychological distress was considered work-related if HCWs declared that the feelings reported were completely or partially linked to their current employment, a question used in the QPHS 2014/15, which showed a good capacity to discriminate the psychological distress associated with work versus associated with personal and sociodemographic factors (SDC—Annex 1, <http://links.lww.com/JOM/B59>).²³

Statistical Analyses

Prevalences and their 95% confidence intervals (CI) were estimated. The temporal trend of high work-related psychological distress was examined using a Cochran-Armitage test. Univariate associations between PSRs and COVID-19 status and work-related psychological distress were evaluated with a chi-square test.

To avoid convergence problems often encountered with log-binomial models,^{31–33} we used robust Poisson models, adjusted for sex, age, race/ethnicity, type of occupation and COVID-19 status, to estimate the prevalence ratios (PR) of high or very high psychological distress associated with the presence of occupational psychosocial risks. Models were also stratified by sex, COVID-19 status, and type of facility (acute-care hospitals [ACH] or long-term care facilities [LTCF]). The independent association between each RPS, the COVID-19 status, and psychological distress was measured in a model including all PSRs, globally and stratified by type of facility. The impact of the household composition was assessed in a model including only the cases, which showed no changes in the estimates. The association between the simultaneous presence of one to five PSRs and psychological distress was also examined with the construction of an overall indicator of RPS. Finally, an exploratory analysis evaluated the association of work-related psychological distress with the perceived risk of acquiring

COVID-19 in the workplace (before contracting the disease) and some organization and infection prevention and control measures in the workplace.

Ethical Aspects

The study was conducted under the legal mandate entrusted to the National Institute of Public Health of Québec by the National Director of Public Health of Québec under the Public Health Act. The study was approved by the research ethics committee of the CHU (University Hospital Center) de Québec-Université Laval and all participants gave oral or written informed consent before inclusion.

RESULTS

Study Population

During the study period 23,318 SARS-CoV-2 laboratory confirmed infected HCWs were reported in Québec; 12,601 were successfully reached; 949 (7.5%) did not meet the inclusion criteria and 21.2% (2666) refused to participate. For controls, 11,498 HCWs who tested negative for SARS-CoV-2 were reached among the 21,900 randomly selected from the laboratory database; 1243 (10.8%) were excluded and 2527 (22.0%) did not consent to participate. Of the 8986 cases and 7228 controls who agreed to participate, 4068 (45.3%) and 4152 (57.4%) respectively completed the survey as of September 7, 2021. The participation rate among eligible HCWs was therefore 34.9% for cases and 42.6% for controls. Cases were representative for age, sex, and clinical characteristics of all infected HCWs reported in Québec during the study period.²

From the 8220 participants, 83.3% were women, 66.7% were less than 45 years, 14.7% were born abroad, 85.2% defined themselves as White, 5.3% as Black, 8.0% other ethnic/racial category, and 1.5% did not answer the question. For occupation, 26.0% were nurses or nursing assistants, 19.1% patient healthcare support workers, 4.6% physicians, and 11.6% worked in management or administration; 37.7% worked in ACH, 16.8% in LTCF, 7.5% in private residences for elderly, and 38.0% in other types of facilities (Table 1).

Compared with controls, cases were more often men, older, defined themselves as black, and worked more often as patient healthcare assistants and in LTCFs (all $P < 0.01$) (Table 1).

Prevalence of Psychological Distress and Psychosocial Risks

High psychological distress (score ≥ 7) was reported by 50.7% of participant HCWs (53.1% of women and 39.5% of men), and 81.5% among them considered it as work-related. High work-related psychological distress was more frequent among controls (46.5%) than among SARS-CoV-2 infected HCWs (36.1%); and among nurses and nursing assistant (49.9%) than among other occupations (37.8% to 38.8%) (Fig. 1). The monthly prevalence of high-work related psychological distress in the previous 30 days remained quite stable over the study period: between 29% and 38% among cases (Cochran-Armitage trend test $P = 0.046$) and between 44% and 49% among controls (trend test $P = 0.16$), with June and July 2021 being the months with lowest prevalences (Fig. 2).

High psychosocial demands were reported by 38.6% (52.2% of nurses or nursing assistants), low or moderate decision authority by 52.1% (61.6% of healthcare support workers and 57.5% of nurses and nursing assistants), low reward by 33.8% (42.8% of healthcare support workers, 37.6% of nurses and nursing assistants but 4.7% of physicians), and low or moderate coworker or supervisor support by 17.2% and 22.5% respectively. Overall, 77.5% reported not having (sometimes, often or always) the means to do quality work and this reached 87.2% among nurses and nursing assistants, and was 84.8 and 78.8 among workers of ACH and LTCF respectively. Sometimes, often or always working against their professional conscience was reported by

TABLE 1. Sociodemographic and Employment Characteristics of Participants, by COVID-19 Status

	All HCWS		COVID-19 HCWS		Non-COVID-19 HCWS		p*
	N	%	N	%	N	%	
Sex, female	6845	83.3	3230	79.4	3615	87.1	<0.01
Age							<0.01
18–44 yrs	5479	66.7	2444	60.1	3035	73.1	
45–59 yrs	2289	27.9	1338	32.9	951	22.9	
>60 yrs	452	5.5	286	7.0	166	4.0	
Born abroad	1206	14.7	833	20.5	373	9.0	<0.01
Mother tongue other than French or English	780	9.5	544	13.4	236	5.7	<0.01
Race/Ethnicity							<0.01
White	7000	85.2	3217	79.1	3783	91.1	
Black	439	5.3	342	8.4	97	2.3	
Other	658	8.0	429	10.6	229	5.5	
NR	123	1.5	80	2.0	43	1.0	
Type of employment							<0.01
Nurses and nursing assistants	2140	26.0	1050	25.8	1090	26.3	
Healthcare support workers	1572	19.1	1089	26.8	483	11.6	
Administration/management	955	11.6	396	9.7	559	13.5	
Physicians	381	4.6	165	4.1	216	5.2	
Other types of work	3172	38.6	1368	33.6	1804	43.5	
Type of facility							<0.01
ACH	3096	37.7	1377	33.9	1719	41.4	
LTCF	1379	16.8	910	22.4	469	11.3	
Private residences for elderly	616	7.5	457	11.2	159	3.8	
Other	3129	38.1	1324	32.6	1805	42.5	

ACH, acute-care hospital; HCW, healthcare worker; LTCF, long-term health facility; NR, do not respond.
*P-value of chi-square test comparing COVID-19 and non-COVID-19 healthcare workers.

52.2% of HCWs, up to 69.9% among nurses and nursing assistants, and 58.9% and 59.3% among workers of ACH and LTCF respectively. Finally, 30.8% considered that they had difficulties to keep a work-life balance, a proportion reaching 47.5% among physicians (SDC—Tables S1, S2, S3 and S4, <http://links.lww.com/JOM/B60>). Compared with controls, low or moderate decision authority was more often reported by cases (54.8% vs 49.5%), while difficult work-life balance and conflict values were less prevalent among cases (26.5%, 73.9%, and 50.3% respectively vs 35.3%, 81.0%, and 54.1% for controls) (SDC—Table S1, <http://links.lww.com/JOM/B60>).

Association Between Psychosocial Risks, COVID-19 Status, and Work-Related Psychological Distress

In univariate analysis, all PSRs were statistically associated with high and very high work-related psychological distress both among cases and among controls. High work-related psychological distress was more frequent among HCWs with difficult work-life balance (63.2% of cases and 71.0% of controls vs 26.5% and 33.0% respectively among those not exposed to this risk) and with high psychological demands (56.5% of cases and 67.1% of controls vs 24.0% and 32.8% respectively among those with low or moderate), followed by those with low reward, low or moderate supervisor support, and work against their professional conscience. Very high work-related psychological distress was more prevalent (19% to 24%) among HCWs with difficult work-life balance, low or moderate coworker or supervisor support, low reward and high psychological demands than among respondent not exposed to these risks (5% to 8%). Associations were similar for both sexes (SDC—Table S1, <http://links.lww.com/JOM/B60>).

When each psychosocial risk was analyzed in a separate adjusted regression model including COVID-19 status, not having the means to do quality work had the strongest association with high work-related

psychological distress (PR = 2.5; 95% CI: 2.3 to 2.8). Those working against their professional conscience (compared with never doing it) (PR = 2.2; 95% CI: 2.1 to 2.4), those with high psychological demands (compared with low or moderate) (PR = 2.1; 95% CI: 2.0 to 2.2) or difficult work-life balance (compared with easy) (PR = 2.2; 95% CI: 2.1 to 2.3) all had ≈2 times higher prevalence of psychological distress. The strength of association was greater (PR between 2.1 and 4.3) when the outcome evaluated was very high work-related psychological distress. In sex-stratified analyses, prevalence ratios remained similar to global estimates. When stratified by COVID-19 status, the association between indicators of values conflict and psychological distress was stronger for cases than for controls (statistically significant only for working against one’s professional conscience) (Table 2). When stratified by facility, no significant differences were found between ACH workers and LTCF workers, with point estimates showing that in LTCF the independent association of psychological distress with not having the means to do quality work (PR = 1.2; 95% CI: 1.0 to 1.5) was weaker than in ACH (PR = 1.5; 95% CI: 1.4 to 1.7) (SDC—Table S4, <http://links.lww.com/JOM/B60>).

In the adjusted model that included all PSRs, associations were similar to those found in the separate models but prevalence ratios were lower and some lost statistical significance. The difficult work-life balance (PR = 1.6, 95% CI: 1.5 to 1.7), the lack of means to do quality work (PR = 1.6, 95% CI: 1.5 to 1.7), and working against one’s professional conscience (PR = 1.5, 95% CI: 1.4 to 1.6) had the strongest associations with high work-related psychological distress, while the difficulty to have work-life balance was associated to the highest risk of very high work-related psychological distress (PR = 2.7; 95% CI: 2.3 to 3.0). Having had COVID-19 was associate to a lower risk of high and very high psychological distress (Table 3).

The exposure to one additional PSR was linearly associated with an increased prevalence of high and very high work-related

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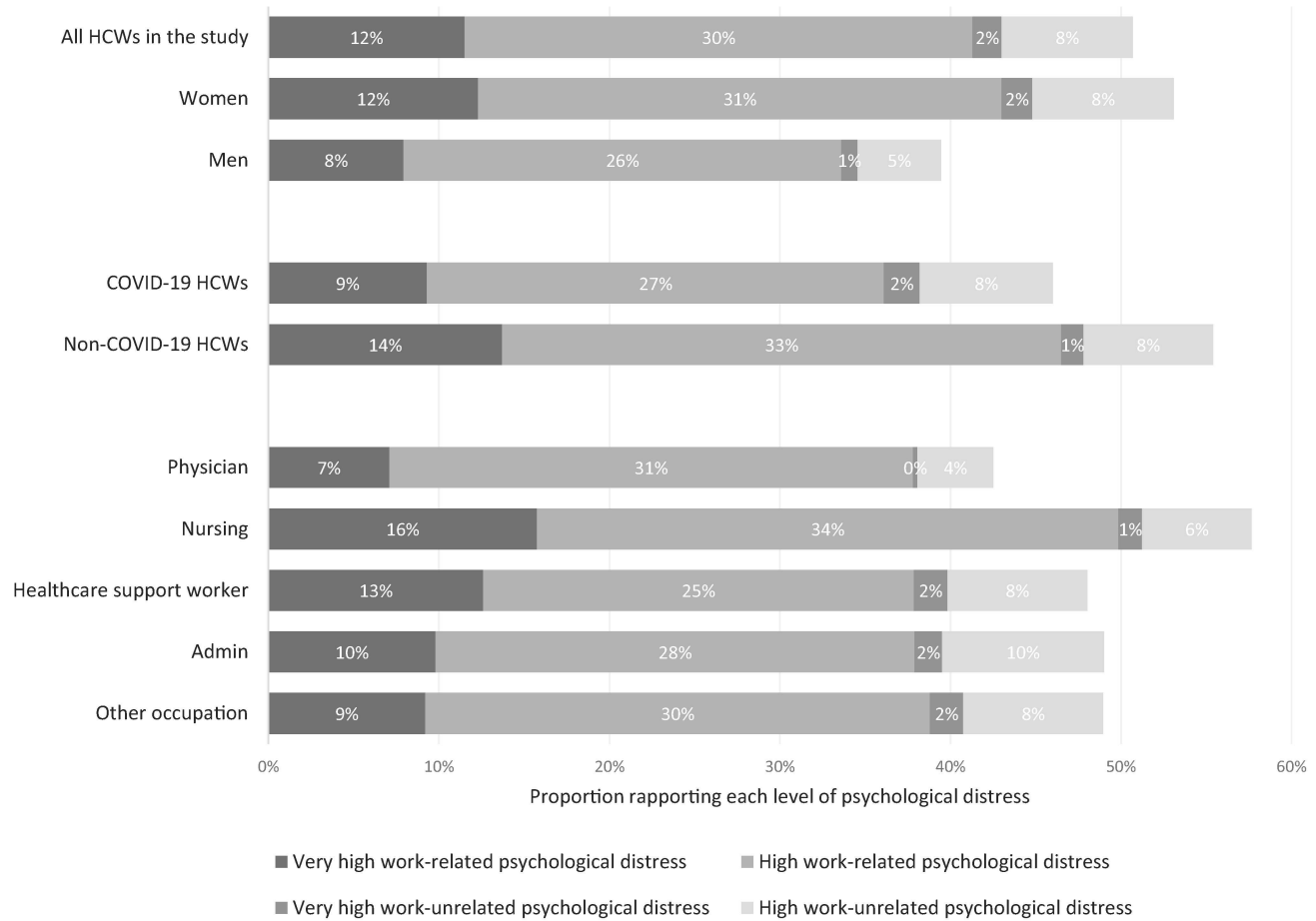


FIGURE 1. Level of psychological distress among SARS-CoV-2 infected healthcare workers as measured by the Kessler (K6) scale, stratified by sex, COVID-19 status, and occupation. Admin, administration and management staff; HCW, healthcare worker; Nursing, nurses and nursing assistants. Note: High psychological distress = score of 7 to 12 in the K6 scale; very high psychological distress = score 13 to 24 in the K6 scale.

psychological distress (only PSRs of Karasek and Siegrist models were considered). HCWs exposed to four or five PSRs had prevalence of high psychological distress 3.9 and 4.4 times greater than those not exposed to any PSR (PR = 3.9; 95% CI: 3.4 to 4.5 and PR = 4.4; 95% CI: 3.8 to 5.1 respectively). Similarly, the prevalence of very high psychological distress was 18.0 and 28.2 times greater among HCWs exposed to 4 or 5 PSRs as compared with unexposed ones, (PR = 18.0; 95% CI: 10.7 to 30.4 and PR = 28.2; 95% CI: 16.7 to 47.6 respectively) (Table 4).

High and very high work-related psychological distress was more common among workers who considered themselves to be at high or very high risk of acquiring COVID-19 in the workplace, as well as among those making a negative assessment of different infection prevention measures at work. When adjusted for demographic characteristics, perceived risk of acquiring COVID-19 in the workplace (PR = 1.3; 95% CI: 1.2 to 1.4), lack of human resources (PR = 1.5; 95% CI: 1.4 to 1.6), and persistence of COVID-19 symptoms for cases (PR = 1.3; 95% CI: 1.2 to 1.4), were associated with high work-related psychological distress (SDC—Table S5, <http://links.lww.com/JOEM/B60>).

DISCUSSION

Half (51%) of HCWs participating to the survey reported high or very high psychological distress, and 82% among them perceived their distress as work-related. Work-related high

psychological distress was higher among non-infected HCWs (47%) compared with SARS-CoV-2 infected participants (36%). These prevalences remained quite stable over the study period, being 44% and 29% respectively at the end of the study period when COVID-19 incidence in the community was lowest. In addition, the results showed that the prevalence of high and very high work-related psychological distress is associated with PSRs and not with SARS-CoV-2 infection, for both men and women. The PSRs most strongly associated with distress were: the difficulty balancing work and personal life, not having the means to do quality work, having to work in a way that offends one’s professional conscience, and high psychological demands. The prevalence of high and very high work-related psychological distress seemed to increase with the number of PSRs to which healthcare worker was exposed.

A meta-analysis about the psychological impact of COVID-19 pandemic among HCWs reported a 12-study pooled prevalence of psychological distress of 46%, but the studies used different distress measurement tools, did not assess the relationship with work and were highly heterogeneous.³ In our study, prevalences of work-related high and very high psychological distress among HCWs with COVID-19 working during the second and third pandemic waves were, respectively, more than two and three times higher than historical prevalences among workers of the same sector reported in the 2014/15 Quebec population health survey using the same Kessler scale, questions, and cut-off. These comparisons should

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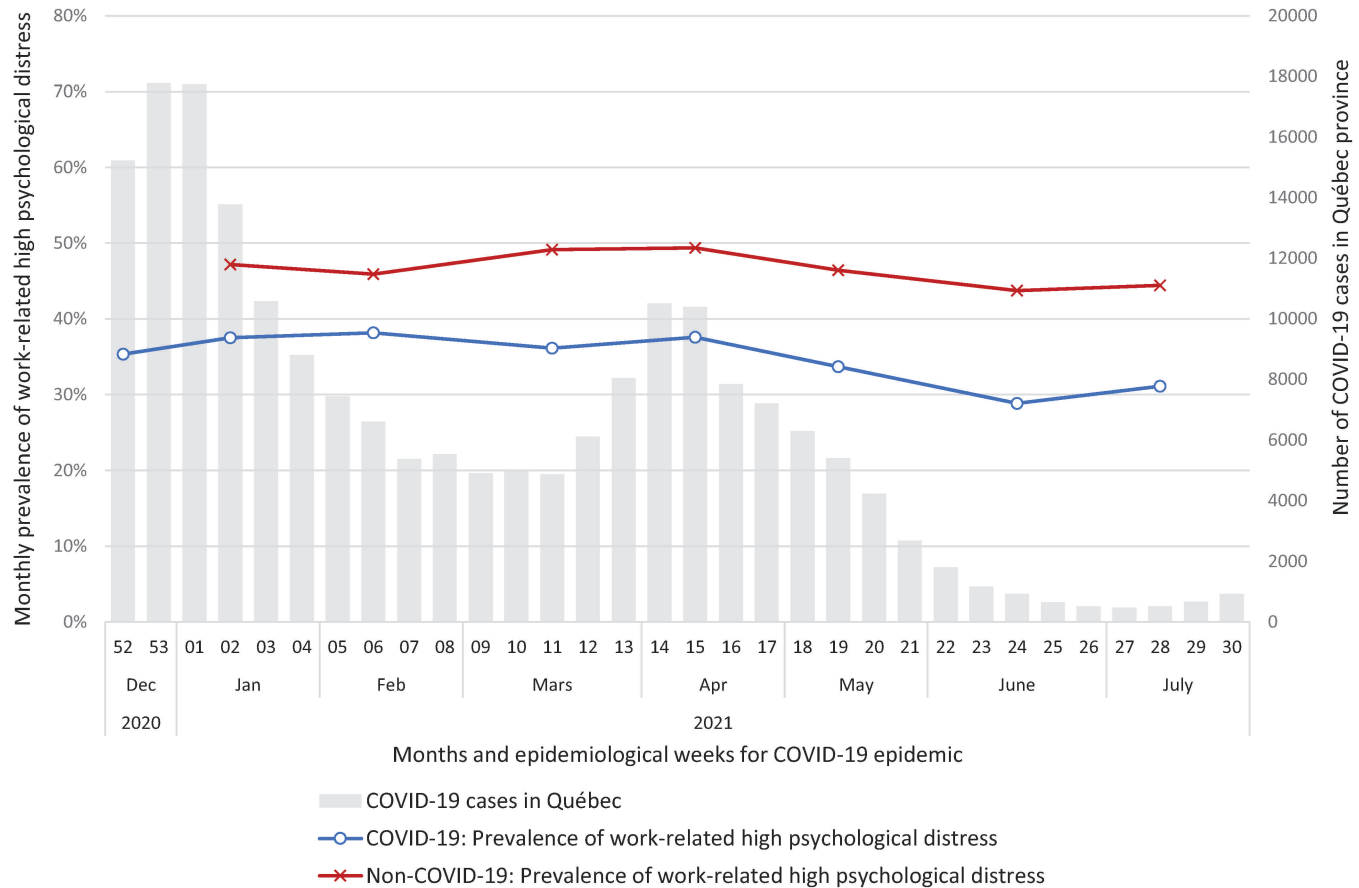


FIGURE 2. Monthly prevalence of work-related high psychological distress ($K6 \geq 7$) among SARS-CoV-2 infected and non-infected healthcare workers by month of survey completion, and weekly number of COVID-19 cases in Quebec province.

be cautiously interpreted considering that the Quebec population health survey data were collected 5 years earlier and outside the pandemic context. As described in other studies, nurses and women had higher prevalences of high and very high psychological distress than other job categories or men.^{3,34,35}

Our results are consistent with those of numerous prospective and cross-sectional epidemiological studies that have shown strong associations between exposure to almost all of the PSRs measured in our study and workers' psychological distress, as well as depression, anxiety, and burnout.^{13-15,24,36-41}

This study underlines the importance of the association between high work-related psychological distress and not having the means to do a quality job and working in a way that harms professional integrity. These characteristic elements of value conflicts may be associated with moral distress or injury and may lead to a loss of professional identity and consequent loss of meaning in work.^{17,42} Since the beginning of this health crisis, several authors have reported negative impact of exposure to highly demanding situations generating ethical or moral conflicts or dilemmas for caregivers: lack of resources to provide the care deemed necessary, disconnection of services with certain patients or users, conflicts between professional obligations and one's own safety or that of one's loved ones, difficult prioritization between the means at one's disposal and the care to be provided, etc.⁴³⁻⁴⁷

These findings are concerning. Although psychological distress is not a mental illness, studies have shown that 80% of individuals with very high psychological distress scores also met DSM-4 diagnostic criteria for a mental disorder, such as anxiety or

depression.^{29,30,48} In addition, Pratt⁴⁹ showed that very high psychological distress, as measured by a K6 questionnaire score of 13 and above, was associated with increased mortality of 30% compared with those with a score below 13.

The importance of reducing the exposure of HCWs to PSRs, and more specifically to high psychological demands, is reinforced by the fact that the prevalence of very high work-related psychological distress increases with the number of PSRs to which workers were exposed. This observation is in line with theoretical models of PSRs, according to which the combination of high psychological demands, low autonomy, and low social support at work represents a higher risk of health damage than exposure to just one of these three PSRs.²⁰ The same is true for the combination of high psychological demands and a low level of recognition at work.²¹

The interpretations regarding primary prevention perspectives should be taken with caution because the cross-sectional, observational design of this study, does not allow to conclude on a causal relationship between PSRs and work-related psychological distress. However, our results suggest that the risk of work-related psychological distress could be reduced with the diminution of PSRs to which HCWs are exposed. For example, the risk of very high psychological distress may be reduced when work schedules are considered to facilitate work-life balance. Such results make it possible to consider action targets that could reduce the risk of mental health problems among healthcare workers. Indeed, during a pandemic, it may be more difficult to reduce the level of psychological work demands, a factor particularly associated with high and very high work-related psychological distress. However, the

TABLE 2. Prevalence Ratios of High (K6 Score ≥ 7) or Very High (K6 Score ≥ 13) Work-Related Psychological Distress According to Each Psychosocial Risk, Globally, and Stratified by Sex (One Model for Each Risk) and COVID-19 Status

PR of High Work-Related Psychological Distress	Global (n = 8220)		Men (n = 1375)		Women (n = 6845)		Cases (n = 4068)		Controls (n = 4152)	
	PR*	95% CI	PR [†]	95% CI	PR [‡]	95% CI	PR [‡]	95% CI	PR [‡]	95% CI
High psychological demands (ref = low or moderate)	2.1	2.0–2.2	2.6	2.2–3.0	2.0	1.9–2.1	2.2	2.0–2.4	2.0	1.9–2.1
Low or moderate decision authority (ref = high)	1.4	1.3–1.5	1.4	1.2–1.6	1.4	1.3–1.5	1.4	1.2–1.5	1.4	1.3–1.5
Low reward (ref = moderate or high)	1.8	1.7–1.9	1.9	1.6–2.2	1.8	1.7–1.9	1.9	1.7–2.0	1.7	1.6–1.8
Low or moderate coworker support (ref = high)	1.5	1.5–1.6	1.8	1.5–2.1	1.5	1.4–1.6	1.6	1.4–1.7	1.5	1.4–1.6
Low or moderate superior support (ref = high)	1.7	1.6–1.7	1.8	1.6–2.1	1.6	1.6–1.7	1.7	1.6–1.9	1.6	1.5–1.7
Difficult work-life balance (ref = easy)	2.2	2.1–2.3	2.3	2.0–2.7	2.2	2.0–2.3	2.2	2.1–2.4	2.1	2.0–2.3
Not always the means to do quality work (ref = always)	2.5	2.3–2.8	2.3	1.8–3.0	2.5	2.3–2.8	2.8	2.4–3.2	2.2	2.0–2.6
Work against their professional conscience (ref = never)	2.2	2.1–2.4	2.5	2.1–2.9	2.2	2.0–2.3	2.6	2.3–2.9	2.0	1.8–2.1

PR of Very High Work-Related Psychological Distress	Global		Men		Women		Cases		Controls	
	PR*	95% CI	PR [†]	95% CI	PR [‡]	95% CI	PR [‡]	95% CI	PR [‡]	95% CI
High psychological demands (ref = low or moderate)	3.6	3.1–4.1	4.3	2.8–6.5	3.5	3.0–4.0	3.4	2.7–4.2	3.7	3.1–4.4
Low or moderate decision authority (ref = high)	2.1	1.8–2.4	1.7	1.1–2.4	2.2	1.9–2.5	1.9	1.5–2.3	2.3	1.9–2.7
Low reward (ref = moderate or high)	3.2	2.8–3.7	3.9	2.6–5.8	3.2	2.8–3.6	3.4	2.8–4.2	3.1	1.6–3.3
Low or moderate coworker support (ref = high)	2.6	2.3–3.0	3.2	2.2–4.7	2.6	2.3–2.9	2.7	2.2–3.3	2.6	2.2–3.0
Low or moderate superior support (ref = high)	2.8	2.5–3.1	3.0	2.1–4.4	2.8	2.4–3.1	2.9	2.4–3.6	2.7	2.3–3.1
Difficult work-life balance (ref = easy)	4.3	3.7–4.9	5.4	3.6–8.0	4.1	3.6–4.7	4.6	3.8–5.6	4.0	3.4–4.7
Not always the means to do quality work (ref = always)	2.5	2.0–3.1	2.8	1.6–5.0	2.4	1.9–3.1	2.8	2.0–3.8	2.2	1.7–3.0
Work against their professional conscience (ref = never)	3.0	2.6–3.5	2.8	1.8–4.4	3.0	2.6–3.6	3.4	2.6–4.3	2.8	2.3–3.4

CI, confidence interval; PR, prevalence ratio; ref, reference category.
* A robust Poisson model for each psychosocial risk adjusted for sex, age (18 to 44, 45 to 59, ≥ 60 years), race/ethnicity (White, Black, other), type of occupation (nursing, healthcare support worker, physician, administration and management staff, other), and COVID-19 status.
[†] A robust Poisson model for each psychosocial risk adjusted for same variables than model "a" except sex.
[‡] A robust Poisson model for each psychosocial risk adjusted for same variables than model "a" except COVID-19 status.

implementation of measures to increase the social support from the manager for his or her team or to recognize the efforts of workers could help reduce the prevalence of high and very high work-related psychological distress. These results are consistent with those of another study which showed that the prevalence of psychological distress and high depressive symptoms related to work are halved when exposure to emotionally demanding work is accompanied by a good level of decision latitude and social support at work.⁵⁰ According to another study, it would be possible to eliminate 14% of new cases of common mental disorders by reducing stressful situations at work.⁵¹ Nevertheless, the association between psychological work demands and work-related distress remains highly significant, and actions that directly address this risk factor will have a greater likelihood of reducing psychological distress.

Work-related psychological distress among HCWs is important to understand the reasons for turnover and attrition in the health sector. A large American survey showed that, even before the pandemic, mental health problems such as burnout were cited by more than 30% of nurses who left their jobs, and that those who worked more than 40 hours per week were three times more likely to cite burnout as a reason for leaving their jobs. In addition, about two-thirds of respondents who had left or who considered leaving their jobs because of burnout attributed the causes to a stressful work environment or understaffing.⁵² A Quebec report published on September 2021 by the state commissioners of the nursing profession, concluded that to be able to offer quality care to the population, nurses must benefit from working conditions that respect their health, safety, and integrity. Long working hours, compulsory overtime has to be abandoned, but the report also indicates that to promote the retention of nurses, employers must give them more autonomy to influence the management of care, as well as conditions that enhance their profession.⁵³ The impact of

PSRs on staff sickness absence is also an issue raised in many studies. In a systematic review, Duchaine et al⁵⁴ reported 14 prospective studies, in which several thousand workers were followed between 1 and 12 years, that demonstrated the impact of PSRs on certified work absences for a mental health problem.⁵⁴

One of the main strengths of the current study is its large number of participants, representative of all SARS-CoV-2 infected HCWs of Quebec during the study period. Moreover, the survey took place between December 2020 and July 2021, which means that the results presented reflect the reality during the second and third pandemic waves in Quebec and not a one-off situation. This study uses an original strategy in the choice of certain indicators that had not been used in other Quebec or international occupational health surveys. These indicators made it possible to highlight relevant results that can broaden the perspectives for action to prevent psychological distress in the workplace, as value conflict issues.

This study has also some limitations. As said earlier, an observational cross-sectional survey cannot conclude on a causal relationship between PSRs and work-related psychological distress, but our results are consistent with several published studies. Exposures and events were self-reported, but bias should be limited because the questions were derived from theoretical models that have been internationally recognized for many years and used in national surveys. However, a common method bias, a consequence of a response tendency to give similar answers to all questions when both exposures and outcomes are measured in a similar way by the same one-time survey, might have overestimated the association between psychological distress and PSR.⁵⁵ The use of different Likert scales for PSR, conflicts of values, and the K6 questionnaire might have reduced this bias.⁵⁵ The use of an abbreviated questionnaire is unlikely to have caused misclassification of PSR as its internal consistency with the

TABLE 3. Prevalence Ratios of High (K6 Score ≥ 7) or Very High (K6 ≥ 13) Work-Related Psychological Distress Adjusted for All Psychosocial Risks and COVID-19 Status, Globally, and Stratified by Sex

PR of High Work-Related Psychological Distress Psychosocial Risk	Global (n = 8220)		Men (n = 1375)		Women (n = 6845)	
	PR*	95% CI	PR [†]	95% CI	PR [†]	95% CI
High psychological demands (ref = low or moderate)	1.4	1.3–1.4	1.7	1.4–2.0	1.3	1.2–1.4
Low or moderate decision authority (ref = high)	1.0	1.0–1.1	1.0	0.8–1.1	1.0	1.0–1.1
Low reward (ref = moderate or high)	1.2	1.1–1.3	1.1	0.9–1.3	1.2	1.1–1.3
Low or moderate coworker support (ref = high)	1.1	1.1–1.2	1.2	1.1–1.4	1.1	1.0–1.2
Low or moderate superior support (ref = high)	1.1	1.1–1.2	1.2	1.1–1.4	1.1	1.1–1.2
Difficult work-life balance (ref = easy)	1.6	1.5–1.7	1.7	1.5–2.0	1.6	1.5–1.7
Not the means to do quality work (ref = always the means)	1.6	1.5–1.8	1.4	1.1–1.8	1.7	1.5–1.9
Work against their professional conscience (ref = never)	1.5	1.4–1.6	1.7	1.4–2.0	1.5	1.4–1.6
COVID-19 status (ref = non-COVID-19)	0.9	0.8–0.9	0.9	0.8–1.0	0.9	0.8–0.9

PR of Very High Work-Related Psychological Distress Psychosocial Risk	Global (n = 8220)		Men (n = 1375)		Women (n = 6845)	
	PR*	95% CI	PR [†]	95% CI	PR [†]	95% CI
High psychological demands (ref — low or moderate)	1.7	1.5–2.0	1.9	1.2–3.1	1.7	1.4–2.0
Low or moderate decision authority (ref — high)	1.2	1.1–1.4	0.9	0.7–1.3	1.3	1.1–1.5
Low reward (ref — moderate or high)	1.6	1.4–1.8	1.7	1.0–2.6	1.6	1.3–1.8
Low or moderate coworker support (ref — high)	1.5	1.3–1.7	1.7	1.1–2.5	1.4	1.3–1.7
Low or moderate superior support (ref — high)	1.4	1.2–1.6	1.6	1.1–2.4	1.4	1.2–1.6
Difficult work-life balance (ref — easy)	2.7	2.3–3.0	3.5	2.3–5.2	2.6	2.2–3.0
Not the means to do quality work (ref — always the means)	1.1	0.9–1.4	1.1	0.6–2.0	1.1	0.9–1.4
Work against their professional conscience (ref — never)	1.6	1.4–1.9	1.4	0.9–2.1	1.6	1.4–1.9
COVID-19 status (ref — non-COVID-19)	0.8	0.7–0.9	0.9	0.6–1.3	0.7	0.7–0.8

CI, confidence interval; PR, prevalence ratio; ref, reference category.
 *A robust Poisson model including all psychosocial risks and COVID-19 status and adjusted for sex, age (18 to 44, 45 to 59, more than or equal to 60 years), race/ethnicity (White, Black, other), and type of occupation (nursing, healthcare support worker, physician, administration and management staff, other).
[†]A robust Poisson model including all psychosocial risks and COVID-19 status and adjusted for same variables than model "a" except sex.

TABLE 4. Prevalence Ratios of High (K6 ≥ 7) or Very High (K6 Score ≥ 13) Work-Related Psychological Distress According to the Global Level of Job Psychosocial Risk (Number of Risks)

Number of Psychosocial Risks (Karasek/Siegrist) to Which the Worker Is Exposed*	N	Prevalence	High Work-Related Psychological Distress		Very High Work-Related Psychological Distress	
			PR ^{†‡}	95% CI	PR ^{†‡}	95% CI
None	1073	13.1%	Reference		Reference	
One	2091	25.4%	1.6	1.4–1.9	3.1	1.8–5.3
Two	2211	26.9%	2.3	2.0–2.7	6.7	3.9–11.2
Three	1540	18.7%	3.2	2.7–3.6	10.2	6.1–17.2
Four	927	11.3%	3.9	3.4–4.5	18.0	10.7–30.4
Five	378	4.6%	4.4	3.8–5.1	28.2	16.7–47.6

CI, confidence interval; PR, prevalence ratio.
 *Psychosocial risks considered are those from Karasek and Siegrist models: high psychological demands, low or moderate decision authority, low reward, low or moderate coworker support, and low or moderate supervisor support.
[†]A robust Poisson model including dummy variables for the number of psychological risks and adjusted for sex, age (18 to 44, 45 to 59, more than or equal to 60 years), race/ethnicity (White, Black, other), type of occupation (nursing, healthcare support worker, physician, administration and management staff, other), and COVID-19 status.
[‡]Linear trend test for exposure to an increasing number of psychosocial risks ($P < 0.01$).

standard instrument was good. We cannot rule out a selection bias related to the ~40% response rate, as participation might be influenced by the psychological condition of HCWs. Individuals with high and very high psychological distress may have felt too bad to respond to a questionnaire (underestimating the prevalence of distress) or may have had a greater participation in a study denouncing their situation (overestimating the prevalence of distress). This latter bias is less likely as HCWs were not invited to a study specifically on

psychological distress but to a broader study assessing workplace factors that may have increased or decreased the risk of COVID-19 and the impact of COVID-19 on HCWs.

CONCLUSION

The psychological distress of health workers during the second and the third pandemic waves in Quebec was mainly work-related, was not increased by having been infected by

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SARS-CoV-2, but was mostly associated with factors related to workload, such as high psychological demands, difficulties in balancing work and personal life, the lack of means to work in accordance with one's professional conscience, and the lack of resources to ensure the quality of services to patients and to protect the safety of workers. Primary prevention measures targeting PSRs may reduce the psychological distress and mental health risks of these essential workers.

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