BMC Psychology

RESEARCH

Open Access

Influence of the pandemic on the mental health of professional workers

Jelena Atanackovic[1*], Henrietta Akuamoah-Boateng[1], Jungwee Park[2], Melissa Corrente[1] and Ivy Lynn Bourgeault[3]

Abstract

Background This study focuses on the influence of the pandemic on professional workers from an explicitly comparative perspective. High levels of stress and burnout have been reported among professional workers pre-pandemic, but the pandemic has had unique consequences for certain professional workers. Gender has emerged as a particularly important factor. While the existing research yields important insights of mental health concerns among professional workers, there is a need for more research that examines these impacts empirically, explicitly from a comparative perspective across professions taking gender more fully into consideration.

Methods This paper undertakes a secondary data analysis of two different pan Canadian sources to address the pandemic impact on professional workers: The Canadian Community Health Survey (2020, 2021) administered by Statistics Canada and the Healthy Professional Worker survey (2021). Across the two datasets, we focused on the following professional workers - academics, accountants, dentists, nurses, physicians and teachers - representing a range of work settings and gender composition. Inferential statistics analyses were conducted to provide prevalence rates of self-perceived worsened mental health since the pandemic and to examine the inter-group differences.

Results Statistical analysis of these two data sources revealed a significant effect of the pandemic on the mental health of professional workers, that there were differences across professional workers and that gender had a notable effect both at the individual and professional level. This included significant differences in self-reported mental health, distress, burnout and presenteeism prior to and during the pandemic, as well as the overall impact of the pandemic on mental health. The high levels of distress and burnout during the pandemic were particularly evident in nursing, teaching, and midwifery - professions where women predominate.

Conclusions Interventions to address the mental health consequences of the pandemic, including their unique gendered and professional dimensions, should consider the intersecting influences and differences revealed through our analysis. In addition to being gender sensitive, interventions need to take into account the unique circumstances of each profession to better respond to the mental health needs of all genders within each professional group.

Keywords Mental health, Professional workers, Pandemic impact, Gender-based analysis

*Correspondence:
Jelena Atanackovic
jatanack@uottawa.ca
[1]Healthy Professional Worker Partnership, University of Ottawa, Ottawa, Canada
[2]Health Analysis Division, Statistics Canada, Ottawa, Canada
[3]School of Sociological and Anthropological Studies, University of Ottawa, Ottawa, 120 University Private K1N6N5, Canada

Background

The recent literature is replete with articles about the mental health impacts of the COVID-19 pandemic on the workforce [1–7]. High levels of stress and burnout have been reported among professional workers pre-pandemic [8–18], and these mental health concerns have been exacerbated by the pandemic [1–5]. But the pandemic has had unique consequences for certain professional workers for which gender is an influential factor. Our focus on gender here is on "the socially constructed roles, behaviours, expressions and identities of girls, women, boys, men, and gender diverse people" [19], in the specific case of professional workers, which entails an intersecting form of roles, behaviours and identities [20]. A cross-cutting consideration is a care work lens which recognizes the influence of both formal and informal forms of care for gendered professional workers [21]. Drawing upon two different sources of pan Canadian survey data, this paper elucidates the range of mental health experiences of professional workers across Canada during the pandemic. The comparative focus enables a novel perspective on the gendered influences of the pandemic on the mental health of different professional workers.

Mental health among professional workers (pre-pandemic)

Pre COVID-19 pandemic research shows that professional workers in various sectors experience an array of mental health issues including stress/psychological distress [8–11], burnout [12–18], anxiety [22–27] and depression [25, 28, 29].

While professional workers are susceptible to an array of mental health problems, stress/distress and burnout seem to be the most common. For instance, one Canadian study showed that severe burnout was typically found in 20-40% of healthcare workers [30]. Similarly, stress and burnout are chronic phenomena reported by teachers often resulting in high rates of attrition [31, 32]. One US study, for instance, revealed that stress was the most frequently cited reason for leaving among teachers before the pandemic [31]. Similarly, a Canadian study of academics conducted in 2010 revealed that 13% reported a substantial level of psychological distress [33]. A study of accountants in the UK found that 90% have experienced work stress, with 43% deciding to take time off due to stress [34].

The literature emphasizes the importance of work-related factors, such as long hours, role overload, inflexible work schedule, or challenging or hostile students/clients/patients, critical incidents and emotion work (in the case of some health professions) and less secure employment status negatively impacting the mental health of professional workers [13, 35–39]. While some of these stressors are common, some are profession specific. For instance, some evidence shows that for one in every six to 10 dentists in the US who experience substance use disorder, contributing factors include feeling isolated in practice and having controlled substances available [40].

Impact of the pandemic on professional workers' mental health

The COVID-19 pandemic has brought with it an unprecedented amount of stress and burnout to professional workers [5, 7, 41]. These effects were especially significant among those who were directly at risk of becoming infected due to the nature of their jobs (e.g., *frontline healthcare workers directly exposed to virus such as nurses, dentists, emergency physicians and teachers*) [1–5]. Canadian data revealed over three-quarters (77%) of health professional workers working in direct contact with confirmed or suspected cases of COVID-19 reported worse mental health compared with before the pandemic and almost two thirds (63%) perceived their days were quite a bit or extremely stressful [41]. In the US, a Rand Corporation survey revealed that a much higher proportion of teachers felt stressed and reported symptoms of depression than the general adult population causing 1 in 4 to consider leaving their jobs [6]. Even professional workers not on the frontline have reported mental health concerns. A study of accountants in the US in March 2022 found nearly all reported suffering from burnout (99%) [7].

Some factors that led to declining mental health among many professional workers during the pandemic are long hours, heavy workloads, new compliance rules, forecasts of an impending economic downturn, family concerns, and the shift to remote or hybrid work, fear of infection and lack of appropriate protective equipment (in the case of frontline workers) [31, 42, 43].

In addition, some evidence shows that presenteeism – the trend of employees continuing to work when they are feeling unwell – has significantly increased during the pandemic, especially in some professions, such as medicine and nursing, which has been shown to affect service provision [44–46].

Influence of gender

Gender shapes the mental health experiences of all workers, including professional workers. Studies conducted with professional workers before the pandemic showed that the prevalence of stress/distress and burnout were higher among men [17, 47], while others showed higher rates of prevalence among women [37, 48–50]. These mixed results are evident even within the same profession. For instance, some studies report that burnout and other mental health conditions seem to be more prevalent among female than male dentists [51], while others suggest that these conditions are more frequent among male dentists [17, 52]. Mental health issues may

manifest themselves in different ways according to gender. For instance, one study on gender differences related to burnout in public accounting has revealed that women reported higher levels of reduced personal accomplishment and men reported higher levels of depersonalization [14].

The COVID-19 pandemic has also been shown to have uniquely gendered impacts on the mental health of professional workers [43, 53]. Some studies find greater psychological distress and poorer mental health outcomes among women [53–55]. These trends are linked to increased caregiving responsibilities and other care and housework duties that disproportionately fell on women during the lockdowns [53–55]. The consideration of care work – at home and at work – undertaken by gendered workers in different professions is emerging as a critically influential factor.

While the existing research yields important insights of mental health concerns among professional workers, there is a need for more research that examines these impacts empirically and explicitly from a gender and comparative perspective across professions. Our analysis also builds on a growing literature that highlights the uniquely gendered impacts of the pandemic on professional workers, and how gender intersects with professional identify insofar as mental health is concerned [50, 56, 57].

Methods

This paper undertakes a secondary data analysis of two different pan Canadian sources to address the pandemic impact on professional workers: The Canadian Community Health Survey (2020, 2021) administered by Statistics Canada and the Healthy Professional Worker survey (2021). Across the two datasets, we focused on the following professional workers - academics, accountants, dentists, nurses, physicians and teachers - which represent a range of work settings and gender composition.

Canadian Community Health Survey (CCHS)

Data source

This study used two annual cycles of the Canadian Community Health Survey (CCHS). The CCHS is a large-scale, population-based cross-sectional survey conducted by Statistics Canada [58]. The CCHS uses a stratified multi-stage cluster sampling design to ensure that the survey results are representative of the Canadian population. The survey collects information related to health status, health care utilization, and health determinants for the Canadian population [58]. The CCHS data is collected from persons aged 12 and over, living in private dwellings in over 100 health regions covering all provinces. The CCHS covers approximately 98% of the Canadian population aged 12 and over [58, 59].

This analysis focused on the data on self-reported mental health outcomes since the pandemic using the two cycles: CCHS 2020[1] – September to December 2020, and CCHS 2021. The two data cycles (2020, 2021) were combined and analyzed to attain sample sizes large enough to yield reasonable estimates [61]. The original sampling weights were adjusted by a factor of two (because two cycles were combined) to represent the Canadian household population [62–64]. The combined estimates do not represent the population of any particular year; rather, they reflect the average Canadian household population across the 2020 (September) to 2021 period [64].

Sample

The sample size of the combined data (CCHS 2020 -September to December 2020 and CCHS 2021) was 32,214 participants (15,626 men and 16,588 women), representing 18,538,985 persons aged 15–75[2] who reported "worked at a job/business last week" or "absent from work/business last week." The response rate for the cycles were: 23.6% (2020), and 24.1% (2021) respectively. The sample of case study professional (CSP) workers were 2,533 representing 1,454,229 workers (502,219 men and 952,010 women) in 2020 and 2021. For more details on sample characteristics, please see Table 1 below.

Measures

- Gender is based on a question asking, "*What is your gender*?" Responses were reported under three categories: male, female, and gender diverse in the 2020 CCHS and 2021 CCHS. The 'Gender diverse' category includes persons reporting a gender other than male or female, persons reporting being unsure of their gender, persons reporting being both male and female, or neither male nor female. Unfortunately, because of the small sample size, individuals who were categorized as non-binary were excluded from the analysis.
- Case Study Professional (CSP) workers were identified based on self-reported occupations translated to the 4-digit codes from the National Occupational Classification for Statistics (NOC) 2016. CSP workers included accountants, nurses, doctors, dentist, professors, and teachers.

[1] After a brief pause respecting lockdowns and public health, the 2020 CCHS resumed collection in September 2020 with telephone surveys only [60]. The resumed collection between September and December 2020 provided the information reflecting respondents' experience with the pandemic. See Statistics Canada (2021) for a detailed description regarding the data validation and methodology change in the 2020 CCHS (September to December 2020).

[2] Questions concerning labour activities last week were asked of respondents aged 15 to 75.

Table 1 Selected sociodemographic characteristics of case study professional workers from the CCHS, 2020–2021

	N	%
Sample size	32,214	100.0
Weighted N	18,538,985	100.0
Gender		
Male	9,737,228	52.5
Female	8,801,756	47.5
Age group		
15 to 24 years	2,149,734	17.9
25 to 44 years	8,526,615	31.6
45 to 64 years	7,031,202	31.1
65 years or older	831,434	19.5
Provinces		
Newfoundland and Labrador	218,261	1.2
Prince Edward Island	80,140	0.4
Nova Scotia	464,026	2.5
New Brunswick	364,643	2.0
Quebec	4,209,329	22.7
Ontario	7,250,431	39.1
Manitoba	650,935	3.5
Saskatchewan	573,781	3.1
Alberta	2,181,674	11.8
British Columbia	2,545,765	13.7
CSP workers		
Non CSP workers	16,427,548	91.9
Total CSP workers	1,454,229	8.1
Accountants	329,812	1.8
Nurses	387,725	2.2
Physicians	129,377	0.7
Dentists	15,507	0.1
Professors	301,548	1.7
Teachers	286,039	1.6

Data sources: Canadian Community Health Survey annual cycles 2020 (September to December) and 2021. Data excludes the three Canadian Territories

- Worsened mental health retrospectively measures self-perceived mental health during the pandemic compared to before the pandemic started. Respondents were asked, "*Compared to before the pandemic started, how would you say your mental health is now? Would you say…: much better now? Somewhat better now? About the same? Somewhat worse now? Much worse now?*" Those who answered somewhat worse now or much worse now were classified as having worsened mental health.

Analytical techniques

Inferential statistics analyses were conducted to provide prevalence rates of self-perceived worsened mental health since the pandemic and to examine the inter-group differences.

The symbol E next to an estimate indicates that the coefficient of variation[3] for this estimate was between 15.1% and 35.0% and the data quality was marginal. Users should interpret these results with caution. Statistical significance was indicated based on the tests with a p-value of less than 0.05. Bootstrap weights[4] were used for significance tests.

Healthy Professional Worker Survey (HPWS)

Data source

As part of the Healthy Professional Worker Partnership[5], a bilingual (French-English), self-administered survey was launched across Canada which included questions related to the intersectional and contextualized experiences of professional workers during the COVID-19 pandemic. The professions included in this survey were medicine, nursing, dentistry, midwifery, academia, teaching, and accounting. The survey was made available online through the Qualtrics platform, and recruitment took place between the end of November 2020 and early May 2021. A convenience sampling approach was employed, utilizing professional association partner organizations, direct email invitations, and social media for recruitment. Research Ethics Board approval was obtained from the University of Ottawa and 16 other collaborating universities.

The survey design incorporated common questions related to the pandemic impact applicable to all professions. Additionally, customized questions tailored to the unique work circumstances of each case study profession were included. Respondents were guided to relevant questions based on their initial profession-specific response, employing an invisible skip-logic feature. The survey took approximately 20 min to complete, with only the initial question being mandatory.

[3] The coefficient of variation (CV) of an estimate is obtained by dividing the standard deviation of the estimate by the estimate itself and is expressed as a percentage of the estimate. Statistics Canada commonly uses CV results when analyzing data and urges users producing estimates from the CCHS data files to also do so. According to Statistics Canada's sampling variability guidelines, estimates with CV not greater than 15.0% are acceptable; estimates with CV between 15.1% and 35.0% can be considered for general unrestricted release but should be accompanied by a warning cautioning subsequent users of the high sampling variability associated with the estimates; estimates with CV greater than 35% are not acceptable and recommended not to release [58, 59].

[4] Bootstrap weights were provided with the data. The bootstrap method is the one recommended by Statistics Canada for analysis of CCHS data to take the stratification, clustering and multiple frame design into account when calculating the variance [58, 59].

[5] Healthy Professional Worker Partnership is a pan-Canadian study that was designed to examine the gendered nature of mental health issues, leaves of absence and return to work experiences of a range of professional workers from a comparative perspective.

Sample

Data analysis was conducted on surveys with a completion rate of 90% or higher, resulting in 3759 retained surveys across the following case studies: Academia (379; *(250 women/92 men)*), Accounting (312; *(202 women/94 men)*), Dentistry (397; *(194 women/185 men)*), Medicine (310; *(258 women/46 men)*), Midwifery (202; *(188 women/0 men)*), Nursing (1013; *(929 women/60 men)*), and Teaching[6] (756; *(585 women/140 men)*). Overall, 2606 women, 617 men and 52 respondents identified as gender fluid, preferred to self-describe or preferred not to answer. For more information on the HPW survey sample, please refer to Table 2.

Measures

Gender was identified from the question, "*What is your gender?*" where it was noted that "Gender refers to the gender that a person internally feels ('gender identity' along the gender spectrum) and/or the gender a person publicly expresses ('gender expression') in their daily life, including at work, while shopping or accessing other services, in their housing environment or in the broader community. A person's current gender may differ from the sex a person was assigned at birth (male or female) and may differ from what is indicated on their current legal documents. A person's gender may change over time." The response categories included: (1) Woman; (2) Man; (3) Non-binary/Gender fluid; and (4) Prefer to self-describe. Gender analyses of the HPW data was limited to binary categories due to the small sample size, which prevented the inclusion of respondents with other gender-diverse identities. Profession was determined in response to the question, "*What is your primary profession/professional role?*"

Table 2 Selected sociodemographic characteristics of respondents to the Healthy Professional Worker Survey, 2021

Sample characteristic	*n*	%
Gender		
Man	617	18.3%
Woman	2606	77.4%
Non-binary+	25	0.7%
Prefer to self-describe	13	0.4%
Prefer not to answer	14	0.4%
BIPOC		
BIPOC	343	10.2%
Sexual orientation		
Heterosexual/Straight	2879	85%
Gay/Lesbian	108	3.2%
Bisexual	137	4.1%
Prefer to self-describe	66	2.0%
Prefer not to answer	69	2.0%
Presence of children		
Living with dependent children or stepchildren	1,133	33.6%
Profession		
Academic	379	11.2%
Accountant	312	9.3%
Dentist	397	11.8%
Teacher	756	22.4%
Midwife	202	6.0%
Nurse	1013	30.1%
Physician	310	9.2%

Notes: Percentages based on $N = 3369$ participants who selected a profession

[6] Note. 756 education workers selected their role as teacher. Those who opted for "other" role and specified roles similar to teaching were included in the teacher group.

The following outcome variables were asked first of respondents to reflect on the present context where they were [during the pandemic] and in February of 2020 [prior to the pandemic]:

- Mental health was identified through the question, *In general, since the start of the COVID-19 pandemic, how would you say your mental health has been?* with response options ranging from Poor (1) to Excellent (5).
- Self-reported distress was measured by the Kessler Psychological Distress Scale (K6) [65] which measures how frequently respondents experienced the following emotions: (1) nervous, (2) hopeless, (3) restless or fidgety, (4) so depressed that nothing could cheer them up, (5) felt everything was an effort, and (6) felt worthless. This included, *Since the start of the COVID-19 pandemic, about how often have you felt nervous? felt hopeless? felt restless or fidgety? felt so depressed that nothing could cheer you up? felt that everything was an effort? experienced feelings of worthlessness?* Responses were scored from 0 (none of the time) to 4 (all of the time).
- Burnout was assessed using a single-item measure taken from the Physician Worklife Survey. This was worded as follows: *Thinking of the time since the start of the COVID-19 pandemic, how would you rate your level of burnout?* where participants rate from (1) "I have no symptoms of burnout" to (5) "I am completely burnt out.
- Presenteeism was assessed using the Stanford Presenteeism Scale (SPS-6), a 6-item self-report questionnaire that measures the degree to which individuals continue working despite mental health challenges [65]. This included: *Since the start of the COVID-19 pandemic, because of my state of mental health, the stresses of my job were hard to handle… despite my state of mental health, I was able to finish hard tasks in my work….my state of mental health distracted me from taking pleasure in my work….I felt hopeless about finishing certain work tasks, due to my state of mental health…. I was able to focus*

on achieving my goals despite my state of mental health.... despite my state of mental health, I have felt energetic enough to complete all my work. Summed scores were grouped into five categories representing different levels of presenteeism, with score ranges as follows: 6–10, 11–15, 16–20, 21–25, and 26–30.

Analytical techniques

Analysis was performed on non-missing values, including frequency tabulations and mean comparisons. Changes in measures were calculated by subtracting the retrospective self-reported values from the values recorded during the COVID-19 pandemic. Statistical significance was assessed using t-test, with a p-value threshold of less than 0.05, based on the null hypothesis that the difference between the two means is equal to zero.

Results

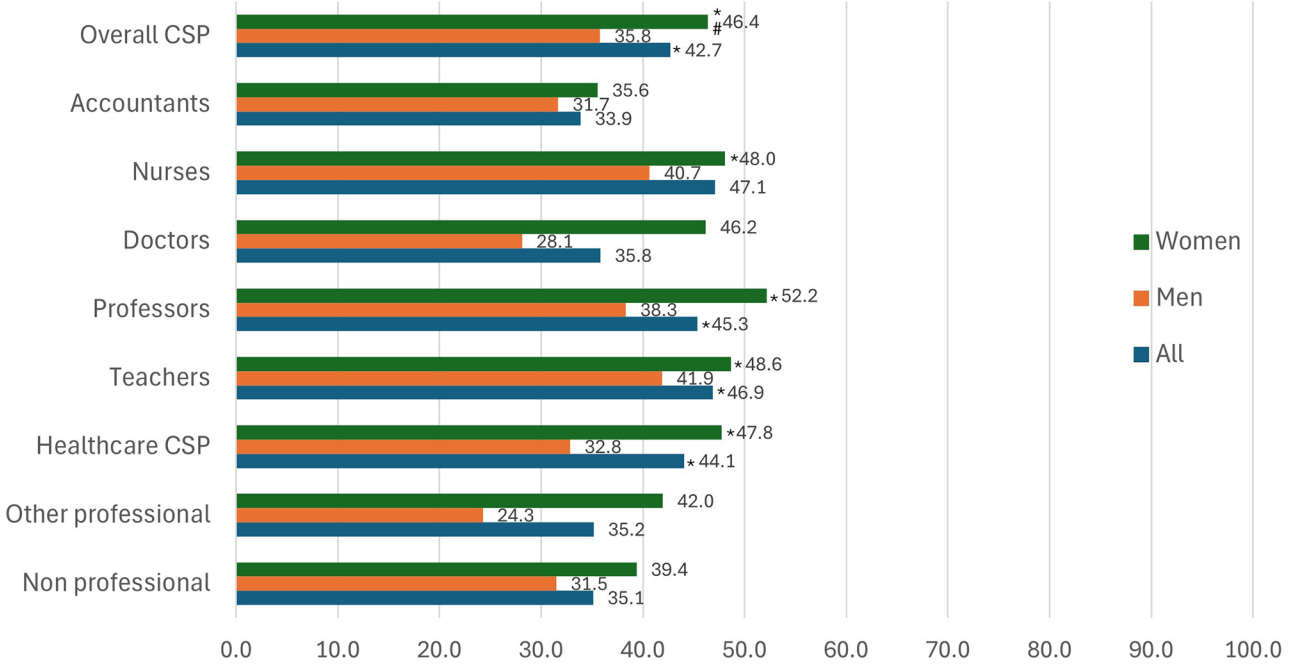
Self-reported worsening of mental health (CCHS)

Figure 1 shows that a considerable number of CSP workers reported that their mental health worsened since the COVID-19 pandemic. 43% of CSP workers reported worsened mental health compared to 35% of their non-professional counterparts. Also, women CSP workers were more likely to report worsened mental health than men CSP workers (46% vs. 36%). Significantly higher rates were found among women whose professions were academic professors (52%), nurses (48%), and teachers (49%).

Self-reported mental health - before & during the pandemic (HPWS)

Similar to the CCHS findings, HPWS data showed there was a significant decline in self-reported mental health from the pre-pandemic period to the pandemic period across all professions included in HPWS. Figure 2 reveals that self-reported mental health was situated between the midpoint of "good" and "very good" prior to the pandemic. Self-reported mental health during the pandemic was lower to the midpoint between "fair" and "good." Notably, while there was no clear clustering of professions with similar characteristics before COVID-19, professions predominantly occupied by women such as midwifery, nursing, and teaching reported particularly low levels of self-reported mental health during the pandemic.

Analysis conducted of gender differences within the professional case studies revealed that women in academia and medicine reported a significantly larger decline in self-reported mental health (Table 3).



*Significantly different from non professional workers at 95% level.
#Significantly different from men of the same occupational category at 95% level.
E Interpret with caution.
Data sources: CCHS 2020, CCHS 2021

Fig. 1 Prevalence (%) of workers who reported worsening mental health since the COVID-19, CCHS, 2020–2021

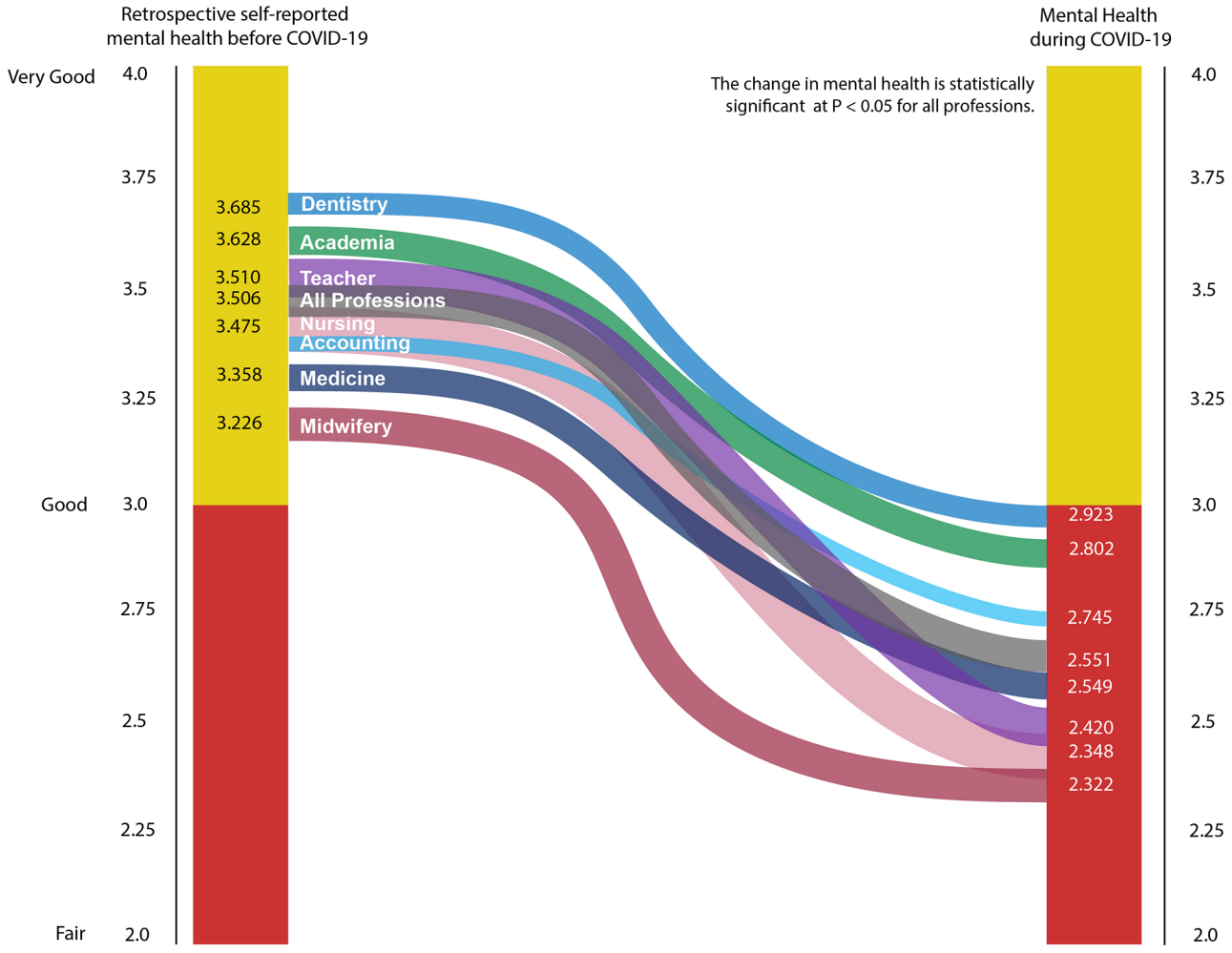


Fig. 2 Self-reported mental health before and during the pandemic, HPWS, 2021

Self-reported distress (HPWS)

Self-reported measures of distress, as measured by the Kessler 6 scale were significantly higher for all professions during the COVID-19 pandemic compared with before its onset (Fig. 3). There was no obvious stratification by gender before the COVID-19 pandemic; however, during the pandemic, elevated levels of distress were particularly evident in professions where women are predominant, such as nursing, teaching, and midwifery. Analysis conducted of gender differences within the profession revealed that women in academia, medicine, and teaching reported significantly higher levels of distress compared to men (Table 3).

Self-reported burnout (HPWS)

Analysis of the single-item burnout question showed an increase in retrospective self-reported burnout during the pandemic compared to prior to it. Prior to the pandemic, most professions fell within the category of "occasionally burned out." The pandemic has led to a shift in several professions towards the category of "experiencing one or more symptoms of burnout." Health professionals reported the highest mean burnout score prior to the COVID-19 pandemic, with medicine reporting the highest burnout score. During the pandemic, professions where women are the majority, such as nursing, midwifery, and teaching reported higher burnout scores (Fig. 4). Medicine's rank changed from the highest burnout group prior to the pandemic to the 4th during the pandemic. Further gender analysis revealed women in academia (0.71 women vs. 0.43 men) and dentistry (0.61 women vs. 0.37 men) reported significantly higher burnout differences before and during COVID-19 (Table 3).

Self-reported presenteeism (HPWS)

While all professions reported presenteeism before COVID, our analysis shows an increase in presenteeism among all the professions during the pandemic (with exception of dentists and education workers as data were not requested of these respondents). Health professions, such as Medicine, and two female dominated professions, Nursing and Midwifery, ranked higher in presenteeism

Table 3 Mental health, distress, presenteeism & burnout by profession & gender, HPWS, 2021

Profession	Gender	Mental Health			Distress			Presenteeism			Burnout		
		n	Mean Change	P_value	n	Mean Change	P_value	n	Mean Change	P_value	n	Mean Change	P_value
Academia	Women	247	-0.91	**0.01***	245	4.28	**0.00***	237	2	0.80	245	0.71	**0.01***
	Men	86	-0.58		86	2.55		84	1.88		86	0.43	
Accounting	Women	198	-0.67	0.14	195	3.38	0.93	191	1.3	**0.02***	197	0.53	0.30
	Men	92	-0.86		92	3.34		91	2.41		92	0.67	
Dentistry	Women	188	-0.74	0.69	185	4.04	0.10		N/A		188	0.61	**0.02***
	Men	162	-0.78		162	3.3			N/A		161	0.37	
Teachers	Women	583	-1.11	0.23	577	5.52	**0.01***		N/A		583	0.93	0.11
	Men	140	-0.99		140	4.49			N/A		140	0.87	
Medicine	Women	255	-0.86	**0.04***	253	4.21	**0.01***	252	1.52	0.15	256	0.63	0.22
	Men	46	-0.52		44	2.59		43	0.84		45	0.42	
Nursing	Women	912	-1.14	0.19	905	5.2	0.42	856	1.81	0.83	904	0.92	0.07
	Men	59	-0.95		59	4.7		55	1.91		59	0.64	

Notes: Change measures were calculated by subtracting the retrospective self-reported values from the values during the COVID-19 pandemic. *$P < 0.05$

Midwifery was excluded due to the absence of male respondents

among the professions we surveyed (Fig. 5). The biggest increase in presenteeism during the pandemic was identified in academia, followed by midwifery and nursing (Fig. 5). Analysis conducted of gender differences within the profession revealed that men in accounting reported significantly higher levels of presenteeism compared to women (Table 3).

Discussion

The two Canadian data sources we analyzed reveal a significant influence of the pandemic on the mental health of professional workers in line with the findings of existing national and international literature [5, 7, 41]. The pandemic did not have a singular effect, but rather was complex and multi-layered, experienced differently across cadres of professional workers depending on their gender, their role within the pandemic response and how the pandemic response impacted the content and context of their work.

Our analysis reveals that a significant proportion of professional workers retrospectively reported a decline in their mental health since the onset of the COVID-19 pandemic. Among CSP workers, 43% reported worsened mental health, compared to 35% of non-professional workers. Moreover, high levels of distress and burnout during the pandemic were particularly evident in nursing, teaching, and midwifery. These are the professional workers required to work during the pandemic (e.g., frontline workers) with heavier workloads and at greater risk of exposure to the virus. These findings are in line with the existing literature that shows that the mental health effects of the pandemic were especially significant among professional (e.g., frontline healthcare workers and teachers) and non-professional workers (e.g., grocery store workers, factory workers, delivery service workers, etc.) who were directly at risk of becoming infected due to the nature of their jobs [1–5, 66–68].

We found gender to have an important influence both in terms of the self-reported gender identity of individual professional workers as well as of the predominant gender of the professions we studied. National estimates based on CCHS indicated 46% of women in the professions studied reported deteriorated mental health, as opposed to 36% of men. Certain professions showed even higher rates among women in academia, teaching, and nursing. Professions where women predominate, such as midwifery, nursing, and teaching, self-reported particularly low levels of self-reported mental health and elevated rates of distress and burnout during the pandemic. This highlights the heightened influence of the pandemic on distress levels for women in these specific professional domains of work. While some literature focuses on gendered mental health impacts of pandemic more generally [69, 70], and in specific sectors or professions [53, 54],

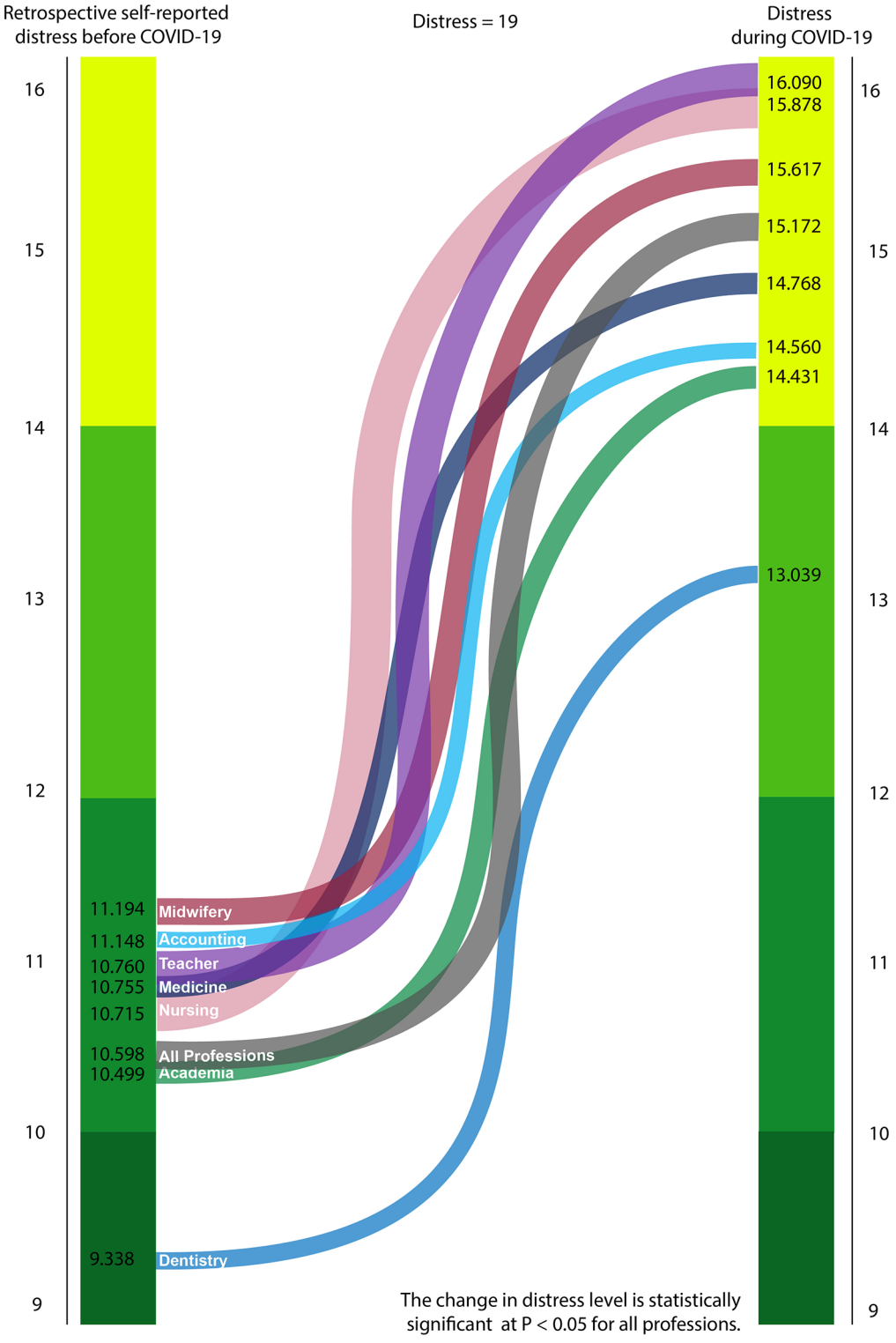


Fig. 3 Self-reported distress before and during the pandemic, HPWS, 2021

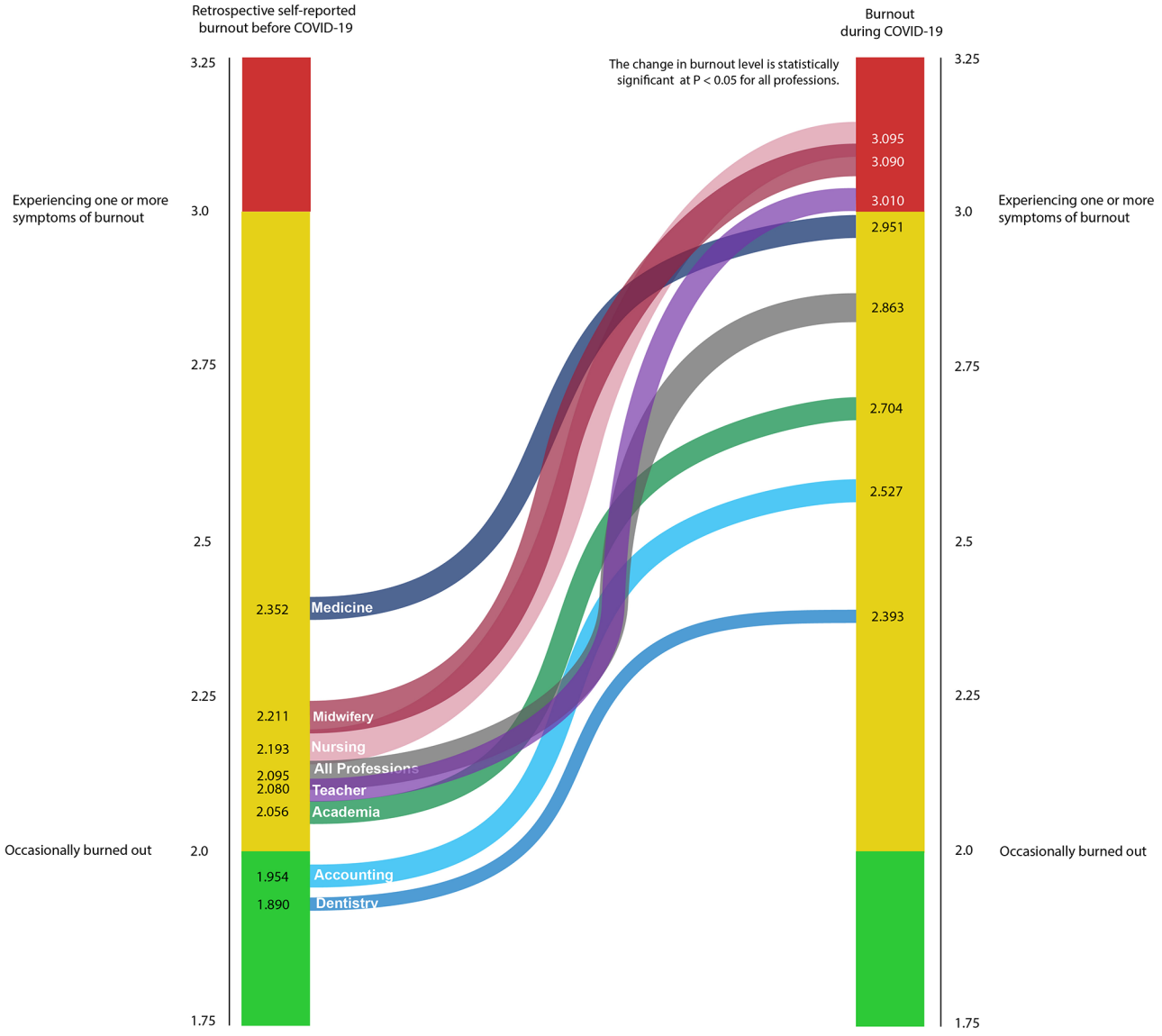


Fig. 4 Self-reported burnout before and during the pandemic, HPWS, 2021

our findings go beyond the influence of gender identity or gender roles by adding a comparative perspective on the effects of the pandemic across several professions working in different sectors. Our research contributes to the knowledge of the influence of the pandemic on professional workers comparatively and from a gender lens – a unique issue less explored in the literature.

Our results also shows that there has been a significant increase in self-reported presenteeism during the pandemic, especially in academia, midwifery and nursing. This is an important finding given that the issue of presenteeism during the pandemic remains relatively unexplored in the literature, especially from a gendered lens or comparative perspective. Most of the existing studies focus on this issue in the healthcare context [44, 45], thus neglecting the importance of this issue for other, non-healthcare professionals. Our analysis also shows that men in accounting reported significantly higher levels of presenteeism compared to women, thus emphasizing the gender dimension of this problem which has been also noted by some previous research [71].

Despite the contributions of our study, there are some notable limitations in the datasets and analyses conducted thereof. In particular, the data collection for the portion since the pandemic was conducted for part of the 2020 cycle and the 2021 cycle of CCHS. Consequently, COVID-19-related questions did not reflect respondents' experiences throughout all waves of the pandemic. The HPWS was conducted online, and the crowdsourced nature of the recruitment and convenience sample means that generalizability may be limited and results (including the p-values) should be interpreted with caution. As the

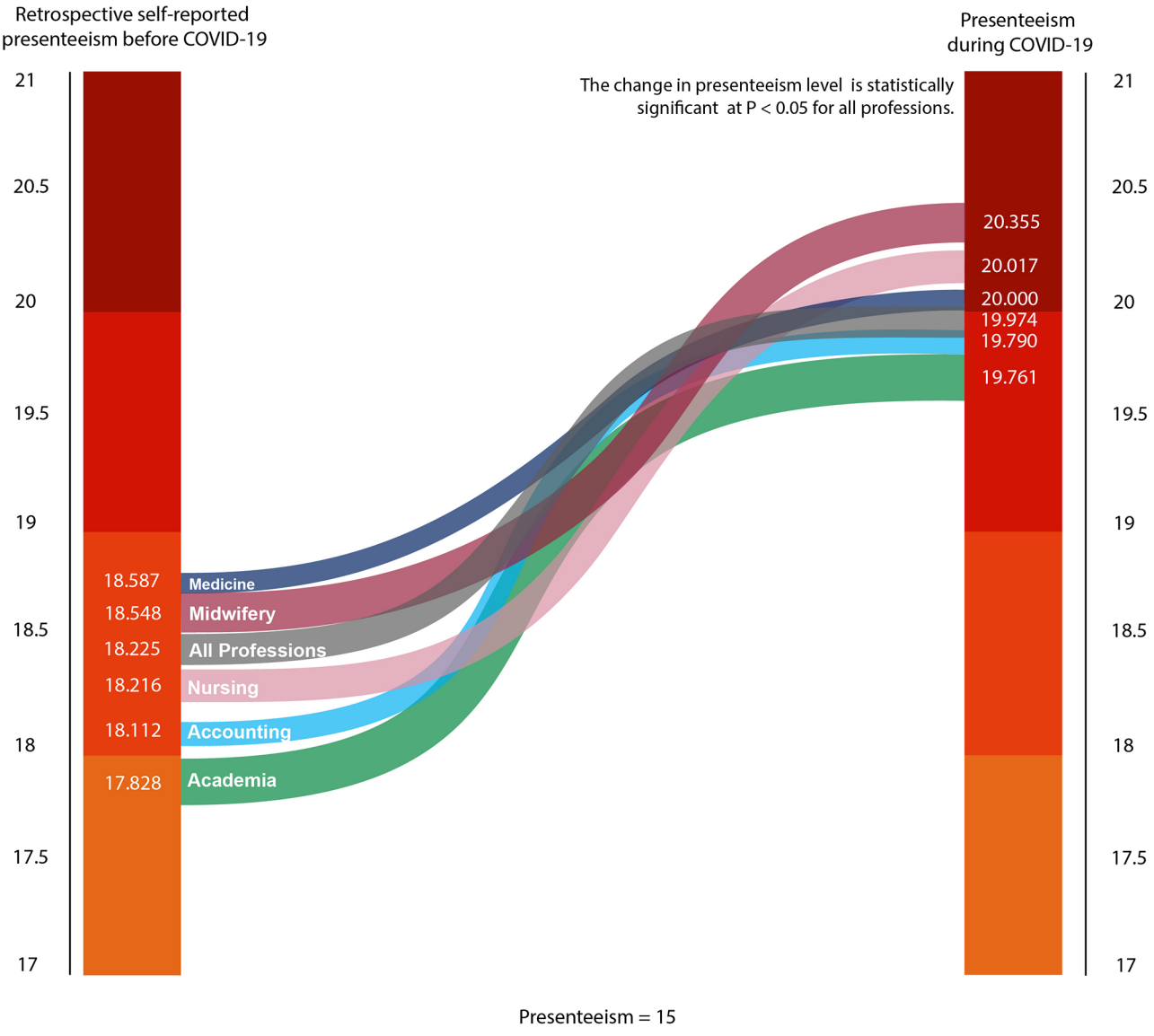


Fig. 5 Self-reported presenteeism before and during the pandemic, HPWS 2021

CCHS and HPWS are both cross-sectional surveys, the measurement of the outcome variable (changes in mental health) relied on a retrospective question. Respondents may have had difficulties recalling precisely what their mental health status was, particularly before the pandemic, with potential for recall bias. It is known that survey respondents tend to report past attitudes and feelings that align more with their current situation and current societal norms and values [72]. Further, the mental health outcomes in this analysis were self-reported and cannot be interpreted as equivalent to clinical diagnoses.

Our analysis of the gendered effects of the pandemic on mental health was focused on comparing outcomes between men and women, neglecting the wide spectrum of other gender diverse identities, which was difficult to undertake considering the insufficiency of the non-binary sample in both the HPWS and CCHS. In future work, we extend the analysis to the intersection of gender with measures of race/ethnicity, age and other personal, familial and work/organizational characteristics considered beyond the scope for this paper.

Future research that compares across different professions and different work contexts (including jurisdictions and countries), including the influence of gender and other social identities is strongly encouraged. To more accurately assess the change, it would be necessary to capture these data across two time points and where the longer-term impacts of the pandemic should also be addressed.

Despite these limitations, our findings have important policy and practice implications and offer valuable insights on how the pandemic impacted mental health

outcomes of professional workers. Our findings have important implications for employers in different sectors as they suggest a need for emergency preparedness plans that take into consideration mental health needs of employees during crisis/disaster situations. Given our finding that the highest distress and burnout scores were identified among certain professionals who were at direct risk of being exposed to the virus and more likely to be women, it seems pertinent that such plans would be of special importance to those professionals who are directly exposed to the threat (e.g., virus, fire, etc.) during emergencies and would need to recognize their full gendered lives. Also, the existing WHO's strategic preparedness and response plan for COVID-19 [73] may benefit from strategies focusing on gendered mental health needs and experiences of various workers, including professional workers.

Conclusions

Our results revealed a significant influence of the pandemic on the self-reported mental health of professional workers, that there were differences across professional workers and that gender had a notable influence both at the individual and professional level. Our analysis has shown significant differences in self-reported mental health, distress, burnout and presenteeism prior to and during the pandemic, as well as the overall impact of the pandemic on mental health. Interventions to address the negative mental health consequences of the pandemic, including their unique gendered and professional dimensions, should consider the intersecting influences and differences revealed through our analysis. In addition to being gender sensitive, interventions need to take into account the unique circumstances of each profession to better respond to the mental health needs of all genders within each professional group.

Abbreviations

CCHS	Canadian Community Health Survey
CSP Workers	Case Study Professional Workers
HPW	Healthy Professional Worker
HPWS	Healthy Professional Worker Survey

Acknowledgements

We would like to acknowledge Sarah Simkin and Christine Tulk for their contributions to data analysis and Renata Khalikova for her contributions to data visualization.

Author contributions

JA conducted literature review for the paper and was a major contributor in writing the manuscript. HB performed the analysis of HPW survey data. JP analyzed and interpreted the Canadian Community Health Survey (CCHS) data regarding mental health outcomes of different professional groups during the pandemic. MC reviewed the manuscript and contributed to the interpretation of the teaching data. IB designed the HPW component of the study, commissioned the CCHS analysis and contributed to the overall structure of the paper. All authors read and approved the final manuscript.

Funding

This work was supported by the Canadian Institute for Health Research (CIHR) under Grant #159072; Social Sciences & Humanities Research Council (SSHRC) under Grant # 895-2018-4014.

Data availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

Ethics board approval for the overall project was received by the University of Ottawa Research Ethics Board (S-05-19-2508 - REG-2508 -) and research ethics boards of other 16 participating universities from team members across Canada. Our research was conducted in accordance with the Declaration of Helsinki. Each HPW survey participant provided the consent to participate before they started the survey.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Received: 16 February 2024 / Accepted: 24 February 2025
Published online: 13 March 2025

References

1. Alencar C, de Silva M, Jural AM, Magno LA, Campos MB, de Silva EA et al. CM. Factors associated with depression, anxiety and stress among dentists during the COVID-19 pandemic. Braz oral res. 2021 [cited 2023 Feb 22];35:e084. Available from: http://www.scielo.br/scielo.php?script=sci_arttext%26pid=S1806-83242021000100274%26tlng=en
2. Barut S, Uçar T, Sabanci Baransel E. Sleep quality, perceived stress, and quality of life of healthcare professionals working in direct contact with COVID-19 (+) patients: A comparative study. Journal of Surgery and Medicine. 2021 Jun 1 [cited 2023 Apr 18];5(6):606–10. Available from: https://ojs.selsistem.com.tr/doi/https://doi.org/10.28982/josam.935556
3. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. JAMA Netw Open. 2020 Mar 23 [cited 2023 Feb 13];3(3):e203976. Available from: https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2763229
4. Nguyen J, Liu A, McKenney M, Liu H, Ang D, Elkbuli A. Impacts and challenges of the COVID-19 pandemic on emergency medicine physicians in the United States. The American Journal of Emergency Medicine. 2021 Oct [cited 2023 Feb 13];48:38–47. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0735675721002746
5. Ozamiz-Etxebarria N, Berasategi Santxo N, Idoiaga Mondragon N, Dosil Santamaría M. The Psychological State of Teachers During the COVID-19 Crisis: The Challenge of Returning to Face-to-Face Teaching. Front Psychol. 2021 Jan 12 [cited 2023 Feb 13];11:620718. Available from: https://www.frontiersin.org/articles/https://doi.org/10.3389/fpsyg.2020.620718/full
6. Steiner ED, Woo A. Job-Related Stress Threatens the Teacher Supply: Key Findings from the 2021 State of the U.S. Teacher Survey. RAND Corporation; 2021 Jun [cited 2023 Apr 21]. Available from: https://www.rand.org/pubs/research_reports/RRA1108-1.html
7. FloQast. Controller's Guidebook: Burnout in Accounting – Understanding the Problem, Leveraging Solutions. 2022. Available from: https://floqast.com/controllers-guidebook/burnout-in-accounting/
8. Kelly T, Barrett M. The Leading Causes and Potential Consequences of Occupational Stress: A Study of Irish Trainee Accountants. Accounting, Finance & Governance Review. 2011 Dec 31 [cited 2022 Mar 8]; Available from: https://afgr.scholasticahq.com/article/27033-the-leading-causes-and-potential-consequences-of-occupational-stress-a-study-of-irish-trainee-accountants
9. Košir K, Tement S, Licardo M, Habe K. Two sides of the same coin? The role of rumination and reflection in elementary school teachers' classroom stress and burnout. Teaching and Teacher Education. 2015 Apr [cited 2023 Apr

4];47:131–41. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0742051X15000074
10. Mehta M, Singh MM, Gupta SK, Kushal A. Study of Stress among Health Care Professionals: A Systemic Review. International Journal of Research Foundation of Hospital and Healthcare Administration. 2018 Jun [cited 2023 Apr 4];6(1):6–11. Available from: https://www.jrfhha.com/doi/https://doi.org/10.5005/jp-journals-10035-1084
11. Mountz A. Women on the edge: Workplace stress at universities in North America: Women on the edge. The Canadian Geographer / Le Géographe canadien. 2016 Jun [cited 2023 Apr 4];60(2):205–18. Available from: https://onlinelibrary.wiley.com/doi/https://doi.org/10.1111/cag.12277
12. Aytekin et al. Burnout levels in neonatal intensive care nurses and its effects on their quality of life. Australian J Adv Nurs. 2013;31(2).
13. Brunsting NC, Sreckovic MA, Lane KL. Special Education Teacher Burnout: A Synthesis of Research from 1979 to 2013. Education and Treatment of Children. 2014 [cited 2022 Mar 8];37(4):681–711. Available from: http://muse.jhu.edu/content/crossref/journals/education_and_treatment_of_children/v037/37.4.brunsting.html
14. Guthrie CP, Jones A. Job burnout in public accounting: understanding gender differences. Journal of Managerial Issues. 2012;24(4):390–411. Available from: http://www.jstor.org/stable/43488148
15. Rothenberger DA. Physician Burnout and Well-Being: A Systematic Review and Framework for Action. Diseases of the Colon & Rectum. 2017 Jun [cited 2023 Apr 17];60(6):567–76. Available from: https://journals.lww.com/00003453-201706000-00005
16. Sabagh Z, Hall NC, Saroyan A. Antecedents, correlates and consequences of faculty burnout. Educational Research. 2018 Apr 3 [cited 2023 Apr 4];60(2):131–56. Available from: https://www.tandfonline.com/doi/full/https://doi.org/10.1080/00131881.2018.1461573
17. Singh P, Aulak DS, Mangat SS, Aulak MS, OCCMED. Systematic review: factors contributing to burnout in dentistry. 2016 Jan [cited 2021 Aug 7];66(1):27–31. Available from: https://academic.oup.com/occmed/article-lookup/doi/https://doi.org/10.1093/occmed/kqv119
18. Stoll K, Gallagher J. A survey of burnout and intentions to leave the profession among Western Canadian midwives. Women and Birth. 2019 Aug [cited 2021 Oct 28];32(4):e441–9. Available from: https://linkinghub.elsevier.com/retrieve/pii/S1871519218303196
19. Government of Canada CI of HR. What is gender? What is sex? - CIHR. 2014 [cited 2024 Sep 22]. Available from: https://cihr-irsc.gc.ca/e/48642.html
20. Rhode D. Gender and Professional Roles. Fordham Law Rev. 1994;63(1). Available from: https://ir.lawnet.fordham.edu/flr/vol63/iss1/5/
21. England P. Emerging Theories of Care Work. Annu Rev Sociol. 2005 Aug 1 [cited 2024 Oct 2];31(1):381–99. Available from: https://www.annualreviews.org/doi/https://doi.org/10.1146/annurev.soc.31.041304.122317
22. Berg LD, Huijbens EH, Larsen HG. Producing anxiety in the neoliberal university. The Canadian Geographer / Le Géographe canadien. 2016 Jun [cited 2023 Apr 17];60(2):168–80. Available from: https://onlinelibrary.wiley.com/doi/https://doi.org/10.1111/cag.12261
23. Chapman HR, Chipchase SY, Bretherton R. Understanding emotionally relevant situations in primary dental practice. 2. Reported effects of emotionally charged situations. Br Dent J. 2015 Nov [cited 2021 Oct 28];219(9):E8–E8. Available from: http://www.nature.com/articles/sj.bdj.2015.852
24. Creedy DK, Sidebotham M, Gamble J, Pallant J, Fenwick J. Prevalence of burnout, depression, anxiety and stress in Australian midwives: a cross-sectional survey. BMC Pregnancy Childbirth. 2017 Dec [cited 2023 Apr 17];17(1):13. Available from: http://bmcpregnancychildbirth.biomedcentral.com/articles/https://doi.org/10.1186/s12884-016-1212-5
25. Ferguson K, Frost L, Hall D. Predicting Teacher Anxiety, Depression, and Job Satisfaction. Journal of Teaching and Learning. 2012 Jan 5 [cited 2023 Apr 17];8(1). Available from: https://jtl.uwindsor.ca/index.php/jtl/article/view/2896
26. Gramstad TO, Gjestad R, Haver B. Personality traits predict job stress, depression and anxiety among junior physicians. BMC Med Educ. 2013 Dec [cited 2023 Apr 17];13(1):150. Available from: https://bmcmededuc.biomedcentral.com/articles/https://doi.org/10.1186/1472-6920-13-150
27. Hegney DG, Craigie M, Hemsworth D, Osseiran-Moisson R, Aoun S, Francis K et al. Compassion satisfaction, compassion fatigue, anxiety, depression and stress in registered nurses in Australia: study 1 results. J Nurs Manag. 2014 May [cited 2023 Apr 17];22(4):506–18. Available from: https://onlinelibrary.wiley.com/doi/https://doi.org/10.1111/jonm.12160
28. Fowler S. Burnout and depression in academia: A look at the discourse of the university. Empedocles: European Journal for the Philosophy of Communication. 2015 Oct 1 [cited 2023 Apr 18];6(2):155–67. Available from: https://intellectdiscover.com/content/journals/10.1386/ejpc.6.2.155_1
29. Silver SR, Li J, Marsh SM, Carbone EG. Prepandemic Mental Health and Well-being: Differences Within the Health Care Workforce and the Need for Targeted Resources. J Occup Environ Med. 2022 Dec [cited 2023 Apr 4];64(12):1025–35. Available from: https://journals.lww.com/https://doi.org/10.1097/JOM.0000000000002630
30. Maunder RG, Heeney ND, Strudwick G, Shin HD, O'Neill B, Young N et al. Burnout in Hospital-Based Healthcare Workers during COVID-19. Ontario COVID-19 Science Advisory Table; 2021 Oct [cited 2023 Mar 6]. Available from: https://covid19-sciencetable.ca/sciencebrief/burnout-in-hospital-based-healthcare-workers-during-covid-19
31. Diliberti MK, Schwartz HL, Grant D. Stress Topped the Reasons Why Public School Teachers Quit, Even Before COVID-19. RAND Corporation; 2021 Feb [cited 2023 Apr 18]. Available from: https://www.rand.org/pubs/research_reports/RRA1121-2.html
32. García-Carmona M, Marín MD, Aguayo R. Burnout syndrome in secondary school teachers: a systematic review and meta-analysis. Soc Psychol Educ. 2019 Feb [cited 2023 Apr 18];22(1):189–208. Available from: http://link.springer.com/https://doi.org/10.1007/s11218-018-9471-9
33. Catano V, Francis L, Haines T, Kirpalani H, Shannon H, Stringer B et al. Occupational stress in Canadian universities: A national survey. International Journal of Stress Management. 2010 Aug [cited 2023 Apr 18];17(3):232–58. Available from: http://doi.apa.org/getdoi.cfm?doi=10.1037/a0018582
34. Lemmon T, Accountancy A. 2019 [cited 2023 Apr 21]. How many accountants are unaffected by stress? Just 2%. Available from: https://www.accountancyage.com/2019/05/13/how-many-accountants-are-unaffected-by-stress-just-2/
35. Ben-Ezra M, Palgi Y, Walker R, Many A, Hamam-Raz Y. The impact of perinatal death on obstetrics nurses: a longitudinal and cross-sectional examination. Journal of Perinatal Medicine. 2014 Jan 1 [cited 2022 Mar 8];42(1). Available from: https://www.degruyter.com/document/doi/https://doi.org/10.1515/jpm-2013-0071/html
36. Boran A, Shawaheen M, Khader Y, Amarin Z, Hill Rice V. Work-related stress among health professionals in northern Jordan. Occupational Medicine. 2012 Mar 1 [cited 2022 Mar 8];62(2):145–7. Available from: https://academic.oup.com/occmed/article-lookup/doi/https://doi.org/10.1093/occmed/kqr180
37. Foster K, Birdsell Bauer L. Out of Shadows: EXPERIENCES OF CONTRACT ACADEMIC STAFF.2018. Available from: https://www.caut.ca/sites/default/files/cas_report.pdf
38. Jones A, Norman CS, Wier B. Healthy Lifestyle as a Coping Mechanism for Role Stress in Public Accounting. Behavioral Research in Accounting. 2010 Jan 1 [cited 2023 Apr 18];22(1):21–41. Available from: https://publications.aahq.org/bria/article/22/1/21/6760/Healthy-Lifestyle-as-a-Coping-Mechanism-for-Role
39. Pezaro S, Clyne W, Turner A, Fulton EA, Gerada C. 'Midwives Overboard!' Inside their hearts are breaking, their makeup may be flaking but their smile still stays on. Women and Birth. 2016 Jun [cited 2021 Aug 7];29(3):e59–66. Available from: https://linkinghub.elsevier.com/retrieve/pii/S1871519215003261
40. Claytor W. Substance Use Disorders Among Dentists. Decisions in Dentistry. 2021 [cited 2023 Apr 18]; Available from: https://decisionsindentistry.com/article/substance-use-disorder-among-dentists/
41. Government of Canada SC. The Daily. 2021 [cited 2022 Jan 10]. Mental health among health care workers in Canada during the COVID-19 pandemic. Available from: https://www150.statcan.gc.ca/n1/daily-quotidien/210202/dq210202a-eng.htm
42. Tyson J, CFO Dive. 2022 [cited 2023 Apr 18]. Most accountants suffer burnout: study. Available from: https://www.cfodive.com/news/most-accountants-suffer-burnout-study/627850/
43. De Kock JH, Latham HA, Leslie SJ, Grindle M, Munoz SA, Ellis L et al. A rapid review of the impact of COVID-19 on the mental health of healthcare workers: implications for supporting psychological well-being. BMC Public Health. 2021 Jan 9 [cited 2023 Apr 21];21(1):104. Available from: https://doi.org/10.1186/s12889-020-10070-3
44. Ishimaru T, Yoshikawa T, Okawara M, Kido M, Nakashima Y, Nakayasu A et al. Presenteeism in front-line physicians involved in COVID-19-related clinical practice: a national survey of employed physician members of the Japan Medical Association. Environ Health Prev Med. 2023 [cited 2023 Nov 2];28(0):13–13. Available from: https://www.jstage.jst.go.jp/article/ehpm/28/0/28_22-00194/_article
45. White-Means SI, Warren CL, Osmani AR. The Organizational Impact of Presenteeism among Key Healthcare Workers due to the COVID-19 Pandemic. The Review of Black Political Economy. 2022 Mar [cited 2023 Nov 2];49(1):20–40.

Available from: http://journals.sagepub.com/doi/https://doi.org/10.1177/00346446211065175
46. Tori K, Dinh TTH, Mather C. Healthcare Professional Presenteeism during a COVID-19 Outbreak in an Australian Rural Healthcare Environment: A Case Analysis. IJERPH. 2021 Aug 6 [cited 2023 Nov 2];18(16):8336. Available from: https://www.mdpi.com/1660-4601/18/16/8336
47. la Cañadas-De GA, Ortega E, Ramirez-Baena L, De la Fuente-Solana EI, Vargas C, Gómez-Urquiza JL. Gender, marital status, and children as risk factors for burnout in nurses: A Meta-Analytic study. Int J Environ Res Public Health. 2018;15(10):2102.
48. West CP, Dyrbye LN, Shanafelt TD. Physician burnout: contributors, consequences and solutions. Journal of Internal Medicine. 2018 [cited 2023 Apr 24];283(6):516–29. Available from: https://onlinelibrary.wiley.com/doi/abs/10.1111/joim.12752
49. Leonelli LB, Andreoni S, Martins P, Kozasa EH, Salvo VLD, Sopezki D et al. Estresse percebido em profissionais da Estratégia Saúde da Família. Rev bras epidemiol. 2017 Jun [cited 2023 Apr 21];20(2):286–98. Available from: http://www.scielo.br/scielo.php?script=sci_arttext%26pid=S1415-790X2017000200286%26lng=pt%26tlng=pt
50. Bourgeault I, Park J, Kohen D, Atanackovic J, James Y. A Gendered Analysis of Work, Stress and Mental Health, Among Professional and Non-Professional Workers. P&P. 2021 Nov 19 [cited 2022 Mar 17];11(2). Available from: https://journals.oslomet.no/index.php/pp/article/view/4029
51. Puriene A, Aleksejuniene J, Petrauskiene J, Balciuniene I, Janulyte V. Self-perceived Mental Health and Job Satisfaction among Lithuanian Dentists. INDUSTRIAL HEALTH. 2008 [cited 2023 Apr 24];46(3):247–52. Available from: https://www.jstage.jst.go.jp/article/indhealth/46/3/46_3_247/_article
52. Ali Bana KFMA, Abbassi ZA, Saleem S, Assessment Of Depression Among The Dentists Of Karachi By Using AKUAD Scale. J Bahria Uni Med Dent Coll. 2019 Sep 4 [cited 2023 Apr 24];09(03):183–7. Available from: https://journals.indexcopernicus.com/search/article?articleId=4111761
53. Morgan R, Tan HL, Oveisi N, Memmott C, Korzuchowski A, Hawkins K et al. Women healthcare workers' experiences during COVID-19 and other crises: A scoping review. Int J Nurs Stud Adv. 2022 Dec [cited 2023 Apr 21];4:100066. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8801061/
54. Del Piccolo L, Donisi V, Raffaelli R, Garzon S, Perlini C, Rimondini M et al. The Psychological Impact of COVID-19 on Healthcare Providers in Obstetrics: A Cross-Sectional Survey Study. Frontiers in Psychology. 2021 [cited 2023 Apr 21];12. Available from: https://www.frontiersin.org/articles/https://doi.org/10.3389/fpsyg.2021.632999
55. Sharma N, Vaish H. Impact of COVID – 19 on mental health and physical load on women professionals: an online cross-sectional survey. Health Care for Women International. 2020 Dec 1 [cited 2023 Apr 21];41(11–12):1255–72. Available from: https://doi.org/10.1080/07399332.2020.1825441
56. Chen C, Guan Z, Sun L, Zhou T, Guan R. COVID -19 exposure, pandemic-related appraisals, coping strategies, and psychological symptoms among the frontline medical staff and gender differences in coping processes. Applied Cognitive Psychology. 2022 Jan [cited 2024 Oct 2];36(1):111–20. Available from: https://onlinelibrary.wiley.com/doi/https://doi.org/10.1002/acp.3902
57. Lorello GR, Gautam M, Barned C, Peer M. Impact of the intersection of anaesthesia and gender on burnout and mental health, illustrated by the COVID-19 pandemic. Anaesthesia. 2021 Apr [cited 2024 Oct 2];76(S4):24–31. Available from: https://associationofanaesthetists-publications.onlinelibrary.wiley.com/doi/https://doi.org/10.1111/anae.15360
58. Statistics Canada. Canadian Community Health Survey (CCHS) Annual component User guide. 2020 September to December Microdata file (including CHSS cases). 2021.
59. Statistics Canada. Canadian Community Health Survey (CCHS) Annual component User guide. 2021 Microdata file. 2022.
60. Statistics Canada. The Daily — Canadian Community Health Survey. 2020. 2021 [cited 2024 Feb 15]. Available from: https://www150.statcan.gc.ca/n1/daily-quotidien/210908/dq210908b-eng.htm
61. Thomas S, Wannell B. Combining cycles of the Canadian community health survey. Health Rep. 2009;20(1):53–8.
62. Rotermann M. The impact of considering birthplace in analyses of immigrant health. Health Rep. 2011;22(4):37–43.
63. Ng E, Pottie K, Spitzer D. Official Language proficiency and self-reported health among immigrants to Canada. Health Rep. 2011;22(4):15–23.
64. Statistics Canada. Canadian Community Health Survey (CCHS) - Annual Component User Guide, 2010 and 2009–2010 Microdata Files. 2011 [cited 2020 Nov 16]. Available from: https://www23.statcan.gc.ca/imdb-bmdi/pub/document/3226_D7_T9_V8-eng.pdf
65. Koopman C, Pelletier KR, Murray JF, Sharda CE, Berger ML, Turpin RS et al. Stanford Presenteeism Scale: Health Status and Employee Productivity: Journal of Occupational and Environmental Medicine. 2002 Jan [cited 2024 Feb 7];44(1):14–20. Available from: http://journals.lww.com/00043764-200201000-00004
66. Janson M, Sharkey JD, Del Cid DA. Predictors of Mental Health Outcomes in Grocery Store Workers amid the COVID-19 Pandemic and Implications for Workplace Safety and Moral Injury. IJERPH. 2021 Aug 17 [cited 2024 Sep 22];18(16):8675. Available from: https://www.mdpi.com/1660-4601/18/16/8675
67. Mayer B, Arora M, Helm S, Barnett M. Essential but Ill-Prepared: How the COVID-19 Pandemic Affects the Mental Health of the Grocery Store Workforce. Public Health Rep. 2022 Jan [cited 2024 Sep 22];137(1):120–7. Available from: http://journals.sagepub.com/doi/https://doi.org/10.1177/00333549211045817
68. Chowdhury N, Kainth A, Godlu A, Farinas HA, Sikdar S, Turin TC. Mental Health and Well-Being Needs among Non-Health Essential Workers during Recent Epidemics and Pandemics. IJERPH. 2022 May 13 [cited 2024 Sep 22];19(10):5961. Available from: https://www.mdpi.com/1660-4601/19/10/5961
69. Thibaut F, Van Wijngaarden-Cremers PJM. Women's Mental Health in the Time of Covid-19 Pandemic. Front Glob Womens Health. 2020 Dec 8 [cited 2023 Nov 2];1:588372. Available from: https://www.frontiersin.org/articles/https://doi.org/10.3389/fgwh.2020.588372/full
70. Almeida M, Shrestha AD, Stojanac D, Miller LJ. The impact of the COVID-19 pandemic on women's mental health. Arch Womens Ment Health. 2020 Dec [cited 2023 Nov 2];23(6):741–8. Available from: http://link.springer.com/https://doi.org/10.1007/s00737-020-01092-2
71. Gustafsson Sendén M, Schenck-Gustafsson K, Fridner A. Gender differences in Reasons for Sickness Presenteeism - a study among GPs in a Swedish health care organization. Ann of Occup and Environ Med. 2016 Dec [cited 2024 Sep 23];28(1):50. Available from: https://aoemj.org/journal/view.php?doi=10.1186/s40557-016-0136-x
72. Hipp L, Bünning M, Munnes S, Sauermann A. Problems and pitfalls of retrospective survey questions in COVID-19 studies. Survey Research Methods. 2020 Jun 2 [cited 2024 Feb 15];109–114 Pages. Available from: https://ojs.ub.uni-konstanz.de/srm/article/view/7741
73. World Health Organization. COVID-19 Strategic Preparedness and Response Plan 2022: Global Monitoring and Evaluation Framework. 2022. Available from: https://www.who.int/publications/m/item/covid-19-strategic-preparedness-and-response-plan-2022--global-monitoring-and-evaluation-framework

Publisher's note