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Severe Depression in Healthcare Workers: Sociodemographic and psychosocial factors during the COVID-19 pandemic

Depressão severa em trabalhadores da saúde: fatores sociodemográficos e psicossociais durante a pandemia de COVID-19

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Abstract. *Objective.* The study investigated the association between severe depression prevalence in healthcare workers and various factors during the COVID-19 pandemic. *Methods.* 610 participants completed an online questionnaire, including the Center for Epidemiologic Studies Depression Scale (CESD). Crude and adjusted prevalence ratios were calculated using Poisson regression. *Results.* Severe depression prevalence was 62.8%. In the adjusted model, women, and those with a family income of up to 4 minimum wages had a higher outcome prevalence. Factors such as poor working conditions, high stigma perception, elevated concern levels, low professional recognition, and increased medication/psychiatric treatment usage were associated with higher severe depression prevalence during the pandemic. Strengthening public policies for healthcare personnel during public-health disasters is essential.

Keywords. Depression, mental health, health personnel, psychosocial factors, cross-sectional studies, COVID-19

Resumo. *Objetivo.* O estudo investigou a associação entre a prevalência de depressão severa entre trabalhadores da saúde e diversos fatores durante a pandemia de COVID-19. *Método.* 610 trabalhadores responderam um questionário online incluindo a Escala de Depressão do Centro de Estudos Epidemiológicos (CESD). Razões de prevalência brutas e ajustadas foram calculadas usando regressão de Poisson. *Resultados.* A prevalência de depressão severa foi de 62,8%. No modelo ajustado, mulheres e aqueles com renda familiar de até 4 salários-mínimos apresentaram risco mais elevado. Condições de trabalho precárias, percepção elevada de estigma, preocupação, baixo reconhecimento profissional e maior uso de medicamentos e tratamento psiquiátrico associaram-se a maior prevalência de depressão severa. É fundamental fortalecer políticas públicas voltadas aos trabalhadores da saúde durante desastres de saúde pública.

Palavras-Chave. Depressão, pessoal de saúde, fatores psicossociais, estudos transversais, COVID-19

Introduction

Biological or public health disasters have profound and lasting effects on population's well-being, often triggering emotional distress and dysfunctional behaviors that can persist over time (Pfefferbaum et al., 2012; Makwana, 2019). Along with social and economic losses, affected individuals and communities frequently experience mental instability that can lead to anxiety and depression. Among recent global crises, the COVID-19 pandemic stands out as an unprecedented biological disaster due to its scale, duration, and the broad range of socioeconomic domains affected (Freitas et al., 2023; Xiong et al., 2020).

Although most individuals exposed to stressful events during public health emergencies do not develop clinical mental disorders, the magnitude of the pandemic substantially increased the prevalence of depression and anxiety worldwide. Meta-analyses conducted in the first year of the pandemic reported depression rates in the general population ranging from 7 to 48% (Bueno-Notivol et al., 2021; Lee et al., 2021). The first two years of the pandemic were marked by high levels of uncertainty and rapid transformations in work and social life, strongly affecting the mental health of the population—particularly Healthcare Workers (HCWs) (Ferrari & Brust-Renck, 2021; Weibelzahl, et al., 2021).

HCWs were among the groups most vulnerable to the mental health consequences of the pandemic because of their direct exposure to risk, intense workload, and moral conflicts associated with patient care (Hernández-Torres et al., 2023; Lai et al., 2020). Systematic reviews identified depression, anxiety, and stress as the most frequent problems in this population (Marvaldi et al., 2021). Depression, conceptualized by the Pan American Health Organization (2018) as a serious mental disorder that can substantially impair work and social functioning, was prevalent among frontline personnel regardless of age, racial background, or socioeconomic status (Vilagut et al., 2016).

International studies during COVID-19 consistently revealed high rates of depressive symptoms among HCWs. For instance, 50% of professionals in Chinese hospitals (Lai et al., 2020) and nearly half of respondents in New York during the 2020 hospitalization peak (Shechter et al., 2020) reported depressive symptoms. Similar findings were observed in European contexts, where being female, single, and working in COVID-19 areas predicted higher depression scores (Di Tella et al., 2020). In the regional context, a study reported 44.7% of Mexican HCWs surveyed showed depression (Lucas-Hernández et al., 2022), with female, single, and medical residents showing higher prevalence.

Major stressors reported by HCWs included insufficient protective equipment, fear of contagion, uncertainty about institutional protocols, and the risk of infecting family members (Deressa et al., 2021; Simms et al., 2020). The literature review by Coelho et al. (2022) reveals that psychoactive drugs are widely used by HCW and are associated with different causes such as high workload, overwork, complexity of dealing with human lives, difficulties inherent in the profession, and absence, not rarely, of a suitable structure for their activities. Lack of institutional support and leadership communication were also associated with higher psychological burden, whereas organizational and peer support appeared to mitigate distress (Feingold et al., 2021).

The fear of contagion, uncertainty, and stigmatization were triggers of high levels of depression, anxiety, and stress (Koren et al., 2023; Lai et al., 2020). In the COVID-19 pandemic, a systematic review of 14 observational studies in 10 countries indicated 43% of participants experienced stigmatization and 45% violence (Saragih et al., 2021). The effects of stigma led 9% of professionals to consider resigning and to be reluctant to go to work (Couto et al., 2021). Stigmatization and violence were related to physical and mental distress, fear of going to work, and avoidance of public spaces (Bitencourt et al., 2021).

A systematic review of the mental suffering of HCWs in different countries in 2020 found that the

prevalence of depression ranged from 7% to 76% (Marvaldi et al., 2021). The magnitude of variation may be due to extrinsic factors, such as the duration effect of the pandemic on the exhaustion of professionals and the accumulation of adverse experiences. Lee et al. (2021) meta-analysis with data from 33 countries highlighted that the prevalence of depression symptoms was lower in countries where governments promptly implemented stricter policies to control the pandemic. The higher prevalence of symptoms appeared to be related to late measures adopted by countries, as was the case in Brazil.

In Brazil, studies conducted among nurses and other health professionals revealed similar trends. Depression symptoms affected between one-third and half of the participants, with associated factors including female gender, younger age, lower income, excessive workload, and inadequate work structure (Garcia et al., 2022; Santos et al., 2021; Silva-Costa et al., 2022). The scarcity of personal protective equipment, lack of clear institutional guidelines, and the feeling of being undervalued were also frequently reported as predictors of emotional distress. These findings suggest that depression among HCWs arises from a complex interaction between sociodemographic conditions (such as gender and income), occupational stressors (including workload, exposure, and lack of resources), and psychosocial factors (such as social support, fear, and stigma).

Although the literature has established a strong association between occupational exposure and mental health outcomes, few studies have examined these three dimensions together within an integrated conceptual model, especially in Latin American contexts. Understanding how these multilevel factors converge is crucial to developing evidence-based strategies to strengthen the mental health of HCWs and prepare health systems for future emergencies. Given the high prevalence of depressive symptoms reported among HCWs during the pandemic, this study focuses specifically on severe depressive symptoms, as they represent the most vulnerable segment of this workforce and demand greater attention from research and public health interventions.

Therefore, this study aimed to analyze the association between severe depression and sociodemographic, occupational, and psychosocial factors among healthcare workers during a public health crisis. We hypothesized that: 1) adverse occupational and psychosocial conditions—such as long working hours, lack of institutional support, social stigmatization, and insufficient protective resources—would be positively associated with severe depressive symptoms; and 2) sociodemographic vulnerabilities, particularly being female and having a lower income, would increase the probability of severe depression

Method

Design of the study

A cross-sectional observational design study was carried out on a sample of HCWs in the state of Rio Grande do Sul, the southernmost state in Brazil. A non-probabilistic sample was selected among those in the state for convenience.

Participants

A total of 627 participants was estimated for sample size based on Hair et al. (2019) sampling theory based on the number of measurement variables. In the current study, we have 19 measurement variables, which led to the estimation of 570 participants with 30 participants per variable. We have then included a 10% additional estimation to account for possible dropout rates given this was online psychological research (Hoerger, 2010).

Overall, the survey was started with 632 HCWs, of which 22 were incomplete and excluded. The final study sample included 610 participants (mean age=39.7 years, SD=10.3), of whom 85% were women, 66% were married/with a partner, 59% had children, and 83% self-identified as white. Most participants resided in the capital city or metropolitan region (71.1%). Participants had a college degree in nursing (27.5%), went to medical school (21.5%), and

some were nursing technicians (21.8%). Most participants worked in hospital settings (71.6%), many of which were federal or state institutions (73.4%). About half of the participants were full-time workers (57.7%) and many worked, at least partially, in the frontline during the pandemic (78.5%).

Procedure

Participants were recruited through social networks (e.g., Facebook, Instagram, LinkedIn) and direct messages from researchers (e.g., WhatsApp, institutional email lists) from July 2020 and May 2021. Participants received a link to take the survey after agreeing with the online Informed Consent Form.

Data were collected using a standardized and pre-tested questionnaire consisting of questions about sociodemographic characteristics, work-related conditions, perception of psychosocial aspects during the pandemic, and symptoms of depression. A pilot study was carried out with 10 HCWs (who did not participate in the final survey) to evaluate the understanding of the questions and estimate their duration. Some questions were modified.

Instruments

The online form has comprised pre-tested questions on sociodemographic, work-related, and psychosocial variables, as well as the Center for Epidemiologic Studies Depression Scale (CES-D) as described below.

Sociodemographic variables. 1) Participant's sex (female/male); 2) age (classified by a proportion of approximately 1/3 in each group: up to 34 years/35 to 43/44 or more); 3) skin color (white/black, brown, yellow or indigenous), 4) marital status (with/without a partner); 5) children (with/without); and 6) family income (classified by a proportion of approximately 1/3 in each group: up to 4 minimum wages/4 to 10 minimum wages/10 minimum wages or more). It is important to note that skin color/race was self-reported according to the official classification system of the Brazilian Institute of Geography and Statistics (IBGE), which includes the categories branco (white), preto (black), pardo (brown), amarelo (yellow), and indígena (Indigenous). These categories are the national standard used in demographic and health surveys to allow comparability across studies and to capture social and structural inequalities related to race and color in Brazil. Consistent with IBGE's conceptual framework, this variable is comprehended as a socially constructed marker of inequality (IBGE, 2022; Freeman et al., 2025).

Work-related variables. 1) Workplace setting (hospital/primary healthcare); 2) professional category (nursing/medicine and other professions); and 3) work situation (support staff/frontline only, and both frontline and support staff).

Psychosocial variables related to work. 1) Received technical training at the institution related to COVID-19 (yes/no); 2) Satisfaction with the training on COVID-19 (meet all needs and doubts or answered partially/helped little); 3) Existence of a protocol for suspected or confirmed cases at the institution (yes/no); 4) Existence of a testing protocol for employees at the institution (yes/no); 5) Perception of PPE availability (always/most of the time/less than half of the time/almost never); 6) I feel that people on the street are afraid of me when they identify that I am a health professional (never/sometimes/always); 7) I feel that close people have already avoided being close to me for fear of being contaminated (never/sometimes/always); 8) I feel that I was mistreated because I am a health professional (never/sometimes/always); 9) Fear of lack of materials and equipment to work with (yes/no); 10) Fear of being overwhelmed with work (yes/no); 11) I feel hopeless during the pandemic (yes/no); 12) Fear of being infected by COVID-19 (not afraid/a little afraid/very afraid); 13) Fear of being stigmatized for being a health professional (not afraid/a little afraid/very afraid); 14) I feel valued as a health professional (never/sometimes/always); 15) I feel supported to continue acting as a health professional (never/sometimes/always); 16) Use of controlled medication (yes/no); 17) Did or are undergoing psychiatric treatment (yes/no); 18) Use of non-prescribed psychotropic medications during the pandemic (I don't

use/no, decreased/no, remained the same/yes, increased); and 19) Use of alcohol in the pandemic (I don't use/no, decreased/no, remained the same/yes, increased).

Outcome. The Center for Epidemiologic Studies Depression Scale (CES-D) in its Portuguese version (Hauck & Teixeira, 2011) was used to assess depressive symptoms experienced in the previous week. The scale has 20 items about mood, psychosomatic symptoms, interactions with others, and motor functioning. Responses were scored on a four-point Likert scale, in which 0=Rarely (less than 1 day), 1=Shortly (1-2 days), 2=Moderately (3-4 days), 3=During most of the time (5-7 days). Responses were added, providing a score between 0 and 60. The presence of severe depressive symptoms was defined as a CES-D score of ≥ 20 (Vilagut et al., 2016). This cutoff was chosen to identify clinically relevant levels of distress and ensure greater analytical contrast between groups, given the high overall prevalence of depressive symptoms (62.8%) in the sample. Reliability in the current sample was adequate with a Cronbach´s Alpha value of 0.896.

Statistical analysis

Data analysis was carried out in two stages. First, a principal components analysis was conducted with the psychosocial variables related to work during the pandemic to identify patterns of responses and to aggregate scores for further analyses. We used a Varimax rotation and Kaiser Normalization to add variability and avoid collinearity between predictors (Hair et al., 2019). Factor loadings equal or greater than .40 were considered in the composition of the factors, and some variables were inverted to ensure consistency in the interpretation of the factor. The factor loadings of the final model were saved and divided into quartiles for analysis, according to the classification as low (first quartile), moderate (second and third quartiles), and high (last quartile). Pearson's chi-square test and linear trend test were used to verify the independent association of each variable with the presence of severe depression symptoms.

The second stage of analysis was conducted using Stata 13.0 software to describe the prevalence of severe depression in its 95% confidence intervals and tested using Pearson's chi-square test and linear trend. Unadjusted and adjusted prevalence ratios were calculated using Poisson regression with robust variance (Victora et al., 1997). The adjustment was made by including the three blocks of variables in the following sequence: sociodemographic, labor, and psychosocial. The variables of each block were adjusted among themselves and by the previous blocks, with the variables with a significance level lower than 20% being maintained in each stage. In all analyses, a significant level of less than 5% was used.

Ethical considerations

The study was approved by the Institutional Review Board of the Universidade do Vale do Rio dos Sinos (CAAE: 34111220.5.0000.5344).

Results

The 19 variables representing psychosocial aspects related to work during the pandemic were introduced into the principal components model, of which 17 had factor loadings above 0.40. The variables "fear of being stigmatized for being a health professional" and "alcohol use during the pandemic" were excluded. The total variance explained by the five factors found was 54.7% (Table 1).

The factors were: 1) average assessment of working conditions, 2) high perception of stigmatization situations, 3) concern about work and illness during the pandemic, 4) moderate levels of feelings of devaluation as a professional, and 5) high levels of medication use and psychiatric treatment. Each of the 17 variables included in the model was associated with the presence of severe depressive symptoms among HCWs during the pandemic, except for "existence of specific protocols for assisting people with COVID-19" (Table 2).

Table 1. Principal components analysis of psychosocial aspects related to work during the COVID-19 pandemic

Questions	Components				
	1	2	3	4	5
Satisfaction with the training on COVID received (meeting needs)	**.79**	.03	-.14	.01	-.12
Receiving some specific technical training to act in the face of COVID-19	**.73**	.09	-.01	-.002	-.12
Existence of specific protocols for assisting people with COVID-19	**.62**	-.05	.10	.06	.01
Existence of a specific testing protocol for employees	**.54**	-.14	-.10	-.08	-.01
Perception of availability of personal protective equipment	**.52**	-.08	-.18	.10	-.01
Being avoided on the streets due to being an HCW	-.05	**.83**	.03	-.05	-.08
Being avoided by people close to me for fear of contamination	**-.47**	**.76**	.16	.05	-.23
Being mistreated due to being an HCW	-.05	**.63**	-.07	-.15	.23
Fear of running out of material and equipment to work with	-.02	.02	**.72**	.11	.08
Fear of being overwhelmed with work	.03	.05	**.71**	.07	.16
Feeling of hopelessness during the pandemic	-.15	.04	**.61**	-.13	.21
Fear of being infected by the new coronavirus	-.23	.02	**.49**	-.16	-.19
Feeling valued as an HCW by most of the people around me	.03	-.07	-.04	**.91**	-.03
Feeling supported by most people to continue working in healthcare	.02	-.06	-.001	**.91**	-.02
Using controlled medication	-.07	.03	.12	-.03	**.82**
Psychiatric treatment (current or past)	-.04	-.17	.17	-.003	**.70**
Use of non-prescribed psychotropic medications	-.08	.26	.01	-.01	**.62**

Note. Factor loadings >.40 are bold. Factor 1: Good working conditions. Factor 2: Perception of stigma. Factor 3: Concerns during the pandemic. Factor 4: Appreciation as a professional. Factor 5: Use of medication and psychiatric treatment.

Table 2. Frequency, proportion, and comparison of psychosocial aspects related to work during the pandemic among healthcare workers with and without severe depression symptoms

Variables	Answer options	Severe Depression Symptoms *N* (%)			χ^2 (p-value)
		With	Without	Total	
Factor 1-Good working conditions					
Satisfaction with the training on COVID received (meeting needs)	All or partially	64 (45.4)	77 (54.6)	141 (23.1)	25.43 (<0.001)
	Helped little	140 (71.4)	56 (28.6)	196 (32.1)	
Receiving specific technical training to act in the face of COVID-19	Yes	231 (58.9)	161 (41.1)	392 (64.3)	6.99 (0.008)
	No	152 (69.7)	66 (30.3)	218 (35.7)	
Existence of protocols for assisting people with COVID-19	Yes	351 (61.9)	216 (38.1)	567 (93)	2.68 (0.102)
	No	32 (74.4)	11 (25.6)	43 (7)	
Existence of a specific testing protocol for employees	Yes	238 (58.9)	166 (41.1)	404 (66.2)	7.69 (0.006)
	No	145 (70.4)	61 (29.6)	206 (33.8)	
Perception of availability of personal protective equipment (how much of the time)	Always	175 (54.2)	148 (45.8)	323 (53)	26.19 (<0.001)
	Most of	175 (71.1)	71 (28.9)	246 (40.3)	
	Less than half	20 (83.3)	4 (16.7)	24 (3.9)	

Continue

Variables	Answer options	Severe Depression Symptoms *N* (%)			χ^2 (p-value)
		With	Without	Total	
Factor 2-Perception of stigma					
Being avoided on the streets due to being an HCW	Always	48 (78.7)	13 (21.3)	61 (10.0)	19.05 (<0.001)
	Sometimes	170 (68.8)	77 (31.2)	247 (40.5)	
	Never	165 (54.6)	137 (45.4)	302 (49.5)	
Being avoided by people close to me for fear of contamination	Always	70 (82.4)	15 (17.6)	85 (13.9)	23.48 (<0.001)
	Never	96 (51.9)	89 (48.1)	185 (51.9)	
Being mistreated due to being an HCW	Sometimes	72 (80.9)	17 (19.1)	89 (14.6)	17.67 (<0.001)
	Never	294 (58.9)	205 (41.1)	499 (81.8)	
Factor 3-Concerns during the pandemic					
Fear of running out of material and equipment to work with	Yes	273 (66.9)	135 (33.1)	408 (66.9)	8.97 (0.003)
	No	110 (54.5)	92 (45.5)	202 (33.1)	
Fear of being overwhelmed with work	Yes	258 (69.9)	111 (30.1)	369 (60.5)	20.32 (<0.001)
	No	125 (51.9)	116 (48.1)	241 (39.5)	
Feeling of hopelessness during the pandemic	Yes	251 (78.4)	69 (21.6)	320 (52.5)	70.56 (<0.001)
	No	132 (45.5)	158 (54.5)	290 (47.5)	
Fear of being infected by the new coronavirus	Very much	140 (81.4)	32 (18.6)	172 (28.2)	35.94 (<0.001)
	A little bit	183 (54.6)	152 (45.4)	335 (54.9)	
Factor 4-Appreciation as a professional					
Feeling valued as an HCW by most of the people around me	Always	114 (53.3)	100 (46.7)	214 (35.1)	12.82 (0.002)
	Sometimes	205 (67.7)	98 (32.3)	303 (49.7)	
Feeling supported by most people to continue working in healthcare	Always	156 (53.4)	136 (46.6)	292 (47.9)	21.05 (<0.001)
	Sometimes	177 (71.7)	70 (28.3)	247 (40.5)	
Factor 5-Use of medication and psychiatric treatment					
Using controlled medication	Yes	199 (76.8)	60 (23.2)	259 (42.5)	31.11 (<0.001)
	No	112 (50.9)	108 (49.1)	320 (36.1)	
Psychiatric treatment (current or past)	Yes	266 (68.4)	123 (31.6)	389 (63.8)	15.65 (<0.001)
	No	70 (49.6)	70 (49.6)	71 (50.4)	
Use of non-prescribed psychotropic medications	Increased use	47 (87.0)	7 (13.0)	54 (8.9)	18.66 (<0.001)
	Don't use	282 (58.9)	197 (41.1)	479 (78.5)	

Note. Comparison performed using Pearson's Chi-square test. δ=Linear trend. Only simple categories or those with residuals ≥1.96 were included.

The overall prevalence of severe symptoms of depression was observed in 62.8% of participants. Frequencies, percentages, and comparisons of sociodemographic, work-related, and psychosocial variables based on the level of depression symptoms were presented in Table 3. The highest frequency of severe symptoms of depression was observed among women, participants between 35 and 43 years of age, nursing staff, and individuals with lower family income. In the adjusted model (Table

Table 3. Frequency, proportion, unadjusted and adjusted prevalence ratio, and confidence interval for severe depression according to the sociodemographic, work-related, and psychosocial aspects related to work during the pandemic among healthcare workers

Variables	Severe Depression Symptoms n(%)			Unadjusted		Adjusted [b]	
	With	Without	Total	PR (CI95%)	*p*	PR (CI95%)	*p*
Sex					<.001		<.001
Men	41 (43.2)	54 (56.8)	95 (15.6)	1			
Women	342 (66.4)*	173 (33.6)	515 (84.4)	1.53 (1.21-1.95)		1.50 (1.20-1.87)	
Age δ					.031		
<34 years	126 (65.3)	67 (34.7)	193 (31.6)	1			
35 to 43 years	147 (68.1)*	69 (31.9)	216 (35.4)	1.04 (0.90-1.19)			
>44 years	110 (54.7)	91 (45.3)	201 (33.0)	0.83 (0.71-0.98)			
Skin color [a]					458		
White	323 (63.5)	186 (36.5)	509 (83.4)	1			
Other	60 (59.4)	41 (40.6)	101 (16.6)	0.93 (0.78-1.11)			
Marital status					.460		
Without partner	136 (64.8)	74 (35.2)	210 (34.4)	1			
With partner	247 (61.8)	153 (38.3)	400 (65.6)	0.95 (0.84-1.08)			
Children [a]					.869		
Without	156 (62.4)	94 (37.6)	250 (41.0)	1			
With	227 (63.1)	133 (36.9)	360 (59.0)	1.01 (0.89-1.14)			
Profession [a]					.030		
Physician/Other	181 (58.6)	128 (41.4)	309 (50.7)	1			
Nursing	202 (67.1)*	99 (32.9)	301 (49.3)	1.14 (1.01-1.29)			
Income δ					<.001		.007
>10 MW	81 (50.9)	78 (49.1)	159 (26.1)	1		1	
4 to 10 MW	133 (63.9)	33 (75)	208 (34.1)	1.25 (1.04-1.50)		1.07 (0.89-1.28)	
<4 MW	159 (72.9)*	59 (27.1)	218 (35.7)	1.43 (1.20-1.70)		1.23 (1.04-1.46)	
Work situation during the pandemic [a]					.959		
Support staff	82 (62.6)	49 (37.4)	131 (21.5)	1			
Frontline worker	301 (62.8)	178 (37.2)	479 (78.5)	1.00 (0.86-1.16)			

Continue

Variables	Severe Depression Symptoms n(%)			Unadjusted		Adjusted [b]	
	With	Without	Total	PR (CI95%)	*p*	PR (CI95%)	*p*
Work location [a]					.944		
Hospital	274 (62.7)	163 (37.3)	473 (71.6)	1			
Primary care	109 (63.0)	64 (37.0)	173 (28.4)	1.00 (0.87-1.15)			
Factor 1-Good working conditions δ					<.001		0.002
Good	74 (48.7)	78 (51.3)	152 (24.9)	1		1	
Regular	204 (66.9)*	101 (33.1)	305 (50.0)	1.37 (1.14-1.64)		1.28 (1.08-1.52)	
Poor	104 (68.4)	48 (31.6)	152 (24.9)	1.40 (1.15-1.70)		1.32 (1.10-1.58)	
Factor 2-Perception of stigma δ					<.001		<.001
Low	80 (52.6)	72 (47.4)	152 (24.9)	1		1	
Medium	185 (60.5)	121 (39.5)	306 (50.0)	1.14 (0.96-1.36)		1.16 (0.99-1.37)	
High	118 (77.6)*	34 (22.4)	152 (24.9)	1.47 (1.24-1.75)		1.37 (1.16-1.62)	
Factor 3-Concerns during the pandemic δ					<.001		<.001
Low	75 (49.3)	77 (50.7)	152 (24.9)	1		1	
Medium	190 (62.1)	116 (37.9)	306 (50.0)	1.25 (1.04-1.51)		1.20 (1.01-1.42)	
High	118 (77.6)*	34 (22.4)	152 (24.9)	1.57(1.31-1.88)		1.45 (1.21-1.72)	
Factor 4-Appreciation as a professional δ					<.001		<.001
High	105 (69.1)	47 (30.9)	152 (24.9)	1		1	
Medium	204 (66.7)*	102 (33.3)	306 (50.0)	1.36 (1.14-1.64)		1.34 (1.12-1.59)	
Low	74 (48.7)	78 (51.3)	152 (24.9)	1.41 (1.16-1.72)		1.45 (1.20-1.74)	
Factor 5-Use of medication and psychiatric treatment δ					<.001		<.001
Low	80 (52.6)	72 (47.4)	152 (24.9)	1		1	
Medium	190 (62.1)	116 (37.9)	306 (50.0)	1.17 (0.99-1.40)		1.22 (1.04-1.43)	
High	113 (74.3)*	39 (25.7)	152 (24.9)	1.41 (1.18-1.68)		1.46 (1.24-1.72)	

Note. PR=Prevalence Ratio. CI=Confidence Interval. MW=Minimum Wage. δ=Linear trend.

[a] Significance between groups tested by Pearson Chi-Square. b Adjusted final model showed. Variables were included in three blocks (e.g., socio-demographic, work-related, and psychosocial) adjusted among themselves and by previous blocks. Variables with $p \leq .20$ were maintained in each block.

*$p < .05$ for comparison between categories with residuals ≥1.96.

Table 4. Unadjusted and adjusted prevalence ratio and confidence interval for severe depression according to the sociodemographic, work-related, and psychosocial aspects related to work during the pandemic among healthcare workers by gender

Variables	Women (N=515)				Men (N=95)			
	Unadjusted		Adjusted[a]		Unadjusted		Adjusted[a]	
	PR (CI95%)	*p*	PR (CI95%)	*p*	PR (CI95%)	*p*	PR (CI95%)	*p*
Age		.111				.116		
<34 years	1				1			
35 to 43 years	1.05 (0.92-1.21)				0.90 (0.54-1.51)			
>44 years	0.87 (0.74-1.03)				0.62 (0.34-1.14)			
Skin color		.539				.802		
White	1				1			
Other	0.94 (0.78-1.13)				1.07 (0.62-1.82)			
Marital status		.537				.485		
Without partner	1				1			
With partner	0.96 (0.84-1.08)				.24 (0.67-2.29)			
Children		.870				.862		
Without	1				1			
With	0.98 (0.87 -1.12)				1.04 (0.65-1.66)			
Profession		.154				.308		
Physician/Other	1							
Nursing	1.09 (0.96-1.23)							
Income		.001		.017		.093		.281
>10 MW	1		1		1		1	
4 to 10 MW	1.17 (0.96-1.41)		1.05 (0.87-1.27)		1.41 (0.79 -2.50)		1.16 (0.71-1.89)	
<4 MW	1.31 (1.10-1.57)		1.21 (1.01-1.44)		1.61 (0.89-2.88)		1.30 (0.70-2.40)	
Work situation		.994				.439		
Support staff	1				1			
Frontline worker	1.00 (0.86-1.15)				1.35 (0.63- 2.88)			
Work location		.939				.599		
Hospital	1				1			
Primary care	1.00 (0.87-1.15)				1.13(0.70 -1.82)			

Continue

Variables	Women (N=515)				Men (N=95)			
	Unadjusted		Adjusted[a]		Unadjusted		Adjusted[a]	
	PR (CI95%)	*p*	PR (CI95%)	*p*	PR (CI95%)	*p*	PR (CI95%)	*p*
F1-Good working conditions		.002		.004		.019		.200
Good	1		1		1		1	
Regular	1.35 (1.13-1. 62)		1.27 (1.07-1.51)		2.62 (0.89- 7.66)		1.24 (0.38-4.01)	
Poor	1.35 (1.11-1.64)		1.28 (1.07-1.54)		3.06 (1.02 -9.19)		1.63 (0.51-5.22)	
F2-Perception of stigma		.002		<.001		.122		
Low	1		1		1			
Medium	1.18 (0.98-1.41)		1.21 (1.02-1.44)		0.82 (0.45-1.48)			
High	1.42 (1.19-1.71)		1.39 (1.16-1.67)		1.65 (0.97-2.81)			
F3-Concerns during the pandemic		<.001		<.001		<.001		<.001
Low	1		1		1		1	
Medium	1.17 (0.98-1.40)		1.12 (0.95-1.33)		2.17 (0.91-5.18)		2.51 (0.88-7.01)	
High	1.42 (1.19-1.71)		1.31 (1.10-1.56)		3.6 (1.56-8.27)		4.29 (1.48-12.43)	
F4-Appreciation as a professional		.007		.001		.006		.128
High	1		1		1		1	
Medium	1.33 (1.11-1.60)		1.34 (1.12-1.59)		1.46 (0.72-3.06)		1.14 (0.54-2.43)	
Low	1.31 (1.07-1.60)		1.38 (1.14-1.68)		2.42 (1.21-4.87)		1.63 (0.79-3.37)	
Factor 5-Use of medication and psychiatric treatment		.001		<.001		.033		.073
Low	1		1		1		1	
Medium	1.15 (0.96-1.37)		1.20 (1.02-1.41)		1.35 (0.68-2.64)		1.13 (0.55-2.30)	
High	1.33 (1.11-1.59)		1.40 (1.19-1.66)		2.01 (1.02-3.93)		1.74 (0.84-3.58)	

Note. PR=Prevalence Ratio. CI=Confidence Interval. MW=Minimum Wage.

[a] Adjusted final model showed. Variables were included in three blocks (e.g., sociodemographic, work-related, and psychosocial) adjusted among themselves and by previous blocks. Variables with p≤.20 were maintained in each block.

3), higher prevalence of severe depression was observed in women compared to men and in HCWs with a low family income compared to groups with high income.

The same pattern of increased prevalence of severe symptoms of depression was observed in the assessment of psychosocial factors at work during the pandemic (Table 3). HCWs, who were more likely to develop severe symptoms of depression, were those who: indicated regular or poor working conditions; had a higher perception of stigma for being a health professional; had high levels of concerns related to the pandemic; perceived moderate or low levels of appreciation for their profession; and used medication or were doing psychiatric treatment.

Because sex differences during the COVID-19 pandemic were consistently highlighted in the mental health literature, additional analyses in Table 4 stratified the prevalence of severe depression for each variable. Overall prevalence was 66.4% for women and 43.2% for men. Results demonstrate that a higher prevalence of severe depression symptoms among women was associated with low income, as with a worse perception of working conditions, a greater perception of stigma, more worries during the pandemic, a lower feeling of professional appreciation, and greater use of medication and psychiatric treatment. A higher prevalence of severe symptoms of depression in men remained associated only with more worries during the pandemic.

Discussion

HCWs are more vulnerable to depressive symptoms during and after public health disasters (Hernández-Torres et al., 2023; Makwana, 2019). In the current study, HCWs presented a higher prevalence of severe symptoms of depression during the COVID-19 pandemic compared with results from previous studies with this population in Brazil (Garcia et al., 2022; Silva-Costa et al., 2022) and in other countries (Chen et al., 2022; Olaya et al., 2021).

Results demonstrated the association between high prevalence of severe depression symptoms among HCWs and sociodemographic, work-related, and psychosocial variables at work during the COVID-19 pandemic. As suggested by Lee et al. (2021), in the contexts where COVID-19 restraining measures were stricter, feelings of uncertainty and helplessness probably lessened among HCWs. As for associated factors, women had a greater prevalence than men for severe depression, which is consistent with the literature (Xiong et al., 2020; Silva-Costa et al., 2022). In the same direction, HCWs who had the lowest family income also showed a greater prevalence of severe depression compared to groups with higher earnings (Santos et al., 2021). Because most participants were women, we should consider that gender inequalities affect the lower remuneration of HCWs, generating greater concern for maintaining employment and survival among them.

The increase in mental distress has been associated in many studies with a significant increase in the demand for patient care, many of whom are in serious condition, in addition to low control over the new disease and working conditions (Almroth et al., 2021; Marvaldi et al., 2021; Morawa et al., 2021). Professionals who rated their work-related conditions as fair or poor had a higher prevalence of severe symptoms of depression, which is consistent with the working conditions reported by Blanchard et al. (2022) and inadequate management described by Nabe-Nielsen et al. (2021). HCWs with moderate and high levels of concerns related to the pandemic showed a high prevalence of severe depression, consistent with Simms et al. (2020). Workers who made medium or high use of medication or psychiatric treatment had more symptoms of severe depression. The use of medications and psychiatric treatment is expected among participants with more symptoms, and among those who already had symptoms before the COVID-19 pandemic (Coelho et al., 2022; Serralta et al., 2020).

The work environment was not the only factor that presented the highest probability of severe depression, but also the feeling of being stigmatized and rejected by people close to them or in the com-

munity, as reported in other studies (Bitencourt et al., 2021; Koren et al., 2023). Feelings of moderate or low appreciation for their work were also associated with higher levels of severe depression symptoms compared to feeling highly valued by their leadership and others, like observed by Feingold et al. (2021). Lack of appreciation was probably due to the spread of false news internationally, which contributed to the discredit of science and global public health institutions, and to weakening the population's adherence to the necessary preventive care when dealing with the epidemic (Bago et al., 2020; Galhardi et al., 2020).

Gender analyses not only showed a greater increase in severe depression symptoms in women, as observed in other studies (Di Tella et al., 2020; Silva-Costa et al., 2022), but also identified distinct situations in which female and male workers showed an increase in symptomatology. A study with frontline health professionals, reports an increase in depressive symptoms in the analysis by gender, both among women and men (Klimkiewicz et al., 2021). Being a woman was, however, associated with a higher prevalence of severe depressive symptoms, although stratification revealed that men and women were affected according to distinct psychosocial factors. Among women, lower family income was also related to a higher prevalence of severe depression, consistent with studies by Teles and Costa (2021) and Santos et al. (2021). Nevertheless, findings should be interpreted with caution due to the small men's sample size.

This study has some limitations that should be acknowledged. Its cross-sectional design and non-probabilistic sampling limit the generalizability of findings and prevent causal inferences about the relationships between sociodemographic, occupational, and psychosocial factors and severe depressive symptoms. It is crucial to consider that the findings may reflect the bidirectional process of association between severe depression symptoms, structural inequalities in pre- and post-COVID-19 working conditions, and previous mental health difficulties among healthcare workers.

In this regard, the repercussions of the COVID-19 pandemic on the mental health of healthcare workers can be understood from a syndemic perspective, as part of a complex process of disease determination stemming from the sequential and long-term interaction among social, environmental, political, and economic factors surrounding health crises (Apolonio et al., 2022). Consequently, working conditions in the healthcare sector in Brazil, already precarious before the COVID-19 pandemic, particularly among non-medical staff, have worsened with the health crisis (Machado et al., 2023), exacerbating the impact of the stressors on workers' mental health while interacting with existing gender and social inequalities. The lack of coordination on COVID-19 responses and the politicization of restriction measures by the federal government led to different levels of fatality rates in each state (Almeida et al., 2022).

The current study results showed an increased prevalence of severe depression among female participants, who were middle-aged, mostly nursing staff, with lower family income, and who showed regular working conditions, high perception of stigma, high concerns during the pandemic, moderate appreciation as a professional, and high use of medication and psychiatric treatment. Severe depression was associated with professionals not having an adequate minimum structure to carry out their activities, facing high work demands, and lacking appreciation and support from superiors and the community in which they work. Although we cannot affirm that these symptoms have started during the COVID-19 pandemic, previous literature with similar sample characteristics suggests that people with pre-existing symptoms or already treated mental health conditions have shown worse or renewed symptomatology (Zibetti et al., 2021). The impacts of this are felt not only in the private sphere, considering their relationships,

but also in the workplace, considering the way they perform their functions.

The high prevalence of severe symptoms of depression among health workers needs to be addressed for the development of public policies aimed at caring for this population, offering adequate working conditions, to qualifying health teams in the provision of healthcare services. Enhancing the mental and physical health of healthcare workers requires disaster preparedness interventions that systematically target and reinforce individual and social protective factors (Søvold et al., 2021). Creating working environments that positively impact the HCWs' well-being requires policymakers to target healthcare infrastructure, an adequate number and training of the staff, fair and timely payment, as well as the inclusion of HCWs in the decision-making process.

The originality of this study lies in its integrated analysis of sociodemographic, occupational, and psychosocial determinants of severe depression among Brazilian HCWs, offering context-specific evidence from a Latin American perspective. However, there are still limitations from the observational design, from which we cannot infer causality and face possible self-report bias given the anonymous nature of the survey. Future research should employ longitudinal designs to monitor the persistence and evolution of severe depression among HCWs in the aftermath of public health emergencies, allowing for potential cross-country comparisons like those conducted during the COVID-19 pandemic. Also, a relational gender perspective could inform the design of mixed-methods studies, providing a more comprehensive understanding of contextual and institutional factors influencing mental health outcomes in this population. Additionally, further studies are needed to explain the politicization role that might affect the mental health of HCWs during COVID-19 pandemic.

References

Almeida, L., Carelli, P. V., Cavalcanti, N. G., Nascimento, J. D., & Felinto, D. (2022). Quantifying political influence on COVID-19 fatality in Brazil. *PloS One, 17*(7), e0264293. https://doi.org/10.1371/journal.pone.0264293

Almroth, M., Hemmingsson, T., Sörberg Wallin, A., Kjellberg, K., Burström, B., & Falkstedt, D. (2021). Psychosocial working conditions and the risk of diagnosed depression: a Swedish register-based study. *Psychological Medicine, 52*(15), 1–9. https://doi.org/10.1017/S003329172100060X

Apolonio, J. S., Silva Júnior, R. T., Cuzzuol, B. R., Araújo, G. R. L., Marques, H. S., Barcelos, I. S., Santos, L. K. S., Malheiro, L. H., Lima de Souza Gonçalves, V., & Freire de Melo, F. (2022). Syndemic aspects between COVID-19 pandemic and social inequalities. *World Journal of Methodology, 12*(5), 350–364. https://doi.org/10.5662/wjm.v12.i5.350

Bago, B., Rand, D. G., & Pennycook, G. (2020). Fake news, fast and slow: Deliberation reduces belief in false (but not true) news headlines. *Journal of Experimental Psychology: General, 149*(8), 1608-1613. https://doi.org/10.1037/xge0000729

Bitencourt, M. R., Alarcão, A. C. J., Silva, L. L., Dutra, A. C., Caruzzo, N. M., Roszkowski, I., Bitencourt, M. R., Marques, V. D., Pelloso, S. M., & Carvalho, M. D. B. (2021). Predictors of violence against health professionals during the COVID-19 pandemic in Brazil: A cross-sectional study. *PLoS One, 16*(6). https://doi.org/10.1371/journal.pone.0253398

Blanchard, J., Li, Y., Bentley, S. K., Lall, M. D., Messman, A. M., Liu, Y. T., ... McCarthy, M. (2022). The perceived work environment and well-being: A survey of emergency healthcare workers during the COVID-19 pandemic. *Academic Emergency Medicine, 29*(7), 851-861. https://doi.org/10.1111/acem.14519

Bueno-Notivol, J., Gracia-García, P., Olaya, B., Lasheras, I., López-Antón, R., & Santabárbara, J. (2021). Prevalence of depression during the COVID-19 outbreak: A meta-analysis of community-based

studies. *International Journal of Clinical and Health Psychology, 21*(1), 100196. https://doi.org/10.1016/j.ijchp.2020.07.007.

Chen, Y., Wang, J., Geng, Y., Fang, Z., Zhu, L., Chen, Y., & Yao, Y. (2022). Meta-analysis of the prevalence of anxiety and depression among frontline healthcare workers during the COVID-19 pandemic. *Frontiers in public health,* 10. https://doi.org/10.3389/fpubh.2022.984630

Coelho, A. S., Marinho, J. F., Lourenço, É. E., Valadares, J. V., Gaudioso, K. G., & Mafra, V. R. (2022). O uso de medicamentos psicoativos entre os profissionais de saúde. *e-Acadêmica, 3*(2), e1432165. https://doi.org/10.52076/eacad-v3i2.165

Couto, R. N., Medeiros, E. D., Souza, A. B. C., Silva, P. G. N., Guimarães, C. L. C., & Fonseca, P. N. (2021). Healthcare professionals in COVID-19: Safety, fear, and intention to leave. *Psicologia: Teoria e Prática, 23*(1). https://www.redalyc.org/journal/1938/193874070001/html/

Deressa, W., Worku, A., Abebe, W., Gizaw, M., & Amogne, W. (2021). Risk perceptions and preventive practices of COVID-19 among healthcare professionals in public hospitals in Addis Ababa, Ethiopia. *PLoS One, 16(*6). https://pubmed.ncbi.nlm.nih.gov/34170910/

Di Tella, M., Romeo, A., Benfante, A., & Castelli, L. (2020). Mental health of healthcare workers during the COVID-19 pandemic in Italy. *Journal of Evaluation in Clinical Practice, 26*(6), 1583-1587. https://doi.org/10.1111/jep.13444

Feingold, J. H., Peccoralo, L., Chan, C. C., Kaplan, C. A., Kaye-Kauderer, H., Charney, D., Verity, J., Hurtado, A., Burka, L., Syed, S. A., Murrough, J. W., Feder, A., Pietrzak, R. H., & Ripp, J. (2021). Psychological impact of the COVID-19 pandemic on frontline healthcare workers during the pandemic surge in New York City. *Chronic Stress,* 5. https://doi.org/10.1177/24705470209778891

Ferrari, J., & Brust-Renck, P. G. (2021). Cuidados em saúde mental ofertados a profissionais de saúde durante a pandemia de Covid-19. *Revista Brasileira de Psicoterapia, 23*(1), 127-142. https://doi.org/10.5935/2318-0404.20210010

Freeman, N. C., Telles, E. E., & Goldberg, R. E. (2025). The changing relationship between racial identity and skin color in Brazil. *Proceedings of the National Academy of Sciences, 122*(1). https://doi.org/10.1073/pnas.2411495121

Freitas, A. W. Q., Witt, R. R., & Veiga, A. B. G. (2023). The health burden of natural and technological disasters in Brazil from 2013 to 2021. *Cadernos de Saúde Pública, 39*(4),. https://doi.org/10.1590/0102-311XEN154922

Galhardi, C. P., Freire, N. P. Minayo, M. C. S., & Fagundes, M.C. M. (2020). Fact or Fake? An analysis of disinformation regarding the Covid-19 pandemic in Brazil. *Science & Collective Health, 25*(Supl.2), 4201-4210. https://doi.org/10.1590/1413-812320202510.2.28922020

Garcia, G. P. A., Fracarolli, I. F. L., dos Santos, H. E. C., de Oliveira, S. A., Martins, B. G., Santin Junior, L. J., Marziale, M. H., & Rocha, F. L. R. (2022). Depression, anxiety and stress in health professionals in the COVID-19 context. *International Journal of Environmental Research and Public Health, 19*(7). https://doi.org/10.3390/ijerph19074402

Instituto Brasileiro de Geografia e Estatística. (2022). *Social inequalities due to color or race in Brazil: Concepts and methods*. https://www.ibge.gov.br/en/statistics/social/population/26017-social-inequalities-due-to-color-or-race-in-brazil.html

Hair, J., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis.* 8a Ed. Cengage.

Hauck, N. F., & Teixeira, M. A. P. (2011). A estrutura fatorial da Escala CES-D em estudantes universitários brasileiros. *Avaliação Psicológica, 10*(1), 91-97. http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S1677-04712011000100010&lng=pt&nrm=iso

Hernández-Torres, R., Martínez Lozano, M., Torres, I., Rosario-Hernández, E., Ramos-Pibernus, A.,

Soto, A., Ortiz, L., Mascayano, F., & Rivera-Segarra, E. (2023). The impact of the Covid-19 pandemic and previous natural disasters on the mental health of healthcare workers in Puerto Rico. *PLOS Global Public Health, 3*(5). https://doi.org/10.1371/journal.pgph.0001784

Hoerger, M. (2010). Participant Dropout as a Function of Survey Length in Internet-Mediated University Studies: Implications for Study Design and Voluntary Participation in Psychological Research. *Cyberpsychology, Behavior, and Social Networking, 13*(6), 697-700. https://doi.org/10.1089/cyber.2009.0445

Klimkiewicz, A., Schmalenberg, A., Klimkiewicz, J., Jasinska, A., Jasionowska, J., Machura, W., & Wojnar, M. (2021). COVID-19 pandemic influence on healthcare professionals. *Journal of Clinical Medicine, 10*(6). https://doi.org/10.3390/jcm10061280

Koren, H., Milaković, M., Bubaš, M., Bekavac, P., Bekavac, B., Bucić, L., Čvrljak, J., Capak, M., & Jeličić, P. (2023). Psychosocial risks emerged from COVID-19 pandemic and workers' mental health. *Frontier Psychology, 14*. https://doi.org/10.3389/fpsyg.2023.1148634

Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., Wu, J., Du, H., Chen, T., Li, R., Tan, H., Kang, L., Yao, L., Huang, M., Wang, H., Wang, G., Liu, Z., & Hu, S. (2020). Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Network Open, 3*(3). https://doi.org/10.1001/jamanetworkopen.2020.3976

Lee, Y., Lui, L. M., Chen-Li, D., Liao, Y., Mansur, R. B., Brietzke, E., Rosenblat, J., Ho, R., Rodrigues, N., Lipsitz, O., Nasri, F., Cao, B., Subramaniapillai, M., Gill, H., Lu, C., & McIntyre, R. S. (2021). Government response moderates the mental health impact of COVID-19: A systematic review and meta-analysis of depression outcomes across countries. *Journal of Affective Disorders, 290,* 364-377. https://doi.org/10.1016/j.jad.2021.04.050

Lucas-Hernández, A., González-Rodríguez, V. D. R., López-Flores, A., Kammar-García, A., Mancilla-Galindo, J., Vera-Lastra, O., Jiménez-López, J. L., & Peralta Amaro, A. L. (2022). Estrés, ansiedad y depresión en trabajadores de salud durante la pandemia por COVID-19. *Revista médica del Instituto Mexicano del Seguro Social, 60(*5), 556–562. https://pmc.ncbi.nlm.nih.gov/articles/PMC10395996/

Machado, M. H., Campos, F., Haddad, A. E., Santos Neto, P. M., Machado, A. V., Santana, V. G. D., Marengue, H. C. O., Santos, R. P. O., Mauaie, C. C., & Freire, N. P. (2023). Transformations in the world of healthcare work: workers and future challenges. *Ciência & Saúde Coletiva, 28*(10), 2773–2784. https://doi.org/10.1590/1413-812320232810.10702023

Makwana, N. (2019). Disaster and its impact on mental health: A narrative review. *Journal of family medicine and primary care, 8*(10), 3090–3095. https://doi.org/10.4103/jfmpc.jfmpc_893_19

Marvaldi, M., Mallet, J., Dubertret, C., Moro, M. R., & Guessoum, S. B. (2021). Anxiety, depression, trauma-related, and sleep disorders among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Neuroscience and Biobehavioral Reviews, 126,* 252–264. https://doi.org/10.1016/j.neubiorev.2021.03.024

Morawa, E., Schug, C., Geiser, F., Beschoner, P., Jerg-Bretzke, L., Albus, C., Weidner, K., Hiebel, N., Borho, A., & Erim, Y. (2021). Psychosocial burden and working conditions during the COVID-19 pandemic in Germany: The voice survey among 3678 health care workers in hospitals. *Journal of Psychosomatic Research, 144.* https://doi.org/10.1016/j.jpsychores.2021.110415

Nabe-Nielsen, K., Nilsson, C. J., Juul-Madsen, M., Bredal, C., Hansen, L. O. P., & Hansen, Å. M. (2021). COVID-19 risk management at the workplace, fear of infection and fear of transmission of infection among frontline employees. *Occupational and Environmental Medicine, 78*(4), 248-254. https://doi.org/10.1136/oemed-2020-106831

Olaya, B., Pérez-Moreno, M., Bueno-Notivol, J., Gracia-García, P., Lasheras, I., & Santabárbara, J. (2021). Prevalence of Depression among Healthcare Workers during the COVID-19 Outbreak: A Systematic Review and Meta-Analysis. *Journal of clinical medicine, 10*(15), 3406. https://doi.org/10.3390/jcm10153406

Pan American Health Organization [PAHO]. (2018). *Depression*. https://www.paho.org/en/topics/depression

Pfefferbaum, B., Schonfeld, D., Flynn, B. W., Norwood, A. E., Dodgen, D., Kaul, R. E., Donato, D., Stone, B., Brown, L. M., Reissman, D. B., Jacobs, G. A., Hobfoll, S. E., Jones, R. T., Herrmann, J., Ursano, R. J., & & Ruzek, J. I. (2012). The H1N1 crisis: A case study of the integration of mental and behavioral health in public health crises. *Disaster medicine and public health preparedness, 6*(1), 67–71. https://doi.org/10.1001/dmp.2012.2

Santos, K. M. R., Galvão, M. H. R., Gomes, S. M., Souza, T. A., Medeiros, A. de A., & Barbosa, I. R. (2021). Depression and anxiety in nursing professionals during the COVID-19 pandemic. *Escola Anna Nery, 25*(spe). https://doi.org/10.1590/2177-9465-EAN-2020-0370

Saragih, I. D., Tonapa, S. I., Saragih, I. S., Advani, S., Batubara, S. O., Suarilah, I., & Lin, C-J. (2021). Global prevalence of mental health problems among healthcare workers during the Covid-19 pandemic: A systematic review and meta-analysis. *International Journal of Nursing Studies, 121*. https://doi.org/10.1016/j.ijnurstu.2021.104002

Serralta, F. B., Zibetti, M. R., & Evans, C. (2020). Psychological distress of university workers during COVID-19 pandemic in Brazil. *International Journal of Environmental Research and Public Health, 17*(22). https://doi.org/10.3390/ijerph17228520

Shechter, A., Diaz, F., Moise, N., Anstey, D. E., Ye, S., Agarwal, S., Birk, J. L., Brodie, D., Cannone, D. E., Chang, B., Claassen, J., Cornelius, T., Derby, L., Dong, M., Givens, R. C., Hochman, B., Homma, S., Kronish, I. M., Lee, S. A. J., Manzano, W., … Abdalla, M. (2020). Psychological distress, coping behaviors, and preferences for support among New York healthcare workers during the COVID-19 pandemic. *General Hospital Psychiatry, 66,* 1-8. https://doi.org/10.1016/j.genhosppsych.2020.06.007

Silva-Costa, A., Griep, R. H., & Rotenberg, L. (2022). Percepção de risco de adoecimento por COVID-19 e depressão, ansiedade, e estresse entre trabalhadores de unidades de saúde. *Cadernos de Saúde Pública, 38*(3), 1-13. https://doi.org/10.1590/0102-311X00198321

Simms, A., Fear, N. T., & Greenberg, N. (2020). The impact of having inadequate safety equipment on mental health. *Occupational Medicine, 70*(4), 278–281. https://doi.org/10.1093/occmed/kqaa101

Søvold, L. E., Naslund, J. A., Kousoulis, A. A., Saxena, S., Qoronfleh, M. W., Grobler, C., & Münter, L. (2021). Prioritizing the mental health and well-being of healthcare workers: an urgent global public health priority. *Frontiers in public health, 9*. https://doi.org/10.3389/fpubh.2021.679397

Teles, A. K. D., & Costa, T. A. M. (2021). Fatores de risco para a depressão em profissionais de enfermagem. *Psicologias em Movimento, 1*(1), 149-167. https://revistas.unifan.edu.br/index.php/RevistaISEPsicologias/article/view/796/0

Vilagut, G., Forero, C. G., Barbaglia, G., & Alonso, J. (2016). Screening for depression in the general population with the Center for Epidemiologic Studies Depression (CES-D): A systematic review with meta-analysis. *PloS one, 11*(5). https://doi.org/10.1371/journal.pone.0155431

Victora, C. G., Huttly, S. R., Fuchs, S. C., & Olinto, M. T. (1997). The role of conceptual frameworks in epidemiological analysis: A hierarchical approach. *International Journal of Epidemiology, 26(*1), 224–227. https://doi.org/10.1093/ije/26.1.224

Weibelzahl, S., Reiter, J., & Duden, G. (2021). Depression and anxiety in healthcare professionals during

the COVID-19 pandemic. *Epidemiology and Infection, 149*(e46), 1-10. https://doi.org/10.1017/S0950268821000303

Xiong, J., Lipsitz, O., Nasri, F., Lui, L. M.W., Gill, H., Phan, L., Chen-Li, D., Iacobucci, M., Ho, R., Majeed, A ... McIntyre, R. S. (2020). Impact of COVID-19 pandemic on mental health in the general population: A systematic review. *Journal of Affective Disorders, 277*, 55-64. https://doi.org/10.1016/j.jad.2020.08.001

Zibetti, M. R., Serralta, F. B., & Brust-Renck, P. G. (2021). Desenvolvimento e relato de experiência de um Protocolo de Primeiros Cuidados Psicológicos a Distância (PCPd) durante a pandemia COVID-19. *Revista Brasileira de Psicoterapia, 23*(1), 73-90. https://doi.org/10.5935/2318-0404.20210007