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# Suicide risk and associated factors in healthcare workers seeking psychological support during COVID-19: a cross-sectional study

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## ABSTRACT

Healthcare workers have been one of the groups most severely affected by the COVID-19 pandemic, leaving them with serious psychological effects. Some of these effects have not been treated promptly, leading to further psychological symptoms. The objective of this study was to evaluate suicide risk in healthcare workers seeking psychological help during the COVID-19 pandemic, and factors associated with this risk on participants that were searching for treatment during the COVID-19 pandemic. This is a cross-sectional study analyzing data from 626 Mexican healthcare workers seeking psychological help due to the COVID-19 pandemic through the [www.personalcovid.com](http://www.personalcovid.com) platform. Before they entered treatment, the Plutchik Suicide Risk Scale, the Depression Scale of the Center for Epidemiologic Studies, the Pittsburgh Sleep Quality Index, and the Professional Quality of Life Measure, were administered. Results: 49.4% ( $n = 308$ ) presented suicide risk. The most severely affected groups were nurses (62%,  $n = 98$ ) and physicians (52.7%,  $n = 96$ ). Predictors of suicide risk in healthcare workers were secondary traumatic stress, high depressive affect, low positive affect, emotional insecurity and interpersonal problems, and medication use. Conclusions: The suicidal risk detected was high, found mostly in nurses and doctors. This study suggests the presence of psychological effects on healthcare workers, despite the time that has elapsed since the onset of the pandemic.

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## Introduction

The COVID-19 pandemic has posed a challenge for health systems worldwide, affecting healthcare workers (HCWs) in various ways, including their mental health (O'Higgins et al., 2022). At the beginning of the pandemic, the mental health consequences for HCWs who had treated patients with the virus included burnout, emotional exhaustion, psychological distress, secondary traumatic stress, constant exhaustion, feeling depressed or unhappy, diminished sleep quality and decreased concentration (Alrawashdeh et al., 2021; Orrù et al., 2021; Pan American Health Organization, 2022). Physicians and nurses have reported the poorest sleep and highest depression (Power et al., 2022). This may have been associated with the characteristics of their job position (those HCWs who were on the frontline were the most affected) (Power et al., 2022).

According to mental health data on Mexican healthcare workers responsible for COVID-19 patients, the most frequent mental health problems during the early phase of the pandemic were insomnia, depression, posttraumatic stress, and health anxiety/somatization symptoms, reporting higher frequencies in those working directly with COVID-19 patients (Robles et al., 2021). In comparison with the initial COVID-19 phase, depression and health anxiety/somatization symptoms as well as grieving due to COVID-19, personal COVID-19 status, and having relatives or close friends with COVID-19 were more frequent during the COVID-19 peak (Robles et al., 2022).

Besides, the psychological impact of HCWs includes a limited ability to enjoy everyday activities, constant exhaustion, feeling depressed or unhappy, reduced concentration, diminished sleep quality, decreased concentration, as well as depression and suicidal thoughts or ideation (Pan American Health Organization, 2022). Bismark et al. (2022) found cases of suicide ideation and self-harm in HCWs during the COVID-19 pandemic, with those at greatest risk being men, younger, lived alone and had a personal history of mental disorders. According to Mortier et al. (2021), during the early phase of the pandemic, approximately 8% of HCWs reported suicidal thoughts and behaviors, 4.9% of whom experienced passive suicide ideation and 3.5% of whom had active suicide ideation, both with and without planning or attempts.

Physicians and nurses have reported the highest rates of suicide risk compared to the general population (Melnyk, 2020), with nurses presenting a greater vulnerability (Davis et al., 2021).

Some of the reasons could be the high job demands, avoidance of use of mental health services owing to fear of stigma, greater access to means to complete suicide via medications (Davis et al., 2021).

During the first stage of COVID-19 in Mexico, 16% of frontline HCWs reported suicide ideation (in contrast with 13.4% of those working at a non-COVID-19 center), reporting the paramedics the highest rates (17.5% compared with 9.8% of nurses, 11% of psychologists, 14.3% of social workers, 15.9% of specialist residents, 16.0% of medical specialists, and 16.6% of undergraduate students) (Robles et al., 2020). The identification of suicide ideation risk factors could permit the development and implementation of specific strategies and interventions to reduce this phenomenon among frontline HCWs.

The [www.personalcovid.com](http://www.personalcovid.com) platform is an online multi-component intervention that is aimed at HCWs. Was created in 2021 to address the high impact of the pandemic

on the mental health of HCWs. To know more about ‘Personal COVID’ see Dominguez-Rodriguez et al., (2022). This article analyzes the psychological and sociodemographic factors associated with suicide risk among HCWs who registered on the platform to receive the psychological intervention.

## **Material and methods**

### ***Study design***

This was a cross-sectional, descriptive study of populations through survey research (Montero & León, 2007), undertaken during a single time frame between 17 July 2021, and 22 February 2022. Data were collected through the web platform [www.personalcovid.com](http://www.personalcovid.com), a multicomponent intervention designed for HCWs (Dominguez-Rodriguez et al., 2022).

### ***Participants and procedures***

To enroll in the online intervention, participants were required to create an account with an email address. They were not asked to provide sensitive or identifiable data, such as the name, address, or phone number of the hospital or clinic to which they are affiliated, to preserve their anonymity. Participants were asked to give their informed consent, before answering the validated questionnaires. Variables were measured before participants received the intervention. The questionnaires were provided to them inside the platform [www.personalcovid.com](http://www.personalcovid.com), in this sense the participants did not need to access no other web page or resource. The questionnaires were provided similarly in a traditional form as it would be Google Forms with one page per questionnaire, indicating a process bar that indicated how much the participant process and how much is remaining. The details of how many participants enrolled, how many dropped out of the process and how many were excluded and included can be found on [Figure 1](#).

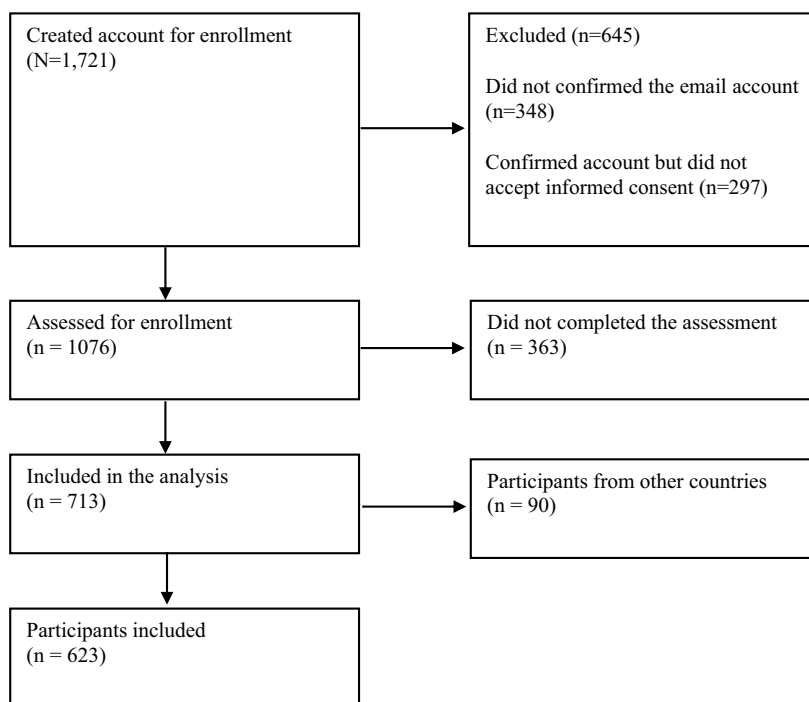
### ***Psychological measures***

#### ***Plutchik suicide risk scale***

This questionnaire evaluates current suicide risk through fifteen questions with a dichotomous format (yes/no). It explores the history of suicide attempts, suicide ideation and plans considering suicide. It establishes a cut-off point of  $> 6$  to identify those at risk of suicide at the time of evaluation and discriminates those with suicide risk and a history of suicide attempts (Plutchik & Van Praag, 1994). This scale has a reliability of  $\alpha = 0.74$  and has been used in studies with a Mexican sample (Alderete-Aguilar et al., 2017).

#### ***Professional quality of life measure (ProQoL-V)***

This instrument, measuring the quality of life during the last 30 days of workers in the caring or helping professions (Stamm, 2010), comprises 30 items answered on a six-point Likert-style scale, ranging from 0 (Never) to 5 (Always). The ProQoL-V evaluates three dimensions: Compassion Satisfaction (CS), Burnout (BO), and Secondary Traumatic



**Figure 1.** Study Flowchart.

Stress (STS). The last two are part of the compassion fatigue construct. For CS, scores below 23 suggest a low satisfaction related to the job. For BO, scores above 41 suggest feelings of not being effective in the position, and for STS, scores above 43 suggest work-related, secondary exposure to extremely or traumatically stressful events (Stamm, 2010). The instrument presents adequate reliability for CS ( $\alpha = .90$ ), BO ( $\alpha = .80$ ), and STS ( $\alpha = .84$ ) scales (Heritage et al., 2018).

### ***Pittsburgh sleep quality index (PSQI)***

Sleep quality was evaluated through the PSQI (Buysse et al., 1989). The index assesses sleep habits during the past month using 18 self-reported items, which form seven components, rating from 0 (no difficulty) to 3 (severe difficulty). The sum of the component scores results in a global score (range 0 to 21), with higher scores indicating worse sleep quality. The instrument suggests a cut-off score of  $\geq 5$  to differentiate between good and poor sleep quality (Buysse et al., 1989). In this study, global score will be used. This instrument has proven to be reliable ( $\alpha = .78$ ) (Jiménez-Genchi et al., 2008).

### ***Center for epidemiologic studies depression scale (CES-D)***

Depression levels were evaluated through the CES-D (Eaton et al., 1998). It is a self-report scale that assesses depression symptoms, based on the DSM criteria. Using a scale of 5 points, (not at all or less than 1 day; 1–2 days; 3–4 days; 5–7 days; nearly every day for 2 weeks), the participants indicated how often they experienced each of the questions/

symptoms. It is divided into six factors: Depressed affect, Positive Affect, Emotional Insecurity, and Interpersonal Problems, Somatization, Emotional Well-being, and Delayed Activity (González-Forteza et al., 2008). This instrument has been used in health research and has proven to be a valid scale among the Mexican population ( $\alpha = 0.93$ ) (González-Forteza et al., 2008).

### ***Sociodemographic information***

Sociodemographic information included open questions such as age. A dichotomous format (yes/no) was used to explore employment status. Moreover, for participants with an affirmative answer, the occupation and the length of experience there were additionally asked, with open questions. Closed questions included educational attainment, with seven options presented in a drop-down menu ranging from primary school to doctoral degree and adding the category other. Additional closed questions asked whether the person was receiving psychological treatment (yes/no) and whether the person had attempted suicide in the past three months (yes/no). The last question was included in addition to the Plutchik Suicide Risk Scale. Finally, another question explored whether the person was on medication (yes/no).

### ***Ethical considerations***

The study was approved by the Research Ethics Committee of the Autonomous University of Ciudad Juárez (CEI-2021-1-266) and is registered in Clinical Trials (NCT04890665). Participants who did not meet the inclusion criteria were excluded from the study. Those participants with suicidal risk were provided with telephones so that they could receive specialized psychological care. Those phones were from public institutions that provide free psychological care.

### ***Statistical analysis***

SPSS 24 was used for the statistical analysis. For descriptive statistics, means and standard deviations of continuous variables such as age, length of experience, sleep quality (PSQI), aspects of professional quality of life (ProQol-V) and depression (CES-D) were calculated. For the categorical variables, percentages and frequencies were obtained. To compare variables, the occupation variable was categorized as 'physicians', 'nurses', 'psychologists' and 'administrative staff', since these were the most common occupations. The rest were categorized as 'other'. Likewise, the education variable was grouped into 'Basic education' (elementary school, middle school and high school) and 'Higher education' (undergraduate and postgraduate). The risk of suicide variable was divided into 'with versus without suicide risk', considering the cut-off point of  $>6$ .

Normality was calculated for all the dependent variables with the Kolmogorov-Smirnov test, obtaining normality in the sample. The Chi-squared test was used to compare suicide risk and variables such as gender, occupation, education, psychological treatment, medication use and suicide attempts in the past three months. Student's t-test was used to compare suicide risk with age, length of experience, professional quality of life, sleep quality, and depression. Pearson's correlations were used to analyze bivariate correlations among the continuous variables in this study (suicide risk, age, length of

experience, professional quality of life, sleep quality, and depression). Student's t-test and one-way ANOVA were used to compare psychological variables (professional quality of life, sleep quality, and depression), with sociodemographic variables and psychological treatment, medication use, and suicide attempts. A Tukey Test for post hoc analysis was conducted. Finally, a logistic regression analysis was performed to explore the variables associated with suicide risk, in which only the significant variables were included. The Nagelkerke-R<sup>2</sup> was used to examine the percentage of variance associated with suicide risk explained by the continuous predictors. Adjusted odds ratio with 95% confidence intervals was also reported to measure the strength of association.

## Results

Six hundred and twenty-three participants were included. Sociodemographic and psychological characteristics are shown in Table 1. The health workers who participated were mostly physicians, nurses, psychologists and staff working in administrative positions. The 'other' category includes health workers such as laboratory technicians, radiological technicians, stretcher bearers, cleaning staff, dentists, laboratory workers, paramedics, chemists, social workers and physiotherapists.

The 49.4% ( $n = 308$ ) of participants presented suicide risk, 84.1% ( $n = 259$ ) were women, 15.3% men ( $n = 47$ ) and 0.3% ( $n = 2$ ) self-reported as other. The profession with the most cases of suicide risk was nurses, with 62% ( $n = 98$ ), followed by physicians, with 52.7% ( $n = 96$ ) (Table 1). Only 14.8% of the total sample ( $n = 92$ ) received psychological treatment, while 15.7% ( $n = 98$ ) used medication. Of the latter, physicians were the ones that most consumed them (6.5%,  $n = 41$ ), as shown in Table 2.

Table 3 presents correlational statistics. Suicide risk was negatively correlated with age, length of experience, compassion satisfaction, and positive affect. At the same time, it correlated positively with the subscales of burnout, secondary traumatic stress, poor sleep quality, and depression, except for positive affect.

Regarding psychological variables, differences were found in quality of life, sleep quality and depression, according to each occupation. Based on one-way ANOVA post hoc tests, significantly higher CS was found in psychologists than physicians ( $p = .001$ , 95% CI [.96, 5.25]), while greater BO was observed in physicians than psychologists ( $p < .001$ , 95% CI [2.58–5.89]), administrative staff ( $p = .020$ , 95% CI [.23–4.55]), and other occupations ( $p = .007$ , 95% CI [.38, 4.06]), and greater STS was observed in nurses than psychologists ( $p < .001$ , 95% CI [4.04, 8.43]). Psychologists presented significantly lower BO levels than physicians ( $p < .001$ , 95% CI [−5.89, −2.58]), nurses ( $p < .001$ , 95% CI [−4.68, −1.27]) and other professions ( $p = .039$ , 95% CI [−3.98, −.06]) and lower levels of STS than all other occupations ( $p < .001$ ). Regarding sleep quality, psychologists had significantly better sleep quality than nurses ( $p = .007$ , 95% CI [−2.95, −.29]) and administrative staff ( $p = .004$ , 95% CI [−4.01, −.48]), as shown in Table 4.

In relation to the dimensions of depression, significantly lower levels of depressed affect were found in psychologists than physicians ( $p = .009$ , 95% CI [−3.83, −.32]) and nurses ( $p < .001$ , 95% CI [−5.10, −1.48]), while lower levels of positive affect were observed in nurses than psychologists ( $p < .001$ , 95% CI [−2.79, −.68]) and other occupations ( $p = .002$ , 95% CI [−2.70, −.37]). Lower levels of emotional insecurity and interpersonal problems were detected in psychologists than nurses ( $p < .001$ , 95% CI [−8.31,



**Table 1.** Sociodemographic characteristics and study variables associated with suicide risk in health workers.

	Mean $\pm$ SD	f (%)	Without suicide risk f (%)	With suicide risk f (%)	Statistics		
					p value	$\chi^2$	t
<b>Age</b>	35 $\pm$ 8.4		35.8 $\pm$ 8.5	34.4 $\pm$ 8.3	.041*	-	2.045
<b>Gender</b>							
Female		515 (82.7)	256 (41.0)	259 (41.5)	.192	3.298	-
Male		106 (17)	59 (11.2)	47 (7.5)			
Other		2 (.3)	0	2 (.3)			
<b>Work</b>							
Yes		607 (97.4)	309	298	.321	1.121	-
No		16 (2.6)	6	10			
<b>Length of experience</b>	8.8 $\pm$ 7.2		9.28 $\pm$ 7.4	8.41 $\pm$ 7	.133	-	1.503
<b>Occupation</b>							
Physician		182 (29.2)	86 (47.3)	96 (52.7)	<0.001**	21.612	-
Nurses		158 (25.4)	60 (38)	98 (62)			
Psychologists		131 (21)	83 (63.4)	48 (36.6)			
Administrative staff		59 (9.5)	33 (55.9)	26 (44.1)			
Others		93 (14.9)	53 (57)	40 (43)			
<b>Education</b>							
Basic education		39 (6.3)	19	20	.884	.246	-
Higher education		550 (88.3)	280	270			
Other		34 (5.5)	16	18			
<b>Psychological treatment</b>							
Yes		92 (14.8)	43	49	.431	.658	-
No		530 (85.1)	272	258			
<b>Medication use</b>							
Yes		98 (15.7)	29	69	<.001**	20.624	-
No		524 (84.1)	286	238			
<b>Suicide attempt in the past three months</b>							
Yes		11 (1.8)	0	11	<.001**	11.490	-
No		611 (98.1)	315	296			
<b>Professional quality of life</b>							
ProQOL CS	38.7 $\pm$ 6.7		40.5 $\pm$ 5.9	36.8 $\pm$ 6.9	<.001**	-	7.174
ProQOL BO	28.2 $\pm$ 5.3		26.1 $\pm$ 4.5	30.3 $\pm$ 5.2	<.001**	-	-10.659
ProQOL STS	24.7 $\pm$ 6.9		21.8 $\pm$ 5.9	27.5 $\pm$ 6.6	<.001**	-	-11.176
<b>Sleep quality</b>							
Sleep quality score	11.0 $\pm$ 4.0		9.4 $\pm$ 3.7	12.6 $\pm$ 3.5	<.001**	-	-10.680
<b>Depression</b>							
CES-D DA	6.5 $\pm$ 5.5		3.4 $\pm$ 3.6	9.6 $\pm$ 5.3	<.001**	-	-16.879
CES-D PA	4.4 $\pm$ 3.2		5.8 $\pm$ 3.2	3.0 $\pm$ 2.4	<.001**	-	11.828
CES-D EI	12.2 $\pm$ 9.2		6.9 $\pm$ 6.1	17.6 $\pm$ 8.8	<.001**	-	-17.492
CES-D S	9.8 $\pm$ 6.2		6.6 $\pm$ 5.2	13.1 $\pm$ 5.5	<.001**	-	-15.176
CES-D EW	4.4 $\pm$ 2.7		4.3 $\pm$ 2.9	4.5 $\pm$ 2.5	0.33	-	-.973
CES-D DA	7.1 $\pm$ 5.9		4.0 $\pm$ 4.1	10.2 $\pm$ 5.8	<.001**	-	-15.190

Abbreviations. CS=Compassion Satisfaction; BO=Burnout; STS=Secondary Traumatic Stress; DA=Depressed Affect; PA=Positive Affect; EI=Emotional Insecurity and Interpersonal Problems; S=Somatization; EW=Emotional Well-being; DA=Delayed Activity.

\* $p < .05$ . \*\*  $p < .001$ .

-2.24]) and physicians ( $p = .020$ , 95% CI [-6.18, -.30]), lower levels of somatization were found in psychologists than nurses ( $p < .001$ , 95% CI [-5.42, -1.30]) and physicians ( $p = .011$ , 95% CI [-4.3, -.33]), lower levels of emotional well-being were observed in nurses than psychologists ( $p = .027$ , 95% CI [-1.89, -.06]) and lower levels of delayed activity were identified in psychologists than nurses ( $p < .001$ , 95% CI [-5.28, -1.39]) as shown in Table 4.



**Table 2.** Psychological variables by occupation.

	Physicians	Nurses	Psychologists	Administrative Staff	Other	<i>p</i> value	$\chi^2$
	<i>f</i> (%)	<i>f</i> (%)	<i>f</i> (%)	<i>f</i> (%)	<i>f</i> (%)		
<b>Psychological treatment</b>							
Yes	32 (5.1)	10 (1.6)	27 (4.3)	9 (1.4)	14 (2.2)	.009*	13.496
No	150 (24.1)	147 (23.6)	104 (16.7)	50 (8.0)	79 (12.7)		
<b>Are you on medication?</b>							
Yes	41 (6.5)	12 (1.9)	23 (3.6)	13 (2.0)	9 (1.4)	.001*	18.733
No	141 (22.6)	145 (23.3)	108 (17.3)	46 (7.3)	84 (13.5)		
<b>Suicide attempt</b>							
Yes	<b>2 (.3)</b>	<b>8 (1.2)</b>	<b>1 (.1)</b>	0	0	.007*	13.972
No	180 (28.9)	149 (23.9)	130 (20.9)	59 (11.0)	93 (14.9)		

\* $p < .05$ . \*\*  $p < .001$ .

Finally, according to the regression, the variables obtained in the final model that predict suicide risk in the health workers studied were STS, high depressive affect, low positive affect, emotional insecurity and interpersonal problems, and medication use, as shown in [Table 5](#).

## Discussion

The objective of the study was to analyze the psychological and sociodemographic factors associated with the presence of suicide risk in healthcare workers seeking psychological support on a virtual platform designed to help users cope with the COVID-19 pandemic.

A high prevalence of suicide risk was found in the study population since nearly half the HCWs surveyed met the suicide risk criteria (49%,  $n = 308$ ). Likewise, prior to the COVID-19 pandemic, the elevated risk of suicide in physicians due to burnout had already been reported (West et al., 2018). Despite the lack of specific data, it is estimated that the suicide rate of healthcare workers in Mexico is between 28 and 40 per 100 000 inhabitants, more than twice that of the general population (Cruz, 2018). In Mexico, during the first stage of COVID-19, the prevalence of suicidal ideation reported in HCWs was higher compared to other countries (8% vs. 16%) (Mortier et al., 2021; Robles et al., 2020). This may be due to the high levels of mental health problems presented in HCWs in Mexico (burnout, STS, anxiety, depression, etc.), besides, the suicidal ideation is more common than other suicidal behaviors, such as self-harm, attempted or completed suicide (Robles et al., 2020).

The participants in the current study were seeking psychological treatment. This could explain the higher mental health and suicide risks. It is essential to include personnel trained to care for people at suicide risk in mental health support strategies, such as comprehensive support groups.

Likewise, another aspect that may explain the difference in suicide risk rates in the different studies, is how it is measured. In this study, the suicidal risk was evaluated through the Plutchik Suicide Risk Scale, which assesses ideation, attempts, planning, and some associated symptoms. In other studies carried out in Mexican HCWs, suicidal thoughts have been evaluated through a question (In the past month, have you felt that you wanted to die, or thought about being dead?) (Robles et al., 2021). This may have influenced the

**Table 3.** Bivariate correlation between psychological and sociodemographic variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Suicide risk	-												
2. Age	-.116**	-											
3. Length of experience	-.108**	.744**	-										
4. ProQOL CS	-.323**	.140**	.135**	-									
5. ProQOL BO	.481**	-.137**	-.081*	-.619**	-								
6. ProQOL STS	.499**	-.027	.023	-.314**	.591**	-							
7. Sleep quality	.509**	.068	.039	-.127**	.285**	.404**	-						
8. CES-D DA	.694**	-.148**	-.120**	-.310**	.479**	.516**	.488**	-					
9. CES-D PA	-.523**	.084*	-.082**	.397**	-.446*	-.377**	-.431**	-.560**	-				
10. CES-D EI	.697**	-.136**	-.110**	-.351**	.533**	.584**	.518**	.868**	-.554**	-			
11. CES-D S	.638**	-.121**	-.088*	-.267*	.448**	.516**	.645**	.759**	-.508**	-.772**	-		
12. CES-D EW	.061	-.001	-.025	.089*	.031	.065	.066	.089*	.194**	.144**	.175**	-	
13. CES-D DA	.647**	-.094*	-.066	-.331**	.489**	.536**	.489**	.816**	-.537**	-.821**	.772**	.133**	-

Abbreviations. ProQOL= Professional Quality of Life; CS=Compassion Satisfaction; BO=Burnout; STS=Secondary Traumatic Stress; CES-D=Center for Epidemiologic Studies Depression Scale; DA=Depressed affect; PA=Positive Affect; EI=Emotional Insecurity and Interpersonal Problems; S=Somatization; EW=Emotional Well-being; DA=Delayed Activity.

\* $p<.05$ . \*\*  $p<.001$ .

**Table 4.** Association between sociodemographic and psychological variables.

Variables	ProQOL Mean ± SD			Sleep quality Mean ± SD	Depression Mean ± SD					
	CS	BO	STS		DA	PA	EI	S	EW	DA
<b>Gender</b>										
Female	38.7 ±6.5	28.2 ±5.1	24.9 ±6.9	11.1±4	6.8±5.5	4.3±3.1	12.7 ±9.2	10.2 ±6.2	4.4 ±2.7	7.3±5.9
Male	38.7 ±7.3	28±5.8	23.3 ±6.7	10.1±4	4.9±5.1	5±3.6	9.7±8.7	7.9±5.8	4.2 ±2.7	5.6±5.4
Other	32 ±2.8	37±2.8	29±7	14±1.4	15.5 ±3.5	1±0	28.5 ±7.7	15.5 ±6.3	4±0	14.5 ±7.7
<i>p</i> value	.366	.063	.071	.043*	<.001**	.042*	.001*	.001*	.716	.006*
<b>Employed</b>										
Yes	38.8 ±6.5	28.2 ±5.3	24.6 ±6.8	11±4	6.4±5.4	4.5±3.2	12.1 ±9.1	9.8±6.2	4.4 ±2.7	7±5.8
No	33.5 ±9.3	29.8±5	26.7 ±9.2	11.6±3.7	9±6.5	2.8±2.2	15.6 ±12.2	11.2 ±6.9	4.5 ±2.2	10.1 ±7.5
<i>p</i> value	.002*	.216	.231	.569	.063	.038*	.133	.372	.854	.036*
<b>Occupation</b>										
Physician	37.4 ±6.7	30±5.3	25.5 ±6.6	11±3.8	6.7±5.3	4.4±3.2	12.4 ±8.7	10.2 ±5.8	4.3 ±2.5	7.2±5.6
Nurse	38.4 ±6.6	28.7 ±5.1	26.7 ±6.9	11.4±4.1	7.9±5.7	3.5±2.5	14.4 ±9.7	11.2 ±6.5	4±2.6	8.5±6.2
Psychologists	40.5 ±6	25.7 ±4.9	20.4 ±5.6	9.8±3.7	4.6±4.9	5.2±3.4	9.1±8.3	7.9±6	5±2.8	5.2±5.3
Administrative staff	38.4 ±6.5	27.6 ±4.8	26±6.2	12.1±4.3	5.9±5.3	4.5±3.2	12±9.4	10±6.4	4±2.7	7±6.1
Other	39.3 ±7.2	27.8 ±4.9	24.6±7	11.1±4.1	6.6±5.7	5±3.3	12.5 ±9.4	9.4±6.2	4.5±3	7.1±6
<i>p</i> value	.001*	<.001**	<.001**	.002*	<.001**	<.001**	<.001**	<.001**	.032*	<.001**
<b>Education</b>										
Basic education	37 ±8.1	28.6 ±4.7	25.1 ±8.4	12.5±3.8	7.7±6.5	3.7±3.3	13.5 ±10.5	10.6 ±7.6	4.2 ±2.9	9±6.7
Higher education	38.9 ±6.5	28.1 ±5.4	24.5 ±6.8	10.9±4	6.4±5.4	4.5±3.2	12.1 ±9.1	9.7±6.2	4.4 ±2.7	6.9±5.8
Other	37.1 ±6.9	29±4	26.7 ±6.1	11.1±3.4	6.9±5.9	4.4±3	13.1 ±9.2	10.3±6	3.8 ±2.5	7.6±5.5
<i>p</i> value	.087	.564	.192	.045*	.297	.322	.552	.643	.375	.086
<b>Psychological treatment</b>										
Yes	38.5 ±6.6	27.7 ±4.8	24.6 ±6.7	11.5±4.2	6.2±5.4	4.6±3	11.7 ±9.4	10±6.5	4.6 ±2.7	7±6.3
No	38.7 ±6.7	28.3 ±5.4	24.7 ±6.9	10.9±4	6.5±5.5	4.4±3.2	12.3 ±9.2	9.8±6.2	4.4 ±2.7	7.1±5.8
<i>p</i> value	.839	.350	.876	.155	.630	.625	.575	.786	.424	.949
<b>Are you on medication?</b>										
Yes	37.7 ±6.8	29.7 ±5.5	27±7.4	13.5±3.8	8.6±5.6	3.6±2.9	16.4 ±9.4	13.3 ±5.7	4.9 ±2.4	10.4 ±6.2
No	38.9 ±6.6	27.9 ±5.2	24.2 ±6.7	10.5±3.9	6.1±5.4	4.6±3.2	11.4±9	9.2±6.1	4.3 ±2.8	6.5±5.6
<i>p</i> value	.130	.002*	<.001**	<.001**	<.001**	.004	<.001**	<.001**	.047*	<.001**
<b>Suicide attempt</b>										
Yes	32.2 ±9.6	30.9 ±5.8	28.1 ±9.4	14.1±4.3	16.1 ±4.1	2±2.7	29.4 ±9.5	19.2 ±7.2	6.5 ±2.5	17±6.2
No	38.8 ±6.6	28.2 ±5.3	24.6 ±6.8	10.9±4	6.3±5.3	4.5±3.2	11.9 ±8.9	9.6±6.1	4.4 ±2.7	6.9±5.7
<i>p</i> value	.027*	.096	.094	.009*	<.001**	.013*	<.001**	<.001**	.015*	<.001**

*Abbreviations.* CS=Compassion Satisfaction; BO=Burnout; STS=Secondary Traumatic Stress; DA=Depressed Affect; PA=Positive Affect; EI=Emotional Insecurity and Interpersonal Problems; S=Somatization; EW=Emotional Well-being; DA=Delayed Activity.

\* $p < .05$ . \*\*  $p < .001$ .

**Table 5.** Logistic regression analysis of suicidal risk in healthcare workers.

Model <sup>a</sup>	B	OR	p	95% CI	
				Lower limit	Upper limit
ProQOL STS	.045	1.046	.018*	1.008	1.086
CES-D DA	.107	1.112	.005*	1.033	1.198
CES-D PA	-.117	.890	.004*	.821	.964
CES-D EI	.094	1.098	<.001**	1.046	1.152
Medication use	-.646	.524	.029*	.294	.035

\* $p < .05$ . \*\*  $p < .001$ .

low rates reported in other Mexican studies since they have specifically evaluated suicidal thoughts.

### ***Does profession matter?***

The impact on the mental health of HCWs has differed according to their occupation. This study found that nurses and physicians experienced the most significant effects on their mental health. Moreover, they suffered the highest levels of BO, STS, depressed affect, emotional insecurity, interpersonal problems, somatization, and delayed activity. It has also been reported that the most severely affected group are frontline HCWs, with the highest levels of anxiety and depression (Ayhan-Balik et al., 2022; Mushtaq et al., 2022). Recent studies have found that physicians and nurses continue to be the health personnel whose mental health has been the most severely affected (Moro et al., 2022), with higher suicide rates reported compared to the general population (Melnik, 2020).

Regarding sociodemographic variables, suicide risk was found to be negatively correlated with age. This is recurrent in the literature since younger health workers have been the most severely affected by the pandemic, presenting higher levels of post-traumatic stress, anxiety, and depression (Martínez-Arriaga et al., 2021; Mushtaq et al., 2022). This may also be related to years of experience since it has been reported that younger nurses exhibited greater difficulty understanding and controlling negative thoughts related to adverse events (Foster et al., 2020).

Diminished sleep quality was another psychological consequence detected in this study. Those with the poorest sleep quality were administrative workers (mean = 12.1) and nurses (mean = 11.4). Along these lines, the systematic review by Cénat et al. (2021) found higher levels of insomnia in health workers compared to the general population. Unlike other studies, this one found elevated levels of sleep disturbances in a group rarely explored: the administrative staff of health centers. Future studies should address this issue to identify specific vulnerabilities in this group.

Furthermore, it is necessary to address healthcare workers' mental health as a priority for this collective (Jiménez-López et al., 2015). Although the COVID-19 pandemic has raised awareness of healthcare workers mental health, it is essential to design proposals to change working conditions and provide timely mental health care for this population.

Regarding the limitations of this study, it is important to recall that the participants evaluated were people who used the [www.personalcovid.com](http://www.personalcovid.com) platform to receive psychological support. This automatically creates a bias since they are people with psychological distress actively seeking some form of psychological care.

Another limitation is that data were collected through a cross-sectional design. This makes it difficult to determine whether the symptoms persisted, increased, or decreased as would be possible in a longitudinal study. Likewise, it would not be possible to know if the HCWs had a suicidal risk prior to the COVID-19 pandemic. However, the results presented are significant in terms of enhancing understanding of the mental health of HCWs in Mexico during COVID-19 pandemic.

A final limitation is the higher number of women ( $n = 515$ ) than men ( $n = 106$ ). Unfortunately, although the psychological treatment offered is not gender-bound, the ratio of men to women seeking treatment is one to five. Previous studies have observed this tendency (Yousaf et al., 2015), not only with HCWs. A future line of research could explore the strategies required to increase the number of male HCWs receiving psychological treatment.

Finally, one of the strengths of this study is that it increases the literature on under-studied populations such as healthcare workers in Mexico, which improves knowledge of the COVID-19 pandemic and means of providing support for HCWs. Moreover, this study increases the knowledge of administrative personnel working in hospitals during the pandemic.

## Conclusions

The psychological effects reported in the population studied were evident. Suicide risk in the study population was high (49.4%) as were depression scores and poor sleep quality. This study suggests the presence of psychological effects on HCWs, despite the time that has elapsed since the onset of the pandemic. The challenges involved in protecting the mental health of this population mean that it is essential to promote effective psychological care programs adapted to the circumstances and preferences of HCWs.

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The authors declare that the research was conducted in the absence of any conflict of interest.

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