Psiquiatría

Artículo Original

Coping mechanisms and mental health impact among COVID-19-Infected Health Workers in a Colombian Secondary Care Hospital, 2020-2021

Mecanismos de afrontamiento e impacto en salud mental de trabajadores de la salud infectados por COVID-19 en un hospital de segundo nivel en Colombia, 2020-2021

Marco Orlando Vargas-Olano[1*]; Shadye Matar-Khalil[2]; Sandra Patricia Cárdenas-Ojeda[3]; Carolina Herrera-Delgado[3]; Andrés Cabezas-Corcione[1]

[1] Grupo Investigación Sinapsis. Universidad Nacional Abierta y a Distancia, Duitama, Colombia.
[2] Universidad del Sinú, Montería, Colombia.
[3] Grupo de investigación en estadística. Universidad Pedagógica y Tecnológica de Colombia, Duitama, Colombia.
*Correo de correspondencia: orlandoacademica@gmail.com

Fecha de recibido: 08 de julio de 2024 - **Fecha de aceptado:** 18 de abril de 2025
ISSN: 0121-0319 | **eISSN:** 1794-5240

Abstract:

Background: during the COVID-19 pandemic, healthcare workers encountered significant challenges in managing their own illness while fulfilling their professional roles. Despite this, the strategies they used to cope with the disease remain largely unexplored. Understanding these mechanisms is crucial for developing strategies that foster resilience, well-being, and their ability to continue providing care. **Objective:** to describe the coping strategies employed by healthcare workers in a secondary care hospital, during the period from august 2020 to september 2021, when they themselves suffered from COVID-19, as well as their perception of how they were affected and the impact on their mental health. **Materials and Methods:** cross-sectional study with mixed-methods approach. Healthcare workers at Clínica Boyacá in Duitama, Colombia who contracted COVID-19, once discharged and prior to their re-entry, responded to a semi-structured interview, the questionnaires Brief Coping Orientation to Problems Experienced and the Depression, Anxiety, and Stress Scale. Descriptive correlational statistics, cross frequency tables and hypothesis testing were conducted, along with a qualitative content analysis. **Results:** a total of 73 healthcare workers were evaluated, with a predominance of adaptive coping strategies, particularly those focused on meaning. Reported conditions included anxiety (49,68 %), stress (31,51 %), and depression (26,03 %). Notably, anxiety exhibited a significant positive correlation with non-adaptive coping strategies ($r = 0,39$ $p < 0,01$). **Conclusions:** after illness, healthcare workers mainly used adaptive coping strategies, particularly positive re-signification. Non-adaptive strategies correlated with higher anxiety. Promoting adaptive coping mechanisms may not only protect mental health but also enhance the quality of patient care.

¿Cómo citar este artículo? Vargas-Olano M, Matar-Khalil S, Cárdenas-Ojeda S, Herrera-Delgado C, Cabezas-Corcione A. Coping mechanisms and mental health impact among COVID-19-Infected Health Workers in a Colombian Secondary Care Hospital, 2020-2021. Med. UIS. 2025;38(2):5-16. DOI: https://doi.org/10.18273/revmed.v38n2-2025002

Keywords: coping Skills; stress, psychological; anxiety; depression; health personnel; COVID-19.

Resumen:

Introducción: durante la pandemia de COVID-19, los trabajadores de la salud que contrajeron la enfermedad enfrentaron significativos desafíos psicológicos. Sin embargo, las estrategias empleadas para afrontar la enfermedad son aún en gran medida desconocidas. **Objetivo:** describir las estrategias de afrontamiento utilizadas por los trabajadores de la salud en un hospital de segundo nivel, durante el período de agosto de 2020 a septiembre de 2021, cuando padecieron de COVID-19, así como su percepción de afectación y el impacto en su salud mental. **Materiales y métodos:** estudio transversal con enfoque mixto. Trabajadores de la salud de la Clínica Boyacá en Duitama, Colombia que padecieron COVID-19, una vez dados de alta y previo a su reingreso, respondieron una entrevista semiestructurada, el cuestionario Orientación Breve de Afrontamiento a los Problemas Experimentados y la Escala de Depresión, Ansiedad y Estrés. Se realizaron estadísticas descriptivas correlacionales, tablas de frecuencias cruzadas, prueba de hipótesis y análisis de contenido. **Resultados:** 73 trabajadores de la salud participaron en el estudio. Se priorizaron estrategias de afrontamiento adaptativas, con un enfoque predominante en la resignificación positiva. Se reportaron ansiedad (49,68 %), estrés (31,51 %) y depresión (26,03 %). La ansiedad se correlacionó positivamente con estrategias no adaptativas ($r = 0,39$ $p < 0,01$). **Conclusiones:** los trabajadores de la salud estudiados, cuando enferman, tienden a utilizar estrategias de afrontamiento adaptativas. Los tipos de afrontamiento no adaptativos se relacionaron positivamente con ansiedad. El fortalecimiento de las estrategias de afrontamiento adaptativas puede beneficiar la salud mental y la calidad de su rol como personal de salud.

Palabras clave: habilidades de Afrontamiento; estrés psicológico; ansiedad; depresión; personal de salud; COVID-19.

Background

The COVID-19 pandemic presented a significant challenge for the general population, with an even greater impact for the healthcare personnel. By september 2020, the Pan American Health Organization (PAHO) reported that 570 000 workers in the Americas region had fallen ill and more than 2500 had died from COVID-19[1]. In Colombia, the situation for healthcare professionals was particularly severe. According to Bulletin No. 166 dated february 10, 2024 of the National Institute of Health, there were 119 769 reported cases and 442 deaths among healthcare personnel[2]. Despite this, the pandemic's impact went beyond mortality, severely affecting Healthcare Workers' (HCWs) mental health.

Several international studies[3,4,5,6] from the beginning of the COVID-19 pandemic described the physical, emotional and cognitive discomfort in health workers, revealing negative effects on their work, family, social performance, well-being and quality of life. Soto-Añari *et al.*[7] in 2021 investigated the presence of subjective cognitive complaints (SCC) characterized by significant concern about the functioning of various cognitive processes, which are associated with anxiety, depression, and occupational burnout in healthcare professionals from five Latin American countries. They found a prevalence of cognitive alterations of 69,2 %, being more frequent among healthcare professionals in administrative staff (79,69 %), those attending to COVID-19 patients (72,39 %), younger individuals (71,47 %), and women (71,99 %).

Similarly, the COVID-19 Health Care Workers Study (HEROES) report[8], made in 2020, which focused on the mental health of personnel during the COVID-19 pandemic in Argentina, Brazil, Chile, Colombia, Bolivia, Guatemala, Mexico, Peru, Puerto Rico, Venezuela, and Uruguay, revealed high rates of depressive symptoms, psychological distress, and an increase in suicidal ideation. According to data obtained from 1719 healthcare professionals, Colombia had the highest level of psychological distress (98 %), as well as 22,8 % participants at moderate to severe risk of depression, 16,1 % experienced anxiety, and 2,6 % had suicidal ideation.

The Colombian healthcare system, which had pre-existing structural limitations before the pandemic, struggled to meet the rising demand for medical services. This crisis resulted in a shortage of personnel, insufficient availability of intensive care unit (ICU) beds, a lack of personal protective equipment, limited medical technology, and shortages of essential supplies. Consequently, the hospital infrastructure experienced a progressive collapse, further increasing the burden on healthcare workers[9,10].

The literature has established a relationship between physical illness and anxiety and/or depression disorders, with a higher prevalence in

clinical populations than in the general population. This relationship is bidirectional, as mental health disorders can be both a cause and a consequence of physical illness. In turn, psychological distress influences the progression of the physical disease through cognitive and behavioral factors affecting self-care as well as biological mechanisms such as immune system alterations or hyperactivation of humoral or neurological mechanisms[11,12].

To mitigate these effects, individuals often rely on coping strategies, which are psychological processes encompassing a spectrum of thoughts, emotions and actions aimed at addressing internal and external demands of situations that threaten well-being, resolving, reducing, or making them tolerable[13]. Adaptable and variable by nature, coping strategies often involve different approaches, which may be learned or acquired to reduce stress and contribute to medium and long-term health.

These strategies have been classified in several ways, considering whether or not they contribute adequately to modifying the problematic situation or the relationship with it. Product of their research on stress and cognitive processes, Lazarus and Folkman in 1987[14] termed two strategies; first is problem-focused, which seek to modify the problem, such as active coping, planning or practical social support; second is emotion-focused, which seek to make the emotional experience derived from the faced difficulties tolerable, and/or change its meaning, including avoidance, minimization, distancing, selective attention and positive reappraisal. Later Carver, in 1997, considering whether they intend to resolve the challenging situation or whether they postpone or avoid it, established strategies such as venting negative emotions, denial, substance use, behavioral disengagement, self-distraction and self-blame as non-adaptive; conversely, positive reframing, planning, active coping, use of emotional and instrumental support, acceptance, religion, and humor were considered adaptive strategies[15].

More recently, a new category of coping has recently been proposed, centered on the meaning individuals attribute to their professional role. It is understood as the value of serving and contributing to their best self. It induces satisfaction with work, influencing psychological functioning and recovery-resilience, being a protective factor for physical and mental health[16].

Only a limited number of studies have specifically examined the coping mechanisms employed by healthcare professionals during and after their own infection with COVID-19. Among these, social support in various forms, such as family, friends, colleagues or with specialized professionals, as well as religion/prayer, appeared as the main coping mechanisms[6,17,18]. These strategies were associated with better mental health conditions, although in some cases, they were used by those who revealed greater mental health problems. Additionally, Babore *et al.* in 2020 identified social support as a risk factor for stress[7] while planning positively correlates with high DASS21 values[16]. Fteropoulli *et al*. in 2021 found a tendency to use escape and avoidance coping strategies, especially in HCWs working in critical care areas such as intensive care or emergencies, and by those who perceived insufficient preparation[4].

Although these findings provide important insights into coping mechanisms, the topic remains largely underexplored. While numerous studies have explored various aspects of COVID-19, including the spread of the virus, prevention measures, and its overall impact on mental health, there is a gap in research specifically focused on how healthcare professionals cope with the disease after being infected. Identifying the coping strategies used by healthcare workers in these situations provides valuable information that can guide the development of future interventions and policies to support their own well-being and to better perform their work.

The objective of this study is to describe the coping strategies employed by healthcare workers in a secondary care hospital, during the period from august 2020 to september 2021, when they themselves suffered from COVID-19, as well as their perception of how they were affected and the impact on their mental health.

Materials and Methods

Procedure

This study employed a mixed-methods, cross-sectional design with convenience sampling. The inclusion criteria encompassed workers at the Clínica Boyacá in Duitama, Colombia, a secondary care healthcare facility, who contracted COVID-19 between august 2020 and september 2021, diagnosed by molecular polymerase chain reaction (PCR) or

antigen tests. Workers who declined to participate or had any condition that prevented them from providing information were excluded from the study. Eligible participants underwent a psychological evaluation between 11 and 33 days after diagnosis, depending on clinical evolution, before returning to work; the results were recorded in their medical records.

The psychological assessment was carried out by a medical professional and a psychologist and consisted of a screening for mental affectation using three instruments (explained in detail in the next section). Data on sex, age and position were obtained from their respective medical records.

Given the situational nature of coping strategies, groups were distinguished according to the period in which the illness occurred and according to their contact with patients. In terms of time, two periods were established, differentiated by the start of vaccination. The 1st period group includes those who became ill between august 2020 and february 2021. The 2nd period group consisted of those who became ill between march 2021 and september 2021, when there was also greater knowledge of the disease and more therapeutic options. The second distinction was made between those who established direct contact with patients or assistance or care groups and those in administrative and maintenance areas.

Instruments

Depression, Anxiety and Stress Scale 21 items (DASS21) is a self-administered instrument designed by Lovibond and Lovibond in 1995[19] that identifies the presence of depression, anxiety and stress. It establishes the categories normal, mild, moderate, severe and very severe. Its abbreviated version of 21 questions, 7 for each of its 3 dimensions with adequate psychometric properties, was ratified in the Colombian environment by Vargas, Cárdenas and Herrera in 2022[20].

Brief Coping Orientation to Problems Experienced (COPE) translated into Spanish[21] and validated in Colombia by Herrera and Rodríguez in 2009[22], is a 28-item questionnaire that evaluates 14 coping strategies for stressful situations including active coping, planning, instrumental support, emotional support, self-distraction, relief, disconnection, reappraisal positive, denial, acceptance, religion, substance use, humor and self-blame. Higher scores indicate greater use of a certain coping strategy.

The third instrument was a semi-structured interview designed to explore the most significant effects experienced during the illness, the resources used to cope, and the lessons learned from the experience. The conditions for applying psychological tests were met, ensuring methodological rigor and minimizing social desirability bias, where participants may provide responses, they believe are expected. To further reduce this bias, participants were invited to respond voluntarily after receiving a detailed explanation of the objectives, benefits, and confidentiality criteria of each instrument. The evaluations were carried out in a setting that fostered trust and comfort.

Workers who presented severe or very severe levels in any of the assessed conditions were referred for clinical psychological care. Additionally, throughout the course of their illness, they received institutional psychological support and follow-up through telephone calls.

Analysis of Data

The statistical and content analysis were carried out by professionals independent of data collection, from databases that preserved the anonymity of the workers. The collected data were processed in july 2023, in the statistical package R version 4.2.021[23] through the integrated development environment Rstudio version 2022.2.3.49222[24]. For the statistical analysis, simple and cross-tabulated frequency tables were prepared to describe DASS21 dimensions and coping strategies. Kolmogorov Smirnov goodness-of-fit tests with Lilliefors adjustment were applied to assess univariate normality and determine differences between scores of adaptive strategies and non-adaptive. For the correlational analysis between the variables measured by DASS21 and coping strategies, Mardia's tests was used to evaluate bivariate normality according to the measurement scale of the variables and compliance with assumptions about normality. Pearson and Spearman correlation coefficients were calculated along with their significance levels.

Based on Carver[15], the coping strategies were classified as adaptive (active coping, planning, emotional support, social support, religion, acceptance, humor, positive reassessment) and non-adaptive (denial, self-distraction, self-blame, disconnection, emotional relief, substance use). Mean scores were calculated for each category. Responses of the two questions for each strategy

took values between 0 (Never) and 6 (Always); the score of 3 was taken as the cut-off point, considering values greater than or equal to three as a significant score. Qualitative data were analyzed using content analysis, following a structured approach to identify analytical units and compare them to form first- and second-level categories[25].

Ethical Considerations

The project was approved by the ethics advisory committee of the Clínica Boyacá. In accordance with Resolution 8430 of 1993 of the Ministry of Health of Colombia, it is a risk-free project for people that uses documentary data without intervention or manipulation of variables.

Results

The entire population of HCWs who contracted COVID-19 (n = 73) participated in the study. Their ages ranged from 21 to 61 years, with a mean of 39.4 ± 10 years. Of these, 86.3 % (n = 63) were women, while 13.7 % (n = 10) were men. Of the total affected individuals, 63.01 % (n = 46) were assistance staff and 36.99 % (n = 27) were administrative personnel. The percentage distribution by professional role is presented in Table 1.

Table 1. Percentage distribution by position.

Position at the clinic	N	%
Nursing assistant	21	28,77
Administrative staff	13	17,81
Head nurse	8	10,96
Doctor	7	9,59
Receptionists	7	9,59
Surgical instrumentation	4	5,48
Bacteriology	4	5,48
General services assistant, pharmacy and radiology technician	3	4,11
Physiotherapist	2	2,74
Clinical laboratory assistant	2	2,74
Kitchen assistant	2	2,74

Source: authors.

Mental health effects of HCWs

The distribution of depression, anxiety and stress according to time periods and the classification by assistance and administrative workers is presented in Table 2. The presence of depression was higher among assistance workers, at 11,68 %, compared to 4,11 % among administrative workers in period one. A similar behavior (9,59 % vs. 1,37 %) was observed in period two, with no case exceeding the moderate level. 26,39 % of HCWs presented some level of anxiety in period one, with 18,17 % in the assistance group and 8,22 % in the administrative group; in period two, 15,43 % belonged to the assistance group and 8,22 % to the administrative group. The prevalence of severe and very severe anxiety was higher in period one (10,06 %) than in period two (5,48 %), with no difference between the assistance and administrative groups. The presence of stress differed between periods in terms of severity, as only in period one there were patients who reported severe and very severe levels.

Table 2. General results, by group and period, of Depression, Anxiety and Stress.

Scale	Normal	Mild	Moderate	Severe	Very Severe	TOTAL
Depression %(n)	73,97(54)	16,44(12)	9,59(7)	0(0)	0(0)	100(73)
Anxiety %(n)	50,68(37)	15,07(11)	15,07(11)	10,96(8)	8,22(6)	100(73)
Stress %(n)	68,49(50)	16,44(12)	10,96(8)	2,74(2)	1,37(1)	100(73)
Depression						
Period	**Normal**	**Mild**	**Moderate**	**Severe**	**Very Severe**	**Group**
One % (n)	10,96(8)	2,74(2)	1,37(1)	0(0)	0(0)	Administrative
	24,66(18)	5,48(4)	5,48(4)	0(0)	0(0)	Assistance
Two % (n)	20,54(15)	0(0)	1,37(1)	0(0)	0(0)	Administrative
	17,81(13)	8,22(6)	1,37(1)	0(0)	0(0)	Assistance

Anxiety						
Period	**Normal**	**Mild**	**Moderate**	**Severe**	**Very Severe**	**Group**
One % (n)	6,85(5)	1,37(1)	0(0)	2,74(2)	4,11(3)	Administrative
	17,81(13)	6,85(5)	4,11(3)	5,48(4)	1,37(1)	Assistance
Two % (n)	13,70(10)	1,37(1)	4,11(3)	1,37(1)	1,37(1)	Administrative
	12,33(9)	5,48(4)	6,85(5)	1,37(1)	1,37(1)	Assistance
Stress						
Period	Normal	Mild	Moderate	Severe	Very Severe	Group
One % (n)	8,22(6)	1,37(1)	4,11(3)	0(0)	1,37(1)	Administrative
	26,03(19)	5,48(4)	1,37(1)	2,74(2)	0(0)	Assistance
Two % (n)	17,81(13)	2,74(2)	1,37(1)	0(0)	0(0)	Administrative
	16,44(12)	6,85(5)	4,11(3)	0(0)	0(0)	Assistance

Source: authors.

Use of coping strategies

Table 3 presents the percentage of HCWs who used each coping strategy, along with the distribution of the five most relevant strategies by period. The most frequently used strategies were those classified as adaptive. Notably, the use of acceptance increased during the second period (from 31,51 % to 46,55 %), suggesting a greater tendency toward psychological adaptation over time. Meanwhile, planning remained consistently high, while active coping and positive reassessment showed slight variations between periods.

Table 3. Percentage of HCWs by strategy and classification of the most relevant strategies by period and group.

Strategy	**Count**		**%**	
Active coping	70		95,89	
Planning	68		93,15	
Acceptance	67		91,78	
Positive reassessment	66		90,41	
Religion	64		87,67	
Self-distraction	61		83,56	
Social support	55		75,34	
Emotional support	52		71,23	
Humor	42		57,53	
Emotional Relief	37		50,68	
Self blame	32		43,84	
Disconnection	18		24,66	
Denial	13		17,8	
Substance use	0		0	
Predominant Strategy	**Administrative (27) %(n)**	**Assistance (46) %(n)**	**Period One %(n)**	**Period Two %(n)**
Active coping	96,29(26)	95,65(44)	49,32(36)	46,58(34)
Planning	100(27)	89,13(41)	45,21(33)	47,95(35)
Acceptance	100(27)	86,95(40)	31,51(23)	46,55(34)
Positive reassessment	96,29(26)	86,95(40)	46,58(34)	43,84(32)
Religion	64,80(24)	86,80(40)	43,84(32)	43,84(32)

Source: authors.

Correlations between coping and mental health problems

Taking the 14 coping strategies and the 3 scales of the DASS21, 136 correlations were calculated between each pair of variables. The Mardia test was conducted to assess the assumption of bivariate normality, with a significance level of $\alpha = 0,05$. For 28 variable pairs, the Pearson correlation coefficient was deemed appropriate, while the Spearman correlation coefficient was used for the remaining 108 pairs. A significant correlation ($p < 0,05$) was found for 35 pairs of correlations, with 13 of them showing a moderate to strong relationship between the DASS scales and coping strategies (see Table 4).

Table 4. Coefficient values and significance of the most significant correlations.

Cross	Coefficient correlation	p value
Depression vs Stress	0,49	<0,01
Depression vs Anxiety	0,4	<0,01
Anxiety vs Stress	0,46	<0,01
Active coping vs Planning	0,63	<0,01
Active coping vs Positive reassessment	0,49	<0,01
Active coping vs Acceptance	0,48	<0,01
Active coping vs Humor	0,41	<0,01
Planning vs Positive reassessment	0,42	<0,01
Planning vs Acceptance	0,49	<0,01
Emotional support vs Social support	0,56	<0,01
Religion vs Acceptance	0,43	<0,01
Positive reassessment vs Humor	0,48	<0,01
Positive reassessment vs Acceptance	0,45	<0,01

Source: authors.

By classifying the strategies as adaptive or non-adaptive, the average score of the strategies within each category was considered. Table 5 presents key statistics for each subdivision. The normal distribution of the differences in scores between adaptive and non-adaptive strategies was assessed using the Kolmogorov-Smirvov test with Lilliefors adjustment (p value = 0,53). The analysis of mean score differences indicated a significant difference between the scores obtained by adaptive and non-adaptive strategies ($p< 0,01$). The 95 % confidence interval for the mean difference ranged from 1,92 to 2,36, with adaptive strategies showing higher scores.

Table 5. Statistics for adaptive and non-adaptive strategies.

Strategies	Mín	Q1	Q2	Mean	Q3	Máx	SD
Adaptives	1,13	3,5	4	4,03	4,75	6	0,97
Non adaptives	0,33	1,5	1,83	1,93	2,33	4,17	0,76

Mín = Mínimun, Q1 = Quartil 1, Q2 = Quartile 2, Q3 = Quartile 3, Máx = Máximum, SD = standard deviation.
Source: authors.

Finally, the Spearman correlation coefficient was calculated between the scores of each DASS21 scale and the score of the adaptive and non-adaptive strategies. A weak significant correlation was found between anxiety and non-adaptive strategies. The results are shown in Table 6.

Table 6. Correlation coefficient between DASS21 scale scores and strategy scores.

Strategy	Depression	Anxiety	Stress
Adaptives r/valor p	-0,17	0,03	-0,14
	0,14	0,82	0,23
Non adaptives r/ valor p	0,21	0,39	0,15
	0,08	<0,01	0,21

r = Spearman correlation coefficient
Source: authors.

Qualitative results

Based on the data obtained from the workers' narratives in the semi-structured interviews, three main analysis categories were identified, as summarized in Table 7. These categories were determined through content analysis of the participants' narratives.

Table 7. Categories of Analysis of Interviews with Workers

Categories	Content Analysis	Frequency
Affectations: Indicates the perceived degree of the impact of the disease (COVID-19)	Isolation	14
	Frustration	4
	Anxiety	5
	Fear of disease effects	6
	Concern for the future	9
	Fear of infecting family	12
	Blame	1
Resources: The perception of factors that allowed coping of the disease	Religion, Prayer, Faith	11
	Practical Support	5
	Emotional Support	4
	Institutional Support	4
Learnings: Lessons that participants recognized from the experience of getting sick	Strengthening	2
	Learning opportunity (empathy, value of your work)	7
	Recognize sources of support	7
	Value health and family	9
	Self-care	17

Source: authors.

The first category describes the perceived impact of the disease, with isolation being a predominant experience due to its physical, social, and occupational consequences. Concern for the future was closely linked to isolation as well as to emotions such as fear, anxiety, and frustration. Fear was commonly reported from the onset of symptoms, particularly in relation to testing protocols, uncertainty regarding results, and potential consequences for family members. Anxiety was associated with a perceived lack of control over symptoms and self-monitoring practices, such as oximetry, blood pressure, and the Borg scale, which contributed to increased uncertainty.

The HCWs identified various resources that were considered useful, necessary, and sufficient to face the disease, easing the physical and mental burden. Perceived support, whether emotional, practical, or institutional, was considered essential. This support included messages, phone calls, provision of food, availability of psychological support, and monitoring tools. Engaging in structured daily activities, such as physical exercise or leisure activities, contributed to a sense of stability during isolation. Additionally, religion and faith emerged as significant coping mechanisms.

The majority of participants recognized positive aspects derived from their illness experience. These included a renewed appreciation for health, family, and professional colleagues, as well as gratitude for the support received. Many reported increased awareness of self-care, vulnerability, and empathy towards patients. The experience also led some participants to perceive themselves as more resilient in the face of adversity. Notably, only two participants reported not identifying any positive aspects from their illness.

Discussion

The findings of this study highlight the significant impact of COVID-19 on the mental health of healthcare professionals, particularly in terms of anxiety and stress. Similar trends have been reported in other studies on healthcare workers during the pandemic, though with variations in severity and affected populations.

For instance, a study carried out in Mexico by Lucas-Hernández *et al.* during 2020 and 2021 in a tertiary hospital found that 83,1 % of healthcare professionals experienced anxiety, 66,3 % reported stress, and 44,7 % suffered from depression, with higher prevalence among those in direct contact with patients[26]. In Spain, Santamaría *et al*. in 2020 reported that among healthcare professionals, 46,7 % experienced stress, 37 % suffered from anxiety, and 27,4 % had depression during the COVID-19 pandemic[27].

In Latin America, the cross-sectional study carried out by Caldichoury *et al.* in the second half of 2021 with health professionals from Colombia, Chile, Argentina, Bolivia, and Ecuador reported that the highest indicators of moderate anxiety were found in Bolivia and Ecuador (64,7 %)[28]. For Colombia, mild anxiety was 57,3 % and severe anxiety was 14,5 %. Regarding depressive symptoms, mild depression was most prevalent in Colombia (65,2 %), moderate depression in Ecuador (37,3 %), moderately severe depression in Argentina (23,1 %), and severe depression in Bolivia (16,8 %). This study suggests that Latin American health personnel working in the public sector are at greater risk of developing depression.

In the present study, differences in anxiety levels were observed between professional roles. Moderate to severe anxiety was more prevalent among assistant workers in both periods (11,32 % in period 1 and 9,59 % in period 2) compared to administrative workers (6,85 % in both periods). Anxiety had the greatest impact on the studied population, particularly during the first period, likely due to initial uncertainties about the disease and treatment limitations that generated feelings of helplessness and pessimism. Severe anxiety in some administrative workers may be linked to limited training in protective measures. Stress, consistent with facing a poorly controlled illness, was also prevalent, while depression had the lowest frequency and severity. Given that data were collected 11 to 33 days post-diagnosis, the absence of significant depressive symptoms does not rule out their later development, warranting cohort studies.

Without appreciable differences based on the period or the risk of exposure due to proximity to patients, these healthcare professionals, when faced with their illness, preferentially used coping strategies considered adaptive, which appeared to act synergistically. This aligns with the findings in the study by Ángel *et al.* in 2020, which compared the strategies used by 60 healthcare professionals, not sick, who cared for patients with and without COVID-19, revealing that the most used were problem-solving, seeking social support and religion[29]. On the other hand, it distances itself from the research carried out by Fteropoulli *et al.*[6] in 2021 in Cyprus and the study in Japan by Tahara *et al.*[18] in 2020, with 1071 and 661 healthcare professionals respectively, which found a prevalence of avoidance strategies in healthcare professionals, whether they were sick or not. This variation may be due to the fact that the use of different strategies is related to various factors, including the context, type of difficulty, its level of threat and whether it is known or unknown; the situation, which may be temporary or structural; available resources and their accessibility; previous effectiveness of the strategies used; personal and sociocultural characteristics, personality traits and mental and physical health conditions.

In particular, the impact on mental health is closely linked to the coping strategies employed. Adaptive approaches are protective, while non-adaptive ones increase vulnerability. In 2020, Eisenbeck *et al.* in their research with 11 227 participants across 30 countries from all continents, reported how resorting to problem-directed strategies is related to a better probability of resolution and learning and a lower degree of emotional affectation[16]. They found that DASS21 scores were negatively linked to active coping, humor, and acceptance and were positively associated with self-distraction, denial, substance abuse, emotional support, behavioral disengagement, emotional expression, religion, and planning. In line with these findings, this study identified a weak significant correlation between the presence of anxiety and resorting to strategies considered non-adaptive.

The relationship between certain strategies and greater psychological well-being cannot be absolutized. While some may argue that strategies

such as religion, positive reappraisal or humor are not adaptive if they do not address the problem directly, there is consensus that problem-focused strategies are effective when the issue is perceived as manageable and within the person's control. For this reason, avoidance strategies may be necessary in adverse situations that are considered impossible to address immediately, requiring postponing them with the possibility of later achieving a more favorable position for coping. Humor, religion or emotional expression, considered non-adaptive, contribute to reducing emotional distress, and their temporary use allows the challenge to be initially faced and facilitates its active approach. In the population studied, subjective discomfort changed according to the perception of the degree of threat of the disease or the availability of different types of resources (both personal and therapeutic alternatives). For some, stopping work temporarily was a strategy, for others acceptance was the basis for using active strategies. Therefore, the consideration of adaptive or dysfunctional is relativized depending on the moment and its immediate or mediated usefulness. The strategies are not mutually exclusive and can coexist[6,14,15].

While the participants of this research differ from other populations studied in the fact of having suffered from the COVID-19 disease, the differences in the impact on mental health, in terms of its extent and severity, can be explained by the presence of resources and protective factors against the experience of the disease that could have influenced the coping strategies they resorted to. These include social, family, and occupational support, both practical and emotional, such as access to personal protective equipment, training in physical and mental self-care, and psychological support. Additionally, participants reported gaining valuable insights, particularly in the revaluation of self-care. This aligns with the findings of Kotera *et al*., who in their qualitative study with healthcare professionals in Japan conducted between december 2020 and january 2021, highlighted that self-care is often undervalued[18]. Their study suggested that improving workplace communication, increasing recognition of healthcare workers' efforts, and fostering self-care could serve as potential solutions to mitigate mental health issues in this population. The present study supports this perspective, reinforcing the importance of self-care as a key element in protecting healthcare workers' well-being.

In the present study, healthcare workers also reported an increase in empathy, which in turn reshaped their role as caregivers, giving their work a transcendent meaning and helping them cope more effectively with challenges. This finding is similar to the results of Eisenbeck *et al*., who demonstrated that enhancing the sense of meaning in life was strongly negatively correlated with anxiety and loneliness, while being positively associated with indicators of both mental and physical well-being[16]. Therefore, both studies underscore the importance of finding meaningful purpose in one's work as a key factor in improving mental health outcomes

Certain limitations must be considered when interpreting the results of this study. These include its idiographic nature, the relatively small and localized sample size, and the absence of comparison groups in the analysis of coping strategies by type of work and period. Additionally, the study did not account for the severity of illness or the potential impact of long-term COVID cases. Another notable limitation is the lack of baseline data on healthcare workers' mental health prior to their illness.

Conclusions

Healthcare workers who contracted COVID-19 experienced a significant impact on their mental health, characterized by high levels of anxiety and stress. The coping strategies they employed influenced the magnitude of this impact, with some being more adaptive than others. The healthcare workers assessed predominantly opted for adaptive coping strategies, which directly address the problematic situation or facilitate its resolution. While non-adaptive strategies, which perpetuate the problem, showed a weak link to anxiety, coping remains a dynamic process influenced by individual and contextual factors. Therefore, what is considered non-adaptive in one context may be functional in another. Promoting adaptive coping strategies requires a supportive work environment that strengthens individual capacities, including self-care and the ability to find meaning in the illness experience. Future research should focus on the design and evaluation of programs that enhance adaptive coping and assess their impact on healthcare workers' well-being and the quality of their professional performance.

Conflict of interest

No conflict of interest.

Funding

No financing.

Acknowledgments

In memory of our colleague at Clínica Boyacá, Carlos Rincón Chaparro, a physician who passed away in the line of duty, faithfully practicing his vocation.

References

1. Organización Panamericana de la Salud [Internet]. Washington (DC): OPS. Cerca de 570.000 trabajadores de la salud se han infectado y 2.500 han muerto por COVID-19 en las Américas; 2022 sep 2 [citado 2024 jul 6] ; [aprox. 3 p.]. Disponible en: https://www.paho.org/es/noticias/2-9-2020-cerca-570000-trabajadores-salud-se-han-infectado-2500-han-muerto-por-covid-19
2. Instituto Nacional de Salud [Internet]. Bogotá (CO): Instituto Nacional de Salud. Coronavirus: personal de salud [citado 2024 jul 6]; [aprox. 2 p.]. Disponible en: https://www.ins.gov.co/Noticias/Paginas/coronavirus-personal-salud.aspx
3. Shechter A, Diaz F, Moise N, Anstey D E, Ye S, Agarwal S, et al. Psychological distress, coping behaviors, and preferences for support among New York healthcare workers during the COVID-19 pandemic. Gen Hosp Psychiatry. 2020;66:1-8.
4. Fteropoulli T, Kalavana TV, Yiallourou A, Karaiskakis M, Koliou Mazeri M, Vryonides S, et al. Beyond the physical risk: Psychosocial impact and coping in healthcare professionals during the COVID-19 pandemic. J Clin Nurs. 2021;6:e15348-e15348
5. Babore A, Lombardi L, Viceconti ML, Pignataro S, MarinoV, Crudele M, et al. Psychological effects of the COVID-2019 pandemic: Perceived stress and coping strategies among healthcare professionals. Psychiatry Res. 2020;293:113366.
6. Kotera Y, Ozaki A, Miyatake H, Tsunetoshi C, Nishikawa Y, Kosaka M, et al. Qualitative investigation into the mental health of healthcare workers in Japan during the COVID-19 pandemic. Int J Environ Res Public Health. 2022;19(1):568
7. Soto M, Rivera C, Ramos L, Denegri L, Herrera J, Camargo L, et al. Prevalencia y factores asociados con las quejas cognitivas subjetivas del personal sanitario latinoamericano durante la pandemia de COVID-19. Rev Colomb Psiquiatr. 2022.
8. Organización Panamericana de la Salud. The COVID-19 HEalth caRe wOrkErs Study (HEROES): informe regional de las Américas. Washington, D.C.: OPS; 2022.
9. Mera A, Delgado M, Merchán Á, Cabra G, Calvache J. Conocimientos y necesidades del personal de salud sobre elementos de protección personal durante la pandemia por COVID-19 en el Cauca. Rev Fac Cienc Salud Univ Cauca. 2020;22(1):16–23.
10. Ministerio de Salud y Protección Social de Colombia. Los retos del sistema de salud que dejó la pandemia por COVID-19. Bogotá: Minsalud; 2020.
11. López I. Ansiedad y depresión, reacciones emocionales frente a la enfermedad. An. Med. Interna. 2007;24(5):209-211.
12. Piqueras J, Martínez A, Ramos V, Rivero R, García L, Oblitas L. Ansiedad, Depresión y Salud. Suma Psicol. 2008;15(1):43-73.
13. Macías A, Madariaga C, Valle M, Zambrano J. Estrategias de afrontamiento individual y familiar frente a situaciones de estrés psicológico. Psicol. Caribe. 2013;30(1):123-145.
14. Lazarus R, Folkman S. Transactional theory and research on emotions and coping. Eur J Pers. 1987;1:141-69.
15. Carver C. You want to measure coping but your protocol's too long: consider the brief COPE. Int J Behav Med. 1997;4(1):92-100.
16. Eisenbeck N, Carreno DF, Wong PTP, Hicks JA, María RG, Puga JL, et al. An international study on psychological coping during COVID-19: Towards a meaning-centered coping style. Int J Clin Health Psychol. 2022;22(1):100256.
17. Labrague LJ. Psychological resilience, coping behaviours and social support among health care workers during the COVID-19 pandemic: A systematic review of quantitative studies. J Nurs Manag. 2021;29(7):1893-1905.
18. Tahara M, Mashizume Y, Takahashi K. Coping Mechanisms: Exploring Strategies Utilized by Japanese Healthcare Workers to Reduce Stress and Improve Mental Health during the COVID-19 Pandemic. Int J Environ Res Public Health. 2020;18(1):131.

19. Lovibond PF, Lovibond SH. The structure of negative emotional states: comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. Behav Res Ther. 1995;33(3):335-343.
20. Vargas-Olano MO, Cárdenas-Ojeda SP, Herrera-Delgado C. Un recurso para atención primaria de la salud mental. DASS-21, propiedades psicométricas. Rev Peru Investig Salud. 2022;6(3):141-148.
21. Crespo M, Cruzado J. La evaluación del afrontamiento: adaptación española del cuestionario COPE con una muestra de estudiantes universitarios. Anál. modif. conducta. 1997;23(92): 797-830.
22. Herrera G, Rodríguez L. Estudio piloto de validación del instrumento Brief Cope Inventory en su versión en español para evaluar estrategias de afrontamiento en mujeres con cáncer de seno. [Tesis de grado en Enfermería]. Bogotá: Pontificia Universidad Javeriana; 2009.
23. R Core Team. R: A Language and Environment for Statistical Computing. Vienna, Austria: R Foundation for Statistical Computing; 2022. Disponible en: https://www.R-project.org
24. RStudio Team RStudio: Integrated Development for R. RStudio, PBC, Boston, MA. 2020. Disponible en: http://www.rstudio.com/.
25. Hernández-Sampieri R, Fernández-Collado C, Baptista-Lucio P. Metodología de la investigación. 6ª ed. México: McGraw Hill; 2014.
26. Lucas-Hernández A, del Rosario González-Rodríguez V, López-Flores A, Kammar-García A, Mancilla-Galindo J, Vera-Lastra O, et al. Estrés, ansiedad y depresión en trabajadores de salud durante la pandemia por COVID-19. Rev Med Inst Mex Seguro Soc. 2022;60(5):556-562.
27. Santamaría MD, Ozamiz-Etxebarria N, Redondo IR, Alboniga-Mayor JJ, Picaza MP. Impacto psicológico de la COVID-19 en una muestra de profesionales sanitarios españoles. Rev Psiquiatr Salud Ment. 2020;14(2):106-112.
28. Caldichoury N, García-Roncallo P, Saldías C, Zurita B, Castellanos C, Herrera-Pino J, et al. Impacto psicológico del COVID-19 en los trabajadores sanitarios durante el segundo año de pandemia en Latinoamérica: estudio de encuesta transversal. Rev Colomb Psiquiatr. 2023;1-10.
29. Ángel, YA, Suarez, TA, Vásquez EA, Mena EP, Organista NA, Rodríguez CC, et al. Estrategias de afrontamiento en personal de la salud que atienden pacientes COVID y no COVID en dos ciudades de Colombia. Divers. Perspect. Psicol. 2022;18(2):175-184.