Article

Not peer-reviewed version

Fear of COVID-19, Risk Perception and Preventive Behavior in Health Workers: A Cross-Sectional Analysis in Middle-Income Latin American Countries

Cesar Antonio Bonilla-Asalde , Oriana Rivera-Lozada , Miguel Ipanaqué-Zapata , Elvis Siprian Castro-Alzate , Robinson Pacheco López , Isabel Cristina Rivera-lozada , FELIX CHONG * , Lucrecia Ramirez Sagastume

Posted Date: 8 February 2023

doi: 10.20944/preprints202302.0136.v1

Keywords: COVID-19; SARS-CoV-2; health personnel; fear to COVID-19

Article

Fear of COVID-19, Risk Perception and Preventive Behavior in Health Workers: A Cross-Sectional Analysis in Middle-Income Latin American Countries

César Antonio Bonilla-Asalde [1], Oriana Rivera-Lozada [2], Miguel Ipanaque [3], Elvis Siprian Castro-Alzate [4], Robinson Pacheco-Lopez [5], Isabel Cristina Rivera-lozada [6], Félix Chong [7,*] and Norma Lucrecia Ramírez Sagastume [8]

[1] Professional School of Human Medicine, Universidad Privada San Juan Bautista, Chorrillos, Lima, Peru
[2] South American Center for Education and Research in Public Health, Universidad Norbert Wiener, Lima, Peru
[3] Instituto de Investigación, Capacitación y Desarrollo Psicosocial y Educativo [Research, Training and Psychosocial and education Development]: PSYCOPERU, Lima, Peru
[4] Academic Program of Occupational Therapy, Academic Program of Doctorate in Health. Universidad del Valle. Cali, Colombia
[5] Universidad Libre, Cali Colombia
[6] Universidad del Cauca, Popayán, Colombia
[7] Ministry of Health of Ecuador
[8] Ministry of Health of Guatemala
* Correspondence: felixchong@hotmail.com

Abstract: The aim of this study was to estimate the association between fear of COVID-19 and risk perception with preventive behavior in health professionals from three Latin American countries. An analytical cross-sectional study was conducted. Health professionals with on-site care in Colombia, Ecuador, Guatemala, and Peru were surveyed. Information was collected through an online self-report questionnaire. The main variables were preventive behavior as the dependent variable and fear of COVID-19 and risk perception as independent variables. Linear regression was used, and Beta coefficients and p-values were calculated. 435 health professionals were included, the majority were aged 42 years or older (45.29%, 95%CI: 40.65%-50.01%) and female (67.82%, 95%CI: 63.27%-72.05%). It was shown that the greater the fear of COVID-19, the greater the preventive behavior of COVID-19 infection (B=2.21, p=0.002 for total behavior; B=1.12, p=0.037 for additional protection at work; B=1.11, p<0.010 for hand washing). The risk perception of COVID-19 infection had a slight direct relationship with preventive behaviors (B=0.28, p=0.021 for total behavior; B=0.13, p=0.015 for hand washing), with the exception of the preventive behavior of using additional protection at work (p=0.339). We found that fear and risk perception are associated with increased practice of hand washing and use of additional protection at work. Further studies are required on the influence of working conditions, job performance and the occurrence of mental health problems in frontline personnel with regard to COVID-19.

Keywords: COVID-19; SARS-CoV-2; health personnel; fear to COVID-19.

1. Introduction

Since the beginning of the pandemic, COVID-19 has caused significant damage to health systems around the world, including financial, material and, mainly, human lives losses [1,2]. All this, despite the strict measures promoted by the authorities to prevent transmission [3], such as strict social distancing, lockdowns and educational campaigns [4]. In addition, the accelerated speed with which the virus spread created challenges in health care systems that forced health care workers to deal with both clinical and non-clinical stressors [5]. These include the shortage of personal protective equipment (PPE), the increasing mortality and morbidity associated with COVID-19 [6], the fear of bringing the virus to family members [7,8] and the constant loss of colleagues to the disease [9]. These

 doi:10.20944/preprints202302.0136.v1

factors have caused in the population an excessive fear of acquiring the disease and, above all, of dying to it [10,11], thus constituting a psychological impact of the pandemic on the population [12]. This impact is also observed in health professionals [8,13,14], in whom the aforementioned conditions have put an enormous psychological pressure that, although it may be beneficial because it encourages them to follow preventive measures such as hand washing and social distancing [15], implies a potential risk to the physical and emotional wellbeing [16] of the main workforce with regard to the pandemic [17,18], and thus compromising their decision-making, their health and the patients' health [19]. In addition, evidence from previous outbreaks [20–22], together with evidence in the COVID-19 pandemic [23–25], suggests that these factors have significant short- and long-term effects on the mental health of healthcare workers.

It has been seen that the measures imposed by the authorities are not sufficient to decrease the transmission of the virus, as there is limited availability of N95 masks, ventilatory equipment, isolation rooms and Intensive Care Units (ICU), particularly in outpatient medicine offices, to effectively evaluate and treat all patients with COVID-19 [26]. This has caused greater concern among healthcare professionals [27], who feel a high risk of acquiring the infection in addition to the intrinsic risk involved in their work [28] with respect to the general population [29]. Therefore, many have adopted preventive measures from a personal initiative [30] and according to their knowledge [31,32], to reduce the risk of infection and thus avoid putting their family and friends at risk, which also contributes to the psychological impact that this pandemic means for them.

This is why it is very important to take care of the mental health of these professionals [6]; however, there is still little evidence on the association between fear of COVID-19 and the preventive behavior in health professionals facing COVID-19 cases in Latin America. Therefore, the aim of this study was to estimate the association between fear of COVID-19 and risk perception with preventive behavior in health professionals from four Latin American countries.

2. Materials and Methods

2.1. Study Design and Area

An observational analytical cross-sectional study was carried out during the COVID-19 pandemic in health personnel from 4 Latin American (LA) countries: Colombia, Ecuador, Guatemala, and Peru. Latin America is made up of 20 countries, with notable cultural, economic and political differences [33]. For example, according to gross national income (GNI), Colombia, Ecuador, Guatemala and Peru are upper middle-income countries [34].

2.1. Sample Size

A total of 481 health professionals with on-site care in the 4 LA countries (Colombia, Ecuador, Guatemala, and Peru) were surveyed, using snowball sampling due to the difficult access to this population in times of COVID-19 The exclusion criteria were not being a physician, nurse or other health professional with on-site care, being older than 18 years old, not accepting the informed consent, not completing at least 50% of the questionnaire. From the 481 participants, 46 health professionals were excluded due to missing data, resulting in a final sample of 435 (90.443%) participants distributed in Colombia (79), Ecuador (121), Guatemala (80) and Peru (155).

2.2. Study Variables and Instruments

The main study variables were preventive behavior as the dependent variable, fear of COVID-19 and risk perception as independent variables. Preventive behavior was obtained from 5 self-reported items about protective attitudes towards COVID-19 grouped according to the use of protection additional to the mask (3 items) and hand washing (2 items). The items use a Likert scale with 5 answer categories (0=Rarely, up to 4=Always), with final scores for the variable ranging from 0 to 20 points (additional mask use=0 to 12 points and hand washing= 0 to 8 points).

 doi:10.20944/preprints202302.0136.v1

Fear of COVID-19 was obtained from 3 self-report items about the fear of becoming infected, infecting one's family, and dying from COVID-19, where these items had a dichotomous response scale (0=No; 1=Yes), with final scores ranging from 0 to 3 points.

The risk perception of COVID-19 was obtained from 4 self-report items about the existence of risk situations of direct contact with patients in care of this disease within the work environment. The items had a dichotomous response scale (0=No; 1=Yes), with a final score of 0 to 4 points.

All the items of the variables were housed in the supplementary section (Appendix A). Likewise, the items for the used variables had adequate reliability values (α, KR-20 >0.50) and factorial structure for the development of this study (Appendix B).

The study covariates were age in tertiles (21 to 33, 34 to 41 and 42 or more), gender (male and female), civil status (married/cohabitant, single and others), number of children (no children, 1 child, 2 or more children), work time (in years), and mental exhaustion (No and Yes).

2.3. Procedure

During the period between March and July 2021, health professionals with on-site care (physicians, nurses, rehabilitators, among others) were invited to participate through the Ministries of Health of the participating countries. The research team was contacted to inform about the objective of the study and to request their voluntary participation. The information was collected through the Google Forms ® platform, with an average duration of 10 minutes for completion. Finally, those who completed the form were asked to refer other possible participants until the study sample was reached.

2.4. Statistical Analysis

The analysis of this study began by answering to the characterization of the main variables and covariates by reporting frequency/percentages or mean/standard deviation tables, depending on the type of variable involved. Then, in order to identify whether there were significant differences according to countries, the Chi-Square, Fisher's Exact or ANOVA test was used, as appropriate, and for the latter, the Tukey post hoc test was performed to identify the country with the best scores obtained.

To answer to the aim of examining the association of fear of COVID-19 and risk perception with preventive behavior (dimensions and total) of health professionals, we used linear regression, presenting two models with coefficients and p-values. The first or crude model examines separately the independent variables and covariates against preventive behavior. In the final or adjusted model, a pooled model was presented with all the main independent variables and covariates that were significant in the crude model. In both models the adjustment according to country was used and the variables were significant with a $p<0.05$. These analyses were performed in the Stata 15.0 software (StataCorp, 2017) [35].

Additionally, for the generation of variables, reliability was taken into account through Cronbach's alpha and internal construct validity through exploratory factor analysis using the Robust Maximum Likelihood Estimator (MLR) with rotation reporting their factor loadings (Appendix B). Cronbach's alpha and factor loadings are adequate with values greater than 0.80 and 0.49 respectively [36]. These analyses were performed using the Rstudio software (Rstudio®, Boston, MA, USA).

2.5. Ethical Aspects

Participation was voluntary, anonymous, and written informed consent was provided within the questionnaire at the beginning of the study. The ethical guidelines of the Helsinki Declaration were followed, and the information protocol was approved by the ethics committee of the Norbert Wiener University issued in the Register Report No. 085-2020.

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 8 February 2023 doi:10.20944/preprints202302.0136.v1

3. Results

3.1. Participants

The participants were 435 health professionals (60.46%, 95%CI: 55.77% - 64.96% are physicians), the majority were aged 42 years or older (45.29%, 95%CI: 40.65% - 50.01%), female (67.82%, 95%CI: 63.27%-72. 05%), with civil status single (57.24%, 95%CI: 52.52%-61.82%), with 2 or more children (54.48%, 95%CI: 49.76%-59.12%), with an average working time of 7.29 years (SD=6.92) and existence of mental exhaustion (90.34%, 95%CI: 87.18%-92.79%) (Table 1).

The main variables reported that according to the total sample the mean score of fear of COVID-19 was 1.65 (SD=10.04), risk perception was 3.15 (SD=0.94). The mean score of preventive behaviors for additional protection at work reported was 7.43 (SD=2.16), hand washing reported was 5.59 (SD=1.15); meanwhile, the grouping of all items (total) of preventive behavior was 13.02 (SD=2.44). Likewise, it was identified that there are significant differences between countries with respect to the scores obtained by health personnel, highlighting that the risk perception in Ecuador is higher than in Guatemala (p<0.001); meanwhile, Guatemala reported higher scores than Ecuador (p<0.001). Regarding preventive behavior, Peruvian health professionals showed higher scores than Ecuadorian professionals (p<0.001) (Appendix C).

Table 1. Comparison of the characteristics of the study sample, fear of COVID-19, risk perception and preventive behaviors among health personnel according to countries.

	Total (n=435)	Colombia (n=79)	Ecuador (n=121)	Guatemala (n=80)	Peru (n=155)	
Variables	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**p-value**
Age in tertiles						
21 to 33 years	153 (35.17)	20 (25,32%)	53 (43,80%)	31 (38,75%)	49 (31,61%)	0,001
34 to 41 years	85 (19.54)	26 (32,91%)	23 (19,01%)	17 (21,25%)	19 (12,26%)	
42 to more	128 (45.29)	33 (41,77%)	45 (37,19%)	32 (40,00%)	87 (56,13%)	
Gender[1]						
Female	295 (67.8)	58 (73,42%)	92 (76,03%)	48 (60,00%)	97 (62,58%)	0,028
Male	140 (32.2)	21 (26,58%)	29 (23,97%)	32 (40,00%)	58 (37,42%)	
Civil Status[2]						
Married/cohabitant	249 (57.24)	39 (49,37%)	87 (71,90%)	50 (62,50%)	73 (47,10%)	<0.001
Single	161 (37.01)	38 (48,10%)	21 (17,36%)	30 (37,50%)	72 (46,45%)	
Other	29 (5.75)	2 (2,53%)	13 (10,74%)	0 (0,00%)	10 (6,45%)	
Number of children[1]						
No children	191 (43.9)	17 (21,51%)	28 (23,14%)	27 (33,75%)	33 (21,29%)	<0.001
One child	85 (19.5)	13 (16,46%)	27 (22,31%)	24 (30,00%)	29 (18,71%)	
Two or more children	159 (36.6)	49 (62,03%)	66 (54,55%)	29 (36,25%)	93 (60,00%)	
Time working (in years)[3]						
Me(Sd)	7.29 (6.92)	5.36 (4.59)	7.25 (7.08)	5.61 (5.04)	9.18 (8.09)	<0.001
Mental Exhaustion[1]						
No	42 (9,66%)	7 (8,86%)	20 (16,53%)	3 (3,75%)	12 (7,74%)	0,015
Yes	393 (90,34%)	72 (91,14%)	101 (83,47%)	77 (96,25%)	143 (92,26%)	
Fear of COVID-19[3]						
Me(Sd)	1.65 (1.04)	1.75 (0.78)	1.52 (0.43)	1.63 (0.76)	1.36 (0.58)	0,237
Risk perception to COVID-19[3]						
Me(Sd)	3.15 (0.94)	3.41 (1.18)	2.73 (1.57)	3.55 (1.16)	3.14 (1.29)	<0.001
Preventive behaviors: Additional protection at work[3]						
Me(Sd)	7.43 (2.16)	7.99 (1.68)	6.71 (2.48)	7.43 (2.52)	7.72 (1.73)	<0.001
Preventive behaviors: Hand washing[3]						
Me(Sd)	5.59 (1.15)	5.6 (1.12)	5.62 (1.12)	5.60 (1.24)	5.55 (1.16)	0,800

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 8 February 2023 doi:10.20944/preprints202302.0136.v1

Preventive behaviors: Total[3]						
Me(Sd)	13.02 (2.44)	13.58 (1.92)	12.33 (2.66)	13.03 (2.97)	13.27 (2.05)	<0.001

Abbreviations: Me: mean, SD: standard deviation.[1]The Chi-square test was used. [2]The Fisher Exact test was used. [3]The ANOVA test was used.

Table 2 shows the characterization of the main variables of the study, which indicates that more than three quarters of the health professionals showed signs of fear of COVID-19 infection (93.10% were concerned about becoming infected, 95.63% were concerned about returning home and infecting their family, and 88.51% were concerned about the possibility of dying from the disease). Likewise, more than three quarters reported indications of risk perception to COVID-19 disease (e.g., 87.82% had direct contact with suspected or confirmed COVID-19 patients in aerosol generation procedures and 81.15% had direct contact with the environment of confirmed COVID-19 patients). Regarding preventive behavior, more than three fifths showed indications of always using additional protection at work (e.g., 73.56% always used face shield or goggles and 72.97% used gloves for care at work), while more than four fifths of the health personnel reported that they always perform hand washing (e.g., 91.95% performed hygiene after exposure to body fluids of any type of patient).

Table 2. Prevalence of fear of COVID-19, risk perception and preventive behavior in health professionals (n= 435).

Variables	n(%)
Fear of COVID-19	
Are you afraid/concerned that you might become infected?	
No	30(6.90%)
Yes	405(93.10%)
Are you afraid/concerned about returning home and infecting your family?	
No	19(4.47%)
Yes	416(95.63%)
Are you afraid/concerned that you might die from COVID-19?	
No	50 (11,49%)
Yes	385(88.51%)
Risk perception	
Have you provided direct care to a confirmed patient with COVID-19?	
No	123(28.3%)
Yes	312(71.7%)
Did you have face-to-face contact (within 1 meter) with a confirmed COVID-19 patient in a health care facility?	
No	112(25.8%)
Yes	323(74.2%)
Were you present when any aerosol generation procedure was performed on suspected or confirmed cases of COVID-19?	
No	53(12.28%)
Yes	382(87.82%)
Did you have direct contact with the environment where the confirmed COVID-19 patient was cared for? For example, bed, bedding, medical equipment, bathroom?	
No	82(18.95%)
Yes	353(81.15%)
Preventive practices	
D1: Additional protection at work	
Do you use disposable gloves in the workplace?	
Rarely	34(7.82%)
Occasionally	54(12.41%)
Most of the time	30(6.90%)
Always	317(72.97%)

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 8 February 2023 doi:10.20944/preprints202302.0136.v1

Do you use face shield or goggles in the workplace?	
Rarely	21(4.83%)
Occasionally	32(7.36%)
Most of the time	62(14.25%)
Always	320(73.56%)
Do you wear a disposable gown in the workplace?	
Rarely	38(8.74%)
Occasionally	49(11.26%)
Most of the time	38(8.74%)
Always	310(71.26%)
D2: Hand washing	
During patient care, do you perform hand hygiene before and after touching the patient even though you use gloves?	
Rarely	9(2.06%)
Occasionally	23(5.29%)
Most of the time	36(8.28%)
Always	367(84.37%)
Do you perform hand hygiene after exposure to body fluids of patients who were unsuspected or confirmed COVID-19 cases?	
Rarely	7(1.61%)
Occasionally	18(4.14%)
Most of the time	10(2.30%)
Always	400(91.95%)

3.2. Association between Fear of COVID-19, Risk Perception with Preventive Behavior

Table 3 in the model adjusted only by country (Model 1) reported that fear of COVID-19 and perception were significantly associated with preventive behavior according to dimensions and total. However, for the final model that included significant covariates (Model 2) the independent variables of fear of COVID-19 and risk perception had a slight decrease in the coefficients of association with respect to preventive behavior. It was evidenced that in health personnel the main exposure variable was fear of COVID-19, reporting that the greater the fear of COVID-19, the greater the preventive behavior of infection to COVID-19 (B=1.75, p=0.039 for total behavior; B=1.11, p=0.046 for additional protection at work; B=1.09, p=0.034 for hand washing). The risk perception of COVID-19 infection had a slight direct relationship with preventive behaviors (B=0.31, p=0.041 for total behavior; B=0.20, p=0.026 for hand washing), with the exception of the preventive behavior of using additional protection at work (p=0.459).

Table 3. Association between fear of COVID-19 and risk perception with preventive behavior of health personnel (n=435).

Variables	Preventive behavior:					
	Additional protection at work		Hand washing		Total	
	B (95%CI)	p-value	B(95%CI)	p-value	B(95%CI)	p-value
Model 1[a]						
Fear of COVID-19	1.17 (0.68 to 2.10)	0,042	1.03 (0.80 to 1.96)	0,037	1.92 (1.53 to 2.54)	0,023
Risk perception	0.37 (0.10 to 0.63)	0,022	0.23 (0.11 to 0.35)	0,010	0.60 (0.36 to 0.83)	0,004
Model 2[a]						
Fear of COVID-19	1.11 (0.85 to 1.78)	0,046	1.09 (0.68 to 1.13)	0,034	1.75 (1.35 to 2.53)	0,039
Risk perception	0.15 (-0.35 to 0.68)	0,459	0.20 (0.05 to 0.78)	0,026	0.31 (0.03 to 0.0.62)	0,041

Abbreviations: B: unstandardized coefficient, CI: confidence intervals.[a] Model 1 was the crude model only taking into account the adjustment by country. [b] Model 2 was adjusted by country and covariates that were significant in the crude model (p<0.05).

 doi:10.20944/preprints202302.0136.v1

4. Discussion

This study aimed to estimate the association between fear and risk perception of COVID-19 and preventive behavior in health professionals from Latin American countries in order to provide basic data to respond to the mental health problems faced by health personnel in middle-income countries. In the presence of emerging events or conditions, such as the case of the pandemic, health professionals have been required to use their emotional and cognitive resources to ensure adaptive mechanisms in their clinical practice and daily life.

It was found that, from the 435 professionals included, 90.34% had mental exhaustion by COVID-19, which is very above what was reported in other studies [5,16,33,34]. This difference is probably due to the fact that the sample was obtained from different Latin American countries and we know that this region is one of the most affected by the scarce resources available to properly face the pandemic [39], thus causing higher rates of psychological problems in health professionals compared to other regions of the world [40]. Another possible reason is that in this study "mental exhaustion" was considered as a psychological complication, whereas other studies have broken down this concept into terms such as "stress", "distress", "mental fatigue", "burnout syndrome", etc., which distributes the prevalences found among the different terms.

In this study, high frequencies of mental exhaustion were found in each of the countries, a situation that differs from several studies conducted worldwide [13,41]. In addition, it was found that 83.47% of the Ecuadorian health professionals included had mental exhaustion. This also differs from the reports in the available evidence [18,42]. The same difference was found in Peruvian health professionals, where 92.26% had mental exhaustion, which is far from what was previously reported [43]. It should be noted that these marked differences between the findings of this study and those reported in the evidence may be mostly due to the type of sampling applied, which does not guarantee the representativeness of the population of health professionals in Colombia, Ecuador, Guatemala, and Peru.

The available literature reports that the main factors associated with mental exhaustion are the inadequate organization and structure of the work, as well as the ability to cope with and manage stressors in COVID-19 care centers [44] . Likewise, other studies found that the work overload to which health professionals were subjected during the first waves of the pandemic was a predisposing factor to mental fatigue [45].

Finally, a 2020 study found that the lack of personal protective equipment was associated with mental fatigue, fear of COVID-19 and anxiety symptoms in frontline personnel [46]. We should keep in mind that, according to the World Health Organization, workers who do not receive enough support and who have limited control over how they can cope with work demands are more likely to have work-related stress, which affects their mental health and performance [47]. These associated factors reported in the cited studies may explain the increased risk perception to COVID-19 experienced by frontline care professionals. This relates to what was found in this study since more than 75% of the included professionals reported indications of risk perception to COVID-19 disease; furthermore, the association between fear of COVID-19 and risk perception has been previously reported [10]. However, unlike our study, the studies cited were conducted in a single country, so it is recommended to conduct multicenter studies to assess whether these risk factors for mental exhaustion are present in more Latin American countries for a better understanding of the problem.

An overall mean fear of COVID-19 score of 1.80 was found, with Colombia being the country that had the highest average with 1.89, while for Peru the average was 1.84. Besides, the average overall risk perception score was 3.15, with Guatemala being the country with the highest average with 3.55, while Peru had 3.14 These results show the high levels of fear and risk perception present among health personnel, which has been previously reported [4,48], where high levels of fear of getting COVID-19 or infecting family members, risk perception and death were found. We did not find studies evaluating these rates in Latin American countries; however, a study that included dentists from all over the world evaluated the fear of COVID-19 experienced by these professionals and found that more than 78% reported that they do feel it [49], which reinforces what was found in this study.

 doi:10.20944/preprints202302.0136.v1

It was found that the average global score for preventive behaviors was 13.02 and that Colombia had the highest average. Also, the use of additional protection at work was the preventive behavior with the highest average score, and Colombia and Peru were the countries with the highest scores. Due to several research in the area, it has been established that the incorporation of preventive measures such as hand washing, the use of masks and face shields are the main and most effective measures for preventing COVID 19 infection. In this regard, external factors such as the dissemination and training in the use of clinical practice guidelines, the dissemination of information in institutional and mass media and the availability of supplies in the workplace have an impact on the incorporation of protective measures during care in clinical scenarios. [50].

This study found that 93.1% reported feeling fear of becoming infected, while 95.63% felt fear of infecting their family. This coincides with what has been reported in other studies, where they found that the main fear of health professionals was to return home and infect their family, followed by the fear of becoming infected [41,51,52]. This reaffirms the fact that health personnel are exposed to multiple stressors and concern factors, where the most affected are the personnel who work in the first line of care against COVID-19, making transit to other scenarios of the daily life of this population [7].

Furthermore, we found an association between fear of COVID-19 and the risk perception with preventive behaviors, where the greater the fear or perceived risk perception, the greater the attitude of taking preventive actions, as reported in other studies [10,30,48,50]

This study has limitations: (1) The sampling applied was non-probabilistic, which does not guarantee the representativeness of the study population of the countries included and, therefore, it is not possible to extrapolate the results. (2) Since an online survey was applied to report mental exhaustion, the result is subject to the subjectivity of the person completing the survey for no test or diagnostic procedure was applied. However, despite the limitations, this study is relevant because it is one of the first to report the rates of fear, risk perception and preventive behavior in health professionals in Latin American countries.

5. Conclusions

In this study, we found that fear and risk perception are associated with increased practice of hand washing and use of additional protection at work. Nevertheless, further studies on the subject are needed because working conditions during the pandemic greatly influence the work performance and mental health of frontline staff in the face of COVID-19; therefore, a better understanding of the subject will allow better decisions to be made and avoid medium- and long-term complications for the health care system in Latin America.

Author Contributions:

Funding: This study was financed by the competitive fund of the Norbert Wiener University.

Conflicts of Interest: The authors have no conflicts of interest.

Appendix A. Self-Reported Items of Fear Of COVID-19, Risk Perception and Preventive Behaviors

Fear of COVID-19

1. Are you afraid/concerned that you might become infected?
2. Are you afraid/concerned about returning home and infecting your family?

Risk perception

1. Have you provided direct care to a confirmed patient with COVID-19?
2. Did you have face-to-face contact (within 1 meter) with a confirmed COVID-19 patient in a health care facility?
3. Were you present when any aerosol generation procedure was performed on suspected or confirmed cases of COVID-19?[1]

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 8 February 2023 doi:10.20944/preprints202302.0136.v1

4. Did you have direct contact with the environment where the confirmed COVID-19 patient was cared for? For example, bed, bedding, medical equipment, bathroom?

Preventive practices

1. Do you use disposable gloves in addition to the use of a KN95 mask or double surgical mask in the workplace?
2. Do you use disposable a face shield or goggles in addition to the use of a KN95 mask or double surgical mask in the workplace?
3. Do you use a disposable gown in addition to the use of a KN95 mask or double surgical mask in the workplace?
4. During patient care, do you perform hand hygiene before and after touching the patient even though you use gloves?
5. Do you perform hand hygiene after exposure to body fluids of patients who were unsuspected or confirmed COVID-19 cases?

Note: Aerosol generating procedures are nebulization, endotracheal intubation, gastric aspiration, oropharyngeal swabbing, airway suctioning, sputum collection, tracheotomy, bronchoscopy, cardiopulmonary resuscitation-CPR and others.

Appendix B. Validity and Reliability of Fear Of COVID-19, Risk Perception and Preventive Behaviors

	Total	Colombia	Ecuador	Guatemala	Peru
Variables	**Λ**	**Λ**	**λ**	**λ**	**λ**
Preventive practices: Additional protection					
Use of disposable gloves in the workplace	0.76	0.70	0.72	0.92	0.82
Do you use face shield or goggles in the workplace?	0.58	0.62	0.65	0.75	0.63
Do you wear a disposable gown in the workplace?	0.86	0.82	0.88	0.94	0.80
α (Dimension)	0.87	0.83	0.88	0.86	0.81
Preventive practices: Hand washing					
During patient care, do you perform hand hygiene before and after touching the patient even though you use gloves?	0.87	0.81	0.97	0.95	0.87
Do you perform hand hygiene after exposure to body fluids of patients who were unsuspected or confirmed COVID-19 cases?	0.91	0.88	0.88	0.92	0.85
α (Dimension)	0.88	0.87	0.92	0.86	0.83
α (Total)	0.86	0.81	0.87	0.84	0.81
KMO(Total)	0.78				
X^2 [p-value](Total)	10503(<0.001)				
%Variance Explained (Total)	57.36%				
Fear of COVID-19					
Are you afraid/concerned that you might become infected?	0.85	0.82	0.84	0.91	0.80
Are you afraid/concerned about returning home and infecting your family?	0.87	0.86	0.78	0.88	0.73
Are you afraid/concerned that you might die from COVID-19?	0.71	0.64	0.63	0.72	0.65

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 8 February 2023 doi:10.20944/preprints202302.0136.v1

KR-20	0.75	0.76	0.80	0.78	0.79
KMO(Total)	0.75				
X^2 [p-value](Total)	11024(<0.001)				
%Variance Explained (Total)	52.3%				
Risk perception					
Have you provided direct care to a confirmed patient with COVID-19?	0.79	0.97	0.94	0.96	0.64
Did you have face-to-face contact (within 1 meter) with a confirmed COVID-19 patient in a health care facility?	0.90	0.96	0.97	0.92	0.60
Were you present when any aerosol generation procedure was performed on suspected or confirmed cases of COVID-19?	0.67	0.81	0.80	0.88	0.65
Did you have direct contact with the environment where the confirmed COVID-19 patient was cared for? For example, bed, bedding, medical equipment, bathroom?	0.79	0.95	0.96	0.96	0.61
Practice					
KR-20	0.87	0.86	0.88	0.94	0.82
KMO(Total)	0.81				
X^2 [p-value](Total)	10349(<0.001)				
%Variance Explained (Total)	58.4%				

Abbreviations: α: Cronbach's alpha, KR-20: Kuder-Richardson 20, λ: factor loadings, KMO: Kaiser-Meyer- Olkin Test; X^2= Bartlett's sphericity test.

Appendix C. Comparisons of Study Variables According to Countries Using Tukey's Post Hoc Test

Variables	Countries	Difference in Means (I-J)	p	[95%CI]
Time in years	Ecuador vs Colombia	1.220	0.610	[-1.34 to 3.79]
	Guatemala vs Colombia	0.240	1.000	[-2.57 to 3.06]
	Guatemala vs Ecuador	-0.980	0.760	[-3.53 to 1.58]
	Peru vs Colombia	3.760	**0.000**	[1.31 to 6.22]
	Peru vs Ecuador	2.540	0.010	[0.39 to 4.69]
	Peru vs Guatemala	3.520	**<0.001**	[1.07 to 5.96]
Risk perception	Ecuador vs Colombia	-0.678	.003	[-1.18 to -0.18]
	Guatemala vs Colombia	0.145	0.903	[-0.40 to -0.69]
	Guatemala vs Ecuador	0.823	**<0.001**	[0.33 to 1.32]
	Peru vs Colombia	-0.263	0.484	[-0.74 to 0.21]
	Peru vs Ecuador	0.415	0.052	[-0.05 to 0.83]
	Peru vs Guatemala	-0.408	0.184	[-0.88 to 0.07]
Preventive behavior: Additional protection at work	Ecuador vs Colombia	-1.280	**0.000**	[-2.07 to -0.49]
	Guatemala vs Colombia	-0.560	0.340	[-1.43 to 0.3]
	Guatemala vs Ecuador	0.710	0.090	[-0.07 to 1.5]
	Peru vs Colombia	-0.260	0.800	[-1.02 to 0.49]
	Peru vs Ecuador	1.010	**0.000**	[0.35 to 1.67]
	Peru vs Guatemala	0.300	0.740	[-0.45 to 1.05]
	Ecuador vs Colombia	0.025	1.000	[-0.41 to 0.46]

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 8 February 2023 doi:10.20944/preprints202302.0136.v1

Preventive behavior: Hand washing	Guatemala vs Colombia	0.005	1.000	[-0.47 to 0.48]
	Guatemala vs Ecuador	-0.020	1.000	[-0.45 to 0.41]
	Peru vs Colombia	-0.050	0.990	[-0.46 to 0.37]
	Peru vs Ecuador	-0.070	0.960	[-0.43 to 0.29]
	Peru vs Guatemala	-0.052	0.990	[-0.46 to 0.36]
	Ecuador vs Colombia	-1.250	**0.000**	[-2.15 to -0.36]
Preventive behavior: Total	Guatemala vs Colombia	-0.560	0.460	[-1.54 to 0.42]
	Guatemala vs Ecuador	0.694	0.190	[-0.2 to 1.59]
	Peru vs Colombia	-0.311	0.780	[-1.17 to 0.54]
	Peru vs Ecuador	0.940	**0.010**	[0.19 to 1.69]
	Peru vs Guatemala	0.250	0.880	[-0.61 to 1.1]

Appendix D. Crude and Adjusted Model of the Covariates in the Preventive Behavior of Health Personnel

	Preventive behavior:					
	Additional protection at work		Hand washing		Overall	
Variable	**B(95%IC)**		**B(95%IC)**		**B(95%IC)**	
Model 1						
Age in tertiles						
21 to 33 years	Ref		Ref		Ref	
34 to 41 years	1.83 (0.45 to 3.21)	**0.024**	0.19 (-0.28 to 0.67)	**0.024**	2.03 (0.79 to 3.26)	**0.014**
42 to more	1.74 (-0.05 to 3.53)	0.054	0.31 (0.01 to 0.63)	0.048	2.06 (0.56 to 3.55)	**0.022**
Gender						
Female	Ref		Ref		Ref	
Male	-0.09 (-0.93 to 0.75)	0.749	-0.15 (-0.50 to 0.19)	0.238	-0.25 (-1.37 to 0.87)	0.526
Civil Status						
Married/cohabitant	Ref		Ref		Ref	
Single	0.17 (-0.41 to 0.75)	0.420	-0.05 (-0.54 to 0.44)	0.75	0.12 (-0.42 to 0.66)	0.539
Other	0.03 (-1.76 to 1.82)	0.960	0.21 (-0.16 to 0.58)	0.175	0.24 (-1.87 to 2.35)	0.745
Number of children						
No children	Ref		Ref		Ref	
One child	1.20 (-0.81 to 3.21)	0.153	0.25 (-0.62 to 1.12)	0.428	1.45 (-0.24 to 3.14)	0.071
Two or more children	2.21 (0.11 to 4.31)	**0.044**	0.02 (-0.73 to 0.77)	0.949	2.23 (0.09 to 4.37)	**0.045**
Time working (in years)	0.01 (-0.04 to 0.45)	0.895	0.01 (0.01 to 0.17)	**0.033**	0.01 (-0.04 to 0.06)	0.521
Mental Exhaustion	1.74 (0.49 to 2.99)	0.021	0.01 (-0.32 to 0.54)	0.481	1.89 (0.17 to 3.52)	0.039
No	Ref		Ref		Ref	
Yes	1.74 (0.49 to 2.99)	**0.021**	-0.27 (-0.58 to 0.03)	0.065	1.15 (0.16 to 2.14)	0.034
Model 2						
Age in tertiles						
21 to 33 years	Ref		Ref		Ref	
34 to 41 years	1.48 (0.2 to 2.76)	0.035	-0.11 (-0.41 to 0.19)	0.297	1.34 (0.14 to 2.55)	0.038
42 to more	1.21 (0.14 to 2.3)	0.037	0.03 (-0.35 to 0.43)	0.782	1.32 (0.47 to 2.16)	0,016
Gender						
Female	Ref		Ref		Ref	
Male	-	-	-	-	-	-
Civil Status						
Married/cohabitant	Ref		Ref		Ref	
Single	-	-	-	-	-	-
Other	-	-	-	-	-	-
Number of children						

No children	Ref		Ref			
One child	0.72 (-0.88 to 2.33)	0.248	-	-	0.65 (-0.2 to 1.5)	0.093
Two or more children	1.68 (0.63 to 2.73)	0.015	-	-	1.45 (1.02 to 1.88)	0.002
Time working (in years)			**0.01 (-0.01 to 0.02)**	**0.079**	-	-
					1.22 (0.05 to 3.44)	1.22
Mental Exhaustion	1.81 (0.36 to 4.93)	0.04	-	-	Ref	
No	Ref		Ref		0.42 (-0.62 to 1.47)	0.288
Yes	1.1 (0.59 to 1.61)	0.006	-	-	0.42 (-0.62 to 1.47)	0.288

Abbreviations: B: unstandardized coefficient, CI: confidence intervals.[a] Model 1 was the crude model only taking into account the adjustment by country. [b] Model 2 was adjusted by country and covariates that were significant in the crude model ($p<0.05$).

References

1. Haileamlak A. The impact of COVID-19 on health and health systems. *Ethiop J Health Sci.* **2021**, *31*, 1073-1074. https://doi.org/10.4314/EJHS.V31I6.1
2. Shroff ZC, Marten R, Vega J, Peters DH, Patcharanarumol W, Ghaffar A. Time to reconceptualise health systems. Lancet (London, England). **2021**, *397*, 2145. https://doi.org/10.1016/S0140-6736(21)01019-9
3. Haldane V, De Foo C, Abdalla SM, Jung AS, Tan M, Wu S, et al. Health systems resilience in managing the COVID-19 pandemic: lessons from 28 countries. *Nat Med.* **2021**, *27*, 964-980. https://doi.org/10.1038/S41591-021-01381-Y
4. Labrague LJ, de los Santos JAA. Fear of COVID-19, psychological distress, work satisfaction and turnover intention among frontline nurses. *J Nurs Manag.* **2021**, *29*, 395-403. https://doi.org/10.1111/JONM.13168
5. Hall H. The effect of the COVID-19 pandemic on healthcare workers' mental health. *JAAPA.* **2020**, *33*, 45-48. https://doi.org/10.1097/01.JAA.0000669772.78848.8C
6. Ripp J, Peccoralo L, Charney D. Attending to the emotional well-being of the health care workforce in a new york city health system during the COVID-19 pandemic. *Acad Med.* **2020**, *95*, 1136-1139. https://doi.org/10.1097/ACM.0000000000003414
7. Danet Danet A. Psychological impact of COVID-19 pandemic in Western frontline healthcare professionals. A systematic review. *Med Clin (Barc).* **2021**, *156*, 449-458. https://doi.org/10.1016/J.MEDCLI.2020.11.009
8. Araújo AC, Araújo AAC, Fernandes MA, Pérez LÁA, Pillon SC. Miedo experimentado por profesionales de salud en la pandemia por COVID-19 e implicaciones para la salud mental *[Fear experienced by health professionals in the COVID-19 pandemic and implications for mental health]*. Rev Cubana Enferm. 2021, 37. Available online: http://revenfermeria.sld.cu/index.php/enf/article/view/3971
9. Bandyopadhyay S, Baticulon RE, Kadhum M, Alser M, Ojuka DK, Badereddin Y, et al. Infection and mortality of healthcare workers worldwide from COVID-19: a systematic review. *BMJ Glob Heal.* 2020, 5. https://doi.org/10.1136/BMJGH-2020-003097
10. Han MFY, Mahendran R, Yu J. Associations Between Fear of COVID-19, Affective Symptoms and Risk Perception Among Community-Dwelling Older Adults During a COVID-19 Lockdown. *Front Psychol.* **2021**, *12*, 961. https://doi.org/10.3389/FPSYG.2021.638831/BIBTEX
11. Musche V, Bäuerle A, Steinbach J, Schweda A, Hetkamp M, Weismüller B, et al. COVID-19-Related fear and health-related safety behavior in oncological patients. *Front Psychol.* **2020**, *11*, 1984. https://doi.org/10.3389/FPSYG.2020.01984/BIBTEX
12. Medina RM, Jaramillo-Valverde L. El COVID-19, Cuarentena y su impacto psicológico en la población. *preprint.* 2020. https://doi.org/10.1590/SCIELOPREPRINTS.452
13. Monterrosa-Castro Á, Davila-Ruiz R, MejíaMantilla A, Contreras-Saldarriaga J, Mercado-Lara M, Flores-Monterrosa C. Occupational Stress, Anxiety and Fear of COVID-19 in Colombian Physicians. *Rev la Fac Ciencias la Salud.* **2020**, *23*, 195-213. https://doi.org/10.29375/01237047.3890
14. Pappa S, Ntella V, Giannakas T, Giannakoulis VG, Papoutsi E, Katsaounou P. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. Brain Behav Immun. **2020**, *88*, 901-907. https://doi.org/10.1016/J.BBI.2020.05.026
15. Harper CA, Satchell LP, Fido D, Latzman RD. Functional Fear Predicts Public Health Compliance in the COVID-19 Pandemic. *Int J Ment Health Addict.* **2021**, *19*, 1875-1888. https://doi.org/10.1007/S11469-020-00281-5
16. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw Open.* 2020, 3. https://doi.org/10.1001/JAMANETWORKOPEN.2020.3976
17. Society of behaviroal medicine. Strategies to Address COVID-19 Related Stressors in Healthcare Settings | SBM - Society of Behavioral Medicine. 2020. Available online: https://www.sbm.org/healthy-living/strategies-to-address-covid-19-related-stressors-in-healthcare-settings

18. Vinueza-Veloz AF, Aldaz-Pachacama NR, Mera-Segovia CM, Pino-Vaca DP, Tapia-Veloz EC, Vinueza-Veloz MF. Burnout syndrome among Ecuadorian medical doctors and nurses during COVID-19 pandemic. *preprint.* 2020. https://doi.org/10.1590/SCIELOPREPRINTS.708
19. Zhang C, Yang L, Liu S, Ma S, Wang Y, Cai Z, et al. Survey of insomnia and related social psychological factors among medical staff involved in the 2019 novel coronavirus disease outbreak. *Front Psychiatry.* 2020, 11. https://doi.org/10.3389/FPSYT.2020.00306
20. Wu P, Fang Y, Guan Z, Fan B, Kong J, Yao Z, et al. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *Can J Psychiatry.* **2009**, *54*, 302-311. https://doi.org/10.1177/070674370905400504
21. Lee SM, Kang WS, Cho AR, Kim T, Park JK. *Psychological impact of the* 2015 MERS outbreak on hospital workers and quarantined hemodialysis patients. *Compr Psychiatry.* **2018**, *87*, 123-127. https://doi.org/10.1016/J.COMPPSYCH.2018.10.003
22. Paladino L, Sharpe RP, Galwankar SC, Sholevar F, Marchionni C, Papadimos TJ, et al. Reflections on the Ebola Public Health Emergency of International Concern, Part 2: The Unseen Epidemic of Posttraumatic Stress among Health-care Personnel and Survivors of the 2014–2016 Ebola Outbreak. *J Glob Infect Dis.* **2017**, *9*, 45. https://doi.org/10.4103/JGID.JGID_24_17
23. Vindegaard N, Benros ME. COVID-19 pandemic and mental health consequences: Systematic review of the current evidence. *Brain Behav Immun.* **2020**, *89*, 531-542. https://doi.org/10.1016/J.BBI.2020.05.048
24. Kang L, Ma S, Chen M, Yang J, Wang Y, Li R, et al. Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. *Brain Behav Immun.* **2020**, *87*, 11-17. https://doi.org/10.1016/J.BBI.2020.03.028
25. Chew NWS, Lee GKH, Tan BYQ, Jing M, Goh Y, Ngiam NJH, et al. A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. *Brain Behav Immun.* **2020**, *88*, 559-565. https://doi.org/10.1016/J.BBI.2020.04.049
26. Adams JG, Walls RM. Supporting the Health Care Workforce During the COVID-19 Global Epidemic. *JAMA.* **2020**, *323*, 1439-1440. https://doi.org/10.1001/JAMA.2020.3972
27. Sougou NM, Diouf JB, Diallo AA, Seck I. Analyse des risques perçus des prestataires de santé en milieu hospitalier dans le cadre de la pandémie à COVID-19: une étude qualitative dans le Centre Hospitalier Roi Baudoin de Guédiawaye, lors de la réception du 1er cas communautaire du Sénégal. *Pan Afr Med J.* **2020**, *37*, 23. https://doi.org/10.11604/PAMJ.SUPP.2020.37.1.25389
28. Sougou NM, Diouf JB, Diallo AA, Seck I. Risk perception of COVID-19 pandemic among health care providers: qualitative study conducted at the King Baudoin Hospital in Guédiawaye. *Pan Afr Med J.* **2020**, *37*, 23. https://doi.org/10.11604/PAMJ.SUPP.2020.37.23.25389
29. Simione L, Gnagnarella C. Differences between health workers and general population in risk perception, behaviors, and psychological distress related to COVID-19 spread in Italy. *Front Psychol.* 2020, 11. https://doi.org/10.3389/FPSYG.2020.02166/FULL
30. Mat Dawi N, Namazi H, Maresova P. Predictors of COVID-19 Preventive Behavior Adoption Intention in Malaysia. *Front Psychol.* 2021, 12. https://doi.org/10.3389/FPSYG.2021.616749
31. Haliwa I, Lee J, Wilson J, Shook NJ. Mindfulness and engagement in COVID-19 preventive behavior. *Prev Med reports.* 2020, 20. https://doi.org/10.1016/J.PMEDR.2020.101246
32. Albaqawi HM, Alquwez N, Balay-odao E, Bajet JB, Alabdulaziz H, Alsolami F, et al. Nursing students' perceptions, knowledge, and preventive behaviors toward COVID-19: A multi-university study. *Front public Heal.* 2020, 8. https://doi.org/10.3389/FPUBH.2020.573390
33. Muñoz-Venturelli P, González F, Urrutia F, Mazzon E, Navia V, Brunser A, et al. Stroke care and collaborative academic research in Latin America. *Salud Publica Mex.* **2022**, *64*, S40-S45. https://doi.org/10.21149/12803
34. World Bank Data Help Desk. World Bank Country and Lending Groups. Available online: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519
35. StataCorp. Stata Statistical Software: Version 15. En: College Station, TX: StataCorp LLC. [Internet]. 2017. Available online: https://www.stata.com/company/
36. Huarcaya-Victoria J, Villarreal-Zegarra D, Podestà A, Luna-Cuadros MA. Psychometric Properties of a Spanish Version of the Fear of COVID-19 Scale in General Population of Lima, Peru. *Int J Ment Health Addict.* **2022**, *20*, 249-262. https://doi.org/10.1007/S11469-020-00354-5/FIGURES/2
37. Gautam M, Kaur M, Mahr G. COVID-19–associated psychiatric symptoms in health care workers: viewpoint from internal medicine and psychiatry residents. *Psychosomatics.* **2020**, *61*, 579. https://doi.org/10.1016/J.PSYM.2020.04.009
38. Preti E, Di Mattei V, Perego G, Ferrari F, Mazzetti M, Taranto P, et al. The Psychological Impact of Epidemic and Pandemic Outbreaks on Healthcare Workers: Rapid Review of the Evidence. *Curr Psychiatry Rep.* 2020, 22. https://doi.org/10.1007/S11920-020-01166-Z

39. Idrovo A, Manrique-Hernández E, Nieves-Cuervo G. Chronicle of a pandemic foretold: Santander case (Part 1). Salud UIS. **2020**, *52*, 225-238. Available online: https://revistas.uis.edu.co/index.php/revistasaluduis/article/view/11085/10904
40. Luis P-C, Gisella ;, Camelli, Paolo ;, Chang P-. Pandemic COVID-19: Political - economic situation and health consequences in Latin America. *Cienc UNEMI.* **2020**, *13*, 120-128. https://doi.org/10.29076/issn.2528-7737vol13iss33.2020pp120-128p
41. Vinelli-arzubiaga D, Jaramillo-aguilar DS, Rojas-roa JL, Vilela-estrada MA, Arias-chavez D, Mejia CR. Anxiety, depression and stress in Latin American health professionals : Characteristics and associated factors. *Bol Malariol y Salud Ambient.* 2021, LXI: 114-122.
42. Vilaret A, Urgilés S. Síndrome de burnout en el personal de salud que trabaja en la unidad de terapia intensiva durante la pandemia covid-19 en un hospital de Quito *[Burnout syndrome in health personnel working in the intensive care unit during the covid-19 pandemic in a hospital in Quito]*. Universidad Internacional SEK. 2020. Available online: https://repositorio.uisek.edu.ec/handle/123456789/3970
43. Virto-Concha C, Virto Farfán C, Cornejo Calderón A, Loayza Bairo W, Alvarez Arce B, Gallegos Laguna Y, et al. Estrés, ansiedad y depresión con estilos de afrontamiento en enfermeras en contacto con COVID-19, Cusco, Perú *[Stress, anxiety and depression with coping styles in nurses in contact with COVID-19, Cusco, Peru]*. Revista Científica de Enfermería. *Colegio de Enfermeras del Perú.* 2020. Available online: https://www.lareferencia.info/vufind/Record/PE_1477b15d49fc79752aa23504b1341330
44. Silva-Gomes RN, Silva-Gomes VT. COVID-19 pandemic: Burnout syndrome in healthcare professionals working in field hospitals in Brazil. *Enfermería Clínica.* **2021**, *31*, 128-129. https://doi.org/10.1016/J.ENFCLI.2020.10.011
45. Loya-Murguía K, Valdez-Ramírez J, Bacardí-Gascón M. Burnout syndrome among health personnel in Latinamerica: systematic review. *JONNPR.* **2018**, *3*, 1-85. Available online: https://www.jonnpr.com/PDF/2060.pdf
46. Blake H, Bermingham F, Johnson G, Tabner A. Mitigating the psychological impact of COVID-19 on healthcare workers: A digital learning package. *Int J Environ Res Public Heal* **2020**, *17*, 2997. https://doi.org/10.3390/IJERPH17092997
47. Griffiths, Amanda, Leka, Stavroula, Cox T. La organización del trabajo y el estrés : estrategias sistemáticas de solución de problemas para empleadores, personal directivo y representantes sindicales *[Work organisation and stress : systematic problem approaches for employers, managers and trade union representatives]*. In: World Health Organization (WHO) [Internet]. 2004. Available online: https://apps.who.int/iris/handle/10665/42756
48. Barber SJ, Kim H. COVID-19 worries and behavior changes in older and younger men and women. *J Gerontol B Psychol Sci Soc Sci.* **2021**, *76*, E17-E23. https://doi.org/10.1093/GERONB/GBAA068
49. Ahmed MA, Jouhar R, Ahmed N, Adnan S, Aftab M, Zafar MS, et al. Fear and practice modifications among dentists to combat novel coronavirus disease (COVID-19) outbreak. *Int J Environ Res Public Health.* 2020, 17. https://doi.org/10.3390/IJERPH17082821
50. Kim K.; Jeong H.; Lee J, Kim K, Jeong H, Lee J. COVID-19 related fear, risk perceptions, and behavioral changes according to level of depression among nursing students. *Int J Environ Res Public Heal* 2022, Vol 19, Page 4814. **2022**, *19*, 4814. https://doi.org/10.3390/IJERPH19084814
51. Sánchez Díaz JS, Peniche Moguel KG, Rivera Solís G, González Escudero EA, Martínez Rodríguez EA, Monares Zepeda E, et al. Psychosis of health care personnel in times of COVID-19. *Med Crítica.* **2020**, *34*, 200-203. https://doi.org/10.35366/94900
52. Urzúa A, Vera-Villarroel P, Caqueo-Urízar A, Polanco-Carrasco R. Psychology in the prevention and management of COVID-19. Contributions from the initial evidence. **2019**, *38*, 103-118.