


RESEARCH

Stress and quality of life of intensive care nurses during the COVID-19 pandemic: Self-efficacy and resilience as resources

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Abstract

Background: Health care workers employed in the COVID-19 emergency are at a high risk of stress.

Aims and objectives: To explore the mediating roles of self-efficacy and resilience between stress and both physical and mental quality-of-life components in intensive care nurses during the COVID-19 pandemic.

Design: Cross-sectional survey design.

Methods: The stress subscale (depression, anxiety, and stress scale in Spanish Scale, DASS-21), the summary components (physical and mental) of health-related quality of life (SF-36), the general self-efficacy scale (GSES), and the resilience scale (RS-14) were administered in 308 intensive care nurses. Serial multiple mediator models were used.

Results: There was a significant indirect effect of levels of perceived stress on both physical and mental health components through self-efficacy and resilience. Specifically, greater perception of self-efficacy was associated with a lower perception of stress and greater resilience, while higher resilience was associated with greater physical and mental health ($B = -0.03$; $SE = 0.02$; 95% confidence interval [CI] = $[-0.07, -0.01]$; $B = -0.03$, $SE = 0.01$, 95% CI = $[-0.07, -0.01]$, respectively). It was observed that self-efficacy alone also mediates the relationship of the perception of stress on the components of physical and mental health ($B = -0.07$; $SE = 0.05$; 95% CI = $[-0.18, -0.03]$; $B = -0.09$; $SE = 0.04$; 95% CI = $[-0.17, -0.24]$, respectively). However, resilience alone was not a significant mediator of these associations.

Conclusions: It can be concluded that stress is linked to the physical and mental health components related to quality of life through self-efficacy and resilience.

Relevance to clinical practice: These psychological resources would allow the nursing staff to maintain a good quality of life despite high levels of stress. These findings

have implications for future research in terms of both model testing and clinical application.

KEYWORDS

COVID-19 pandemic, intensive care unit, nurses, quality of life, resilience, self-efficacy, stress

1 | INTRODUCTION

The health crisis caused by the 2019 coronavirus pandemic (COVID-19) has highlighted the relevance of intensive care unit (ICU) health care personnel. At the same time, this situation has caused a decrease in the quality of life related to both the physical and mental health of these particular workers.¹ Lack of resources, lack of sleep, longer work shifts, or risks associated with exposure to the virus are some of the factors that have contributed to the appearance of stress,^{2,3} understood as feelings of physical or emotional tension that appear in adverse situations when we are overwhelmed by believing that we do not have the time or personal resources to solve it.⁴ A current review of the stress perceived by health care professionals during the COVID-19 pandemic notes that nurses experience extremely high stress.⁵ As a consequence, this group has indicated that their physical and mental quality of life has worsened, having a detrimental impact on the quality of patient care.⁶

The transactional theory of stress proposed by Lazarus and Folkman⁴ provides an adequate framework to understand the health consequences in ICU personnel during this pandemic. This model proposes that individuals are agents and not victims of the stress process, suggesting the need to study the personal psychological resources of workers to maintain health, despite exposure to adverse conditions. Being in continuous contact with the suffering of others, subjected to high care pressures without the necessary support to carry out the activity safely, or long work days in which they are caring for people who are invaded by fear, evidence the psychological resources that individuals develop while working in this environment.⁷

Two of the main personal resources that play an important role in how the individual addresses challenges are self-efficacy and resilience. From the perspective of Bandura's theory, self-efficacy is considered a central construct in carrying out a behaviour, since the relationship between knowledge and action is significantly mediated by thoughts of self-efficacy. The latter has been defined as the belief in one's abilities to achieve their proposed objectives.⁸ Resilience theory attempts to answer why some people respond better to stress and adversity. Thus, resilience is defined as the ability to flexibly assume and overcome limited situations.⁹

Within the studies carried out regarding the impact on health care staff working during the COVID-19 pandemic, and according to the literature in other populations, it has been found that both resilience and self-efficacy have been negatively associated with stress, anxiety,

What is known about this topic

- Work environment is a major source of stress. Hospitals are stressful workplaces due to the increasing complexity and demands.
- Current reviews show that stress perceived by health professionals during the COVID-19 pandemic is extremely high.
- Specifically, among nurses, the main sources of stress were increased work demands or lack of psychological resources.
- Critical care personnel have suffered great physical and mental exhaustion during the pandemic.

What this paper adds

- The self-efficacy of intensive care unit (ICU) nurses plays a fundamental role in the relationship between stress and the physical and mental health quality-of-life components.
- The sequential model shows that self-efficacy ("I am capable of handling this") is necessary to elicit adaptive and effective psychological resources (ie, resilience).
- Both resources (first self-efficacy and second resilience) are shown as mediators between stress and the physical and mental health components of quality of life during the COVID-19 pandemic in ICU nurses.

physical fatigue, or work performance, among others,¹⁰⁻¹² and positively associated with well-being, quality of life, or physical functionality.¹³⁻¹⁵ Furthermore, different studies have mentioned the possible mediating role of both variables in the face of highly stressful events.^{11,15} Therefore, it could be considered that possessing positive psychological resources could reduce the impact associated with the stressful situations created by coping with the COVID-19 pandemic on ICU personnel. In this context, the most current literature has shown that nurses have high and moderate levels of resilience and moderate levels of self-efficacy despite presenting symptoms of anxiety and depression.^{16,17} Thus, the aim of this study was to analyse the moderating effect of personal resources, namely, self-efficacy and resilience, between stress and the components of physical and mental quality of life in ICU nurses during the COVID-19 pandemic. It is

hypothesized that both variables mediate the relationship between stress and physical and mental health components.

2 | METHODS

2.1 | Procedure

Data collection was performed using an online electronic form designed for this purpose by the research team. The aim of the study was presented on the first sheet of the questionnaire, and the consent to use their data in the study was requested. A previous pilot study was carried out with health professionals ($n = 20$) from a public hospital in Madrid (Spain). The selection of the sample was carried out by means of non-probability convenience sampling, sending the link to ICU nurses in the Spanish health system who had been in contact with patients affected by COVID-19, circulating it through social networks (Facebook, Twitter, LinkedIn) and corporate emails from hospitals nationwide when available, so the exact number of participants who were invited to participate could not be known. A minimum sample size of 200 participants was established, following the minimum number criteria for modelling analysis.¹⁸ A total of 308 nurses who provided their services in surgical and general critical care units between the months of March 2020 to June 2020 participated in the present study. At this time, Spain was facing the first wave of the pandemic.

2.2 | Ethical consideration

The study was approved by the Hospital Ethics and Research Committee. In addition, the present study has received the scientific endorsement of the Spanish Society of Intensive and Coronary Care Nursing (SEEIUC).

2.3 | Measurements

2.3.1 | Stress

The stress subscale of the depression, anxiety, and stress scale¹⁹ was used in its Spanish version (DASS-21).²⁰ This subscale consists of 7 items on a Likert-type response format of four alternatives from 0 (it has not happened to me) to 3 (it has happened to me a lot or most of the time). The score ranges from 0 to 21 points. The Cronbach's alpha value in the present study was .88, which is considered excellent. Furthermore, in the original validation of the Spanish version, a Cronbach's alpha for stress of .82 was obtained.²⁰

2.3.2 | Self-efficacy

The general self-efficacy scale (GSES) was used.^{21,22} It is composed of 10 items that measure the stable feeling of competence to

handle life situations. It is scored on a Likert-type response scale with four alternatives, ranging from 1 (strongly disagree) to 4 (strongly agree), with a range of total scores from 10 to 40. In this study, the GSES showed excellent internal consistency (Cronbach's alpha = .87) similar to what was obtained in the original Spanish validation (Cronbach's alpha = .90).²¹

2.3.3 | Resilience

The resilience scale (RS-14) was used for this study.^{23,24} This scale measures, through 14 items, the degree of individual resilience, considered as a positive personality characteristic that allows the individual to adapt to adverse situations. It is assessed using a Likert-type response scale with seven alternatives, ranging from 1 (totally disagree) to 7 (totally agree). The alpha value was .89 in the present study, which implies an excellent internal consistency, being slightly higher than that obtained in the original Spanish validation (Cronbach's alpha = .79).²⁴

2.3.4 | Quality-of-life components related to physical and mental health

The two summary components, physical health component (PCS) and mental health component (MCS), of the health-related quality-of-life scale (SF-36) were used as the main result in this study.²⁵ The SF-36 is made up of 36 items that cover the following scales: physical function, physical role, bodily pain, general health, vitality, social function, emotional role, and mental health. The combination of the scores for each dimension gives rise to two summary scores corresponding to the PCS and the MCS. This allows the obtained values to be compared with the population values. For the Spanish population, these two components have a mean of 50 (Min = 0, Max = 100) and an SD of 10. Scores above or below 50 are considered to be better or worse, respectively, than those of the general population. The Spanish versions of the SF-36 health questionnaire and the population norms have been validated by Alonso et al.²⁵ The Cronbach's alpha of the scale for the PCS was .90 and for the MCS it was .89. Both values, involving excellent reliability, were higher to those obtained in the original Spanish validation of the scale, both being above .70.²⁵

2.4 | Statistical analysis

The analyses were performed with the SPSS 22 statistical package.²⁶ First, descriptive analysis, internal consistency analysis (Cronbach's alpha coefficients), and Pearson correlations were performed. For continuous variables, means, SDs, and range medians were used, while categorical data were presented as numbers and percentages. The level of statistical significance for all tests was established at a P value of $<.05$.

For the serial multiple mediation analysis (SMM; mediation of several mediators going one after another), SPSS macro PROCESS (model 6) was used, applying two significant mediators. As recommended by Hayes,²⁷ the regression/trajjectory coefficients are all in non-standardized form since the standardized coefficients generally do not have a useful substantive interpretation. The tested model included stress as a predictor (X), self-efficacy (M1), and resilience (M2) as mediators and PSC and MSC as dependent variables (Y and Y', respectively). The model fit was also examined using the following criteria: a chi-square/df of ≤ 2 , a *P* value of $>.05$, a comparative fit index of ≥ 0.95 , and an approximation of the mean squared error of <0.06 .²⁸

3 | RESULTS

3.1 | Sample characteristics, descriptive statistics, and zero-order correlations

Among the 308 participants, 268 (87%) were women and 40 (13%) were men. The average age was 38.86 (SD = 10.29). A total of 53.9% were working on a temporary basis, 19.8% were permanent staff, and 26.3% were hired specifically for the COVID-19 pandemic. All participants cared for COVID patients during the sampling period. Of which, <2% (1.9%) cared for <5 COVID patients, 9.7% cared for 5-10 COVID patients, 30.2% cared for 11-20 COVID patients, and 58.1% cared for >20 COVID patients. Regarding the workload during the pandemic, 0.6% reported a lower than usual load, 3.9% a workload equal to the usual, and 95.5% a higher than usual load. The average number of hours during the week was 45.12 (SD = 10.88) with a range of 20-100.

Table 1 shows the mean values, SDs, and ranges for the sociodemographic and psychosocial variables. There was a significant correlation between the scores of all the variables under study. Stress was negatively correlated with resilience ($r = -0.31$, $P = .021$), self-efficacy ($r = -0.21$, $P < .001$), as well as with PCS ($r = -0.29$, $P < .001$) and MCS ($r = -0.67$, $P < .001$). The PCS positively correlated with resilience ($r = 0.16$, $P = .004$) and self-efficacy ($r = 0.19$, $P = .001$). Likewise, the MCS also positively correlated with both variables ($r = 0.19$, $P < .001$; $r = 0.29$, $P < .000$, respectively). Regarding the sociodemographic variables, no significant differences were observed (all $P > .05$).

Following the recommendations of Baron and Kenny²⁹ for the inclusion of mediator variables, there must be a significant correlation between both predictors and outcome variables. In order to establish the importance of psychosocial variables and assess whether they should be included in the model, the two mediators proposed here were analysed with predictive (stress) and criterion variables (PCS and MCS). As shown by the analyses described earlier, both resilience and self-efficacy could be included in the route model; therefore, they were included for mediation analysis. Sociodemographic variables were not included as covariates in the mediation model since previous analyses did not indicate statistically significant associations between

TABLE 1 Sample characteristics (n = 308)

Variables	Descriptives	
Age, mean (SD)	38.86 (10.29)	
Sex, n (%)		
Female	268 (87)	
Male	40 (13)	
Employment relationship, n (%)		
Fixed	166 (53.9)	
Interim	61 (19.8)	
Hired for the COVID-19 pandemic	81 (26.3)	
Care for patients with COVID, n (%)	308 (100)	
No. of COVID patients, n (%)		
<5	6 (1.9)	
5-10	30 (9.7)	
11-20	93 (30.2)	
>20	179 (58.1)	
Workload during COVID, n (%)		
Less than normal workload	2 (0.6)	
Same as normal workload	12 (3.9)	
More than normal workload	294 (95.5)	
No. of working hours/weekly working day, mean (SD)	45.12 (10.88)	
Psychosocial characteristics		
Theoretical range	Sample range	Mean (SD)
Stress	0-21	10.46 (4.31)
Self-efficacy	10-40	29.65 (3.69)
Resilience	1-98	78.12 (15.31)
Physical health component	0-100	87.53 (16.51)
Mental health component	0-100	53.98 (22.06)

Note: Theoretical range is the interval between the maximum value and the minimum value that can be obtained in those dimensions. Instead, the sample range is the interval between the maximum value and the minimum value of the sample in that dimension.

the said variables and the outcome variables of the study (stress and quality of life).

3.2 | SMM analysis

Since two mediators were used and two models were proposed, four different causal models were produced: SMM 1 (stress-self-efficacy-resilience-PCS), SMM 2 (stress-resilience-self-efficacy-PCS), SMM 3 (stress-self-efficacy-resilience-MCS), and SMM 4 (stress-resilience-self-efficacy-MCS). The four models were compared in terms of the significant pathway created by each different causal order of mediators. Only the indirect routes SMM1 and SMM 3 were significant (Figures 1 and 2). For the SMM 1 model, a total effect ($B = -1.13$, $SE = 0.20$, $t = -5.41$, $95\% CI = [-1.54, -0.72]$, $P < .001$)

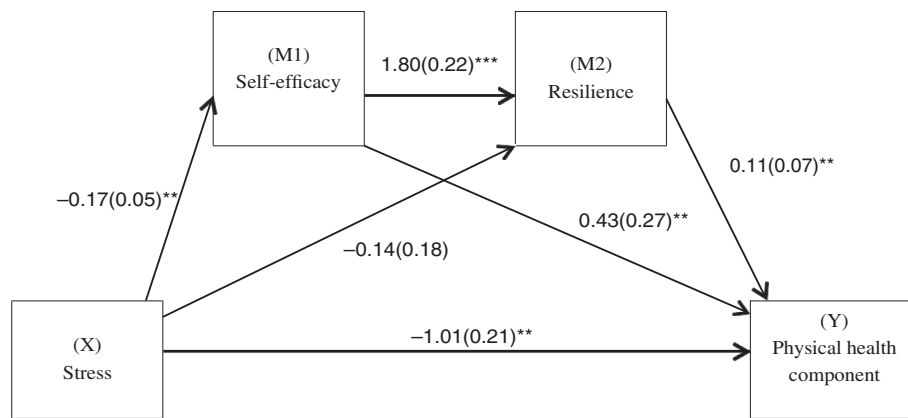


FIGURE 1 Path diagram illustrating direct effects and causal paths linking stress with physical health component (PCS). Serial multiple mediation analysis with stress as the independent variable, PCS as the dependent variable, and self-efficacy and resilience as the first and second mediators. X, independent variable; M, mediator; Y, dependent variable. Values are unstandardized regression coefficients (SE in parentheses) and the associated *P* values (**P* < .05, ***P* < .01, ****P* < .001). Bracketed association = direct effect (controlling for indirect effects). Solid lines indicate significant pathways, and dashed lines indicate nonsignificant pathways

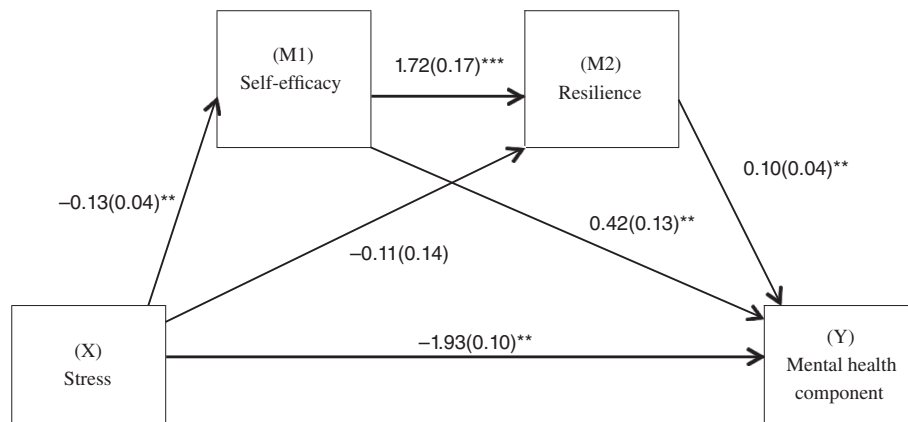


FIGURE 2 Path diagram illustrating direct effects and causal paths linking stress with mental health component (MCS). Serial multiple mediation analysis with stress as the independent variable, MCS as the dependent variable, and self-efficacy and resilience as the first and second mediators. X, independent variable; M, mediator; Y, dependent variable. Values are unstandardized regression coefficients (SE in parentheses) and the associated *P* values (**P* < .05, ***P* < .01, ****P* < .001). Bracketed association = direct effect (controlling for indirect effects). Solid lines indicate significant pathways, and dashed lines indicate nonsignificant pathways

of the predictors on PCS was found. Furthermore, there was a significant indirect effect of stress on PCS via self-efficacy and resilience ($B = -0.03$; $SE = 0.02$; $95\% \text{ CI} = [-0.07, -0.01]$) (Figure 1). That is, lower perception of stress predicted greater self-efficacy, which predicted greater resilience, which, in turn, predicted a higher PCS. There was also a significant simple indirect effect of stress on PCS through self-efficacy ($B = -0.07$; $SE = 0.05$; $95\% \text{ CI} = [-0.18, -0.03]$). In contrast, no mediating effect was observed through resilience ($B = -0.02$; $SE = 0.02$; $95\% \text{ CI} = [-0.04, 0.22]$). The contrast test, despite not showing significant differences between the indirect effects compared, shows that the model that represents all mediators in series ($95\% \text{ CI} = [-0.07, -0.01]$) is slightly superior to the model that represents self-efficacy alone ($95\% \text{ CI} = [-0.12, -0.09]$). Overall, the effect of stress on PCS in the model accounting for all mediators explained 12% of the variance ($R^2 = 0.12$; $P < .0001$). However, the

variance explained by the model that represents self-efficacy alone explains 7% ($R^2 = 0.07$; $P = .014$).

For the SMM3 model, the total effect was also observed ($B = -2.14$, $SE = 0.13$, $t = -15.80$, $95\% \text{ CI} = [-2.41, -1.88]$, $P < .001$). The effect of stress on the MCS was also completely mediated by self-efficacy ($B = -0.09$; $SE = 0.04$; $95\% \text{ CI} = [-0.17, -0.14]$) and by the two serial mediators ($B = -0.03$, $SE = 0.01$, $95\% \text{ CI} = [-0.07, -0.01]$). In contrast, no mediating effect on resilience was observed ($B = -0.04$, $SE = 0.02$, $95\% \text{ CI} = [-0.05, 0.24]$). The contrast test, despite not showing significant differences between the indirect effects compared, shows that the model that represents all mediators in series ($95\% \text{ CI} = [-0.07, -0.02]$) is slightly superior to the model that represents self-efficacy alone ($95\% \text{ CI} = [-0.16, -0.14]$). Overall, the effect of stress on the MCS in the model accounting for all mediators explained 45% of the variance ($R^2 = 0.45$;

$P = .0002$). However, the variance explained by the model that represents self-efficacy alone explains 41% ($R^2 = 0.41$; $P < .0001$).

4 | DISCUSSION

The main aim of this study was to elucidate the associations between the perception of stress, self-efficacy, resilience, and health, both physical and mental, in ICU nurses during the COVID-19 pandemic. In accordance with the hypothesis presented, there was a significant indirect effect of perceived stress on PCS, mediated by self-efficacy and resilience. The same happened using MCS as an outcome. That is, lower perceived stress predicted higher self-efficacy scores, which predicted greater resilience, which, in turn, predicted higher levels of PCS and MCS. One possible explanation is that individuals with strong beliefs about their abilities can actively solve problems and adapt better to complex situations.³⁰ People with these abilities react positively to stress, use resources better, and can more calmly accept the consequences of setbacks.^{14,15} This finding directly supports the model proposed by Lazarus and Folkman,⁴ which emphasizes the importance of studying psychological resources to explain the associations between stress processes and the health of individuals. Lazarus and Folkman added the significance of cognitive processes in connection with stress to the previously existing, predominantly functional-organic, stress models. In particular, considering the sequential nature of the model,⁴ the primary and secondary assessments affect the outcome of the adjustment process through the use of different coping strategies or psychological resources. Particularly, secondary assessment is directly linked to the perception of individuals' capabilities of handling the stressor (self-efficacy). From the sequential model, it could be hypothesized that a positive secondary assessment ("I am capable of handling this") is necessary to elicit adaptive and effective psychological resources (ie, resilience). These results have important practical implications since they show that having these resources allows health care workers, in situations of stress, such as the COVID-19 pandemic, to improve their general health status related to quality of life. Specifically, different studies have focused on the role of resilience in intensive care nursing staff. At an applied level, it is of special interest to understand the concept of resilience so as to be able to provide support and develop programmes to help nurses become and stay resilient.³¹ It should be borne in mind that resilience is a resource that arises in especially adverse situations. Specifically, a review carried out in nurses suggested that challenging workplaces, psychological emptiness (ie, a feeling of numbness that is illusive and disturbing, provoking an inability to feel anything emotionally, or the sensation of not having any purpose), diminishing perception of well-being, and a sense of dissonance are contributing factors for resilience. Different strategies have been proposed to promote resilience, such as cognitive reframing, toughening up, grounding connections, work-life balance, reconciliation.³¹ It seems fundamental, therefore, to provide adequate training and orientation before assigning nurses to ICU to help, to offer disaster-emergency-preparedness training to allow nurses to be equipped, to provide caring and authentic nursing

leadership and to arrange ongoing psychological support to frontline nurses.³² Different interventions have shown their effectiveness on occupational stress and resilience levels of nurses working in ICUs.^{33,34} Our results additionally show the relevance of self-efficacy as a prior cognitive resource for the implementation of resilience. Given that the effectiveness of cognitive behavioural therapy in improving self-efficacy is well known, showing its benefits on the ICU nurses' occupational stress,^{35,36} future resilience interventions should include promoting self-efficacy as a prerequisite. In the absence of previous research, it could be hypothesized that the perception of capacity constitutes a necessary cognitive requirement for the implementation of resilience skills.

In the present study, the simple indirect effect of the perception of stress on the PCS and the MCS through self-efficacy was significant. Although this study has focused on ICU nurses, these results are consistent with a study carried out among Wuhan health care staff during the pandemic.¹¹ However, in contrast to what has been previously found in health care personnel³⁷ and in other populations,³⁰ among ICU nurses involved in this pandemic, it appears that resilience alone does not have a significant mediating effect between stress and PCS and MCS. This could mean that self-efficacy is required as a resource to develop resilience. These findings suggest that it is not resilience per se, but the perception of self-efficacy that is fundamental in explaining the relationship between the perception of stress and PCS and MCP. Thus, it appears that a cumulative protective effect (self-efficacy, resilience) is created by means of multiple resources. Other authors in other contexts have already mentioned this phenomenon previously.³⁸ For this reason, it is possible that resilience, without other additional protective mechanisms such as self-efficacy, is not enough to moderate the relationship between the perception of stress and the components of physical and mental health. Future studies in this context should focus on the role of other potential positive psychological resources such as social support or self-esteem, among others.

In addition, the findings indicate a direct effect of the perception of stress on physical and mental health components. Similarly, these findings show that the high level of stress to which ICU nurses have been subjected directly contributes to worse health. These results confirm what other authors found in health care personnel in general during the pandemic in Singapore, India,³⁹ and China.^{11,40}

Finally, the descriptive results show that, despite the stress levels (mean scores in the theoretical range of the scale), our sample exhibits high scores for self-efficacy and resilience (especially with regard to the latter). Regarding quality of life, our results indicate that MCS is significantly affected. However, high scores are observed in PCS, indicating a good quality of life relating to physical components. These data are consistent with previous literature that indicate high indicators of stress, emotional symptoms (anxiety, depression), and in general, impaired mental health in health care personnel during the COVID-19 pandemic.^{32,41,42} Likewise, different studies have also shown, in accordance with our results, high scores in positive psychological characteristics (ie, resilience, self-efficacy) among health care staff in these circumstances.^{16,17}

5 | LIMITATIONS

The present study has a series of limitations to take into account. In first place, it is a correlational study, so causality cannot be established in the results. Furthermore, this was an internet-based study, so the response rate cannot be known and therefore some bias, regarding who answered the survey, could be found. Finally, the sample is made up of Spanish nurses from ICUs during the COVID-19 pandemic, without additional data from ICU nurses or other health care personnel from other countries. Therefore, the results cannot be generalized.

6 | IMPLICATIONS FOR CLINICAL PRACTICE

The results obtained have, in our opinion, important practical repercussions. Effective intervention programmes for health care professionals to improve their physical and mental health when caring of critically ill patients must be designed,⁴³ being even more relevant in pandemic situations.⁴⁴ Therefore, it is of special relevance to implement programmes based on the acquisition or improvement of psychological resources such as self-efficacy and resilience.

7 | CONCLUSIONS

Due to the magnitude and characteristics of the COVID-19 pandemic, nurses have seen their quality of life reduced in terms of physical and mental health. Therefore, taking into account the results obtained in this study, it is of special relevance to develop programmes for nurses based mainly on improving self-efficacy. The results of this study show that being a resilient person works as a resource in stressful situations, only if individuals also present thoughts of self-efficacy. In addition, no significant differences were found with regard to the sociodemographic and other variables collected and the variables under study, so it could be considered that these psychological resources could be universal within the sociodemographic diversity collected in this sample.

AUTHOR CONTRIBUTIONS

Cecilia Peñacoba: Conceptualization; methodology; software; validation; formal analysis; investigation; resources; data curation; writing—original draft preparation; writing—review and editing; visualization; supervision; project administration; read and agreed to the published version of the manuscript. **Patricia Catala:** Conceptualization; methodology; software; validation; formal analysis; investigation; resources; data curation; writing—original draft preparation; writing—review and editing; visualization; read and agreed to the published version of the manuscript. **Lilian Velasco:** Methodology; software; validation; investigation; resources; data curation; writing—review and editing; visualization; read and agreed to the published version of the manuscript. **Francisco Javier Carmona-Monge:** Software; validation; investigation; resources; data curation; writing—original draft preparation; writing—

review and editing; visualization; project administration; funding acquisition; read and agreed to the published version of the manuscript. **Fernando J. Garcia-Hedra:** Validation; investigation; resources; data curation; writing—review and editing; visualization; funding acquisition; read and agreed to the published version of the manuscript. **Fernanda Gil-Almagro:** Conceptualization; methodology; validation; formal analysis; investigation; resources; data curation; writing—original draft preparation; writing—review and editing; visualization; supervision; project administration; funding acquisition; read and agreed to the published version of the manuscript.

ETHICS STATEMENT

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by the Bioethics Committee of the Hospital Universitario Fundación de Alcorcón.

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REFERENCES

- Lai J, Ma S, Wang Y, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw Open*. 2020;3:e203976. <https://doi.org/10.1001/jamanetworkopen.2020.3976>
- 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>
- Sasangohar F, Jones SL, Masud FN, Vahidy FS, Kash BA. Provider burnout and fatigue during the COVID-19 pandemic: lessons learned from a high-volume intensive care unit. *Anesth Analg*. 2020;131:106-111. <https://doi.org/10.1213/ANE.0000000000004866>
- Lazarus RS, Folkman S. *Stress, Appraisal, and Coping*. New York, NY: Springer; 1984.
- Bohlken J, Schömig F, Lemke MR, Pumberger M, Riedel-Heller SG. COVID-19-Pandemie: Belastungen des medizinischen Personals. *Psychiatr Prax*. 2020;47:190-197. <https://doi.org/10.1055/a-1159-5551>
- An Y, Yang Y, Wang A, et al. Prevalence of depression and its impact on quality of life among frontline nurses in emergency departments during the COVID-19 outbreak. *J Affect Disord*. 2020;276:312-315. <https://doi.org/10.1016/j.jad.2020.06.047>
- Luthans F, Youssef CM, Avolio BJ. *Psychological Capital: Developing the Human Competitive Edge*. Oxford, UK: Oxford University Press; 2006.
- Bandura A. *Self-Efficacy: the Exercise of Control*. New York, NY: Freeman; 1997.
- Bowlby J. *Attachment and Loss*. New York: Basic Books; 1980.
- Pragholapati A. Self-efficacy of nurses during the pandemic Covid-19. *Academia Edu*. 2020;6:1-7.

11. Hou T, Dong W, Zhang R, et al. Self-efficacy and fatigue among health care workers during COVID-19 outbreak: a moderated mediation model of posttraumatic stress disorder symptoms and negative coping. 30 April 2020, PREPRINT (Version 1) available at Research Square. <https://doi.org/10.21203/rs.3.rs-23066/v1>
12. Louise Duncan D. What the COVID-19 pandemic tells us about the need to develop resilience in the nursing workforce. *Nurs Manage.* 2020;27:22-27. <https://doi.org/10.7748/nm.2020.e1933>
13. Lesser IA, Nienhuis CP. The impact of COVID-19 on physical activity behavior and well-being of Canadians. *Int J Environ Res Public Health.* 2020;17:3899. <https://doi.org/10.3390/ijerph17113899>
14. Prime H, Wade M, Browne DT. Risk and resilience in family well-being during the COVID-19 pandemic. *Am Psychol.* 2020;75:631-643.
15. Yıldırım M, Arslan G, Özasan A. Perceived risk and mental health problems among healthcare professionals during COVID-19 pandemic: exploring the mediating effects of resilience and coronavirus fear. *Int J Ment Health Addict.* 2020;1-11. <https://doi.org/10.1007/s11469-020-00424-8>
16. Roberts NJ, McAloney-Kocaman K, Lippiett K, Ray E, Welch L, Kelly C. Levels of resilience, anxiety and depression in nurses working in respiratory clinical areas during the COVID pandemic. *Respir Med.* 2021;176:106219. <https://doi.org/10.1016/j.rmed.2020.106219>
17. Xiong H, Yi S, Lin Y. The psychological status and self-efficacy of nurses during COVID-19 outbreak: a cross-sectional survey. *Inquiry.* 2020;57:004695802095711. <https://doi.org/10.1177/0046958020957114>
18. Westland JC. Lower bounds on sample size in structural equation modeling. *Electron Commer Res Appl.* 2010;9:476-487.
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;33:335-343.
20. Bados A, Solanas A, Andrés R. Psychometric properties of the Spanish version of depression, anxiety and stress scales (DASS). *Psicothema.* 2005;17:679-683.
21. Schwarzer R, Baessler J. Evaluación de la autoeficacia adaptación española de la Escala de Autoeficacia general. *Ansiedad estrés.* 1996; 2:1-8.
22. Schwarzer R, Jerusalem M. Generalized self-efficacy scale. In: Weinman J, Wright S, Johnston M, eds. *Measures in Health Psychology: A User's Portfolio. Causal and Control Beliefs.* Windsor, UK: NFER-NELSON; 1995.
23. Wagnild G. A review of the resilience scale. *J Nurs Meas.* 2009;17: 105-113.
24. Sánchez-Teruel D, Robles-Bello M. Escala de resiliencia 14 ítems (RS-14): propiedades psicométricas de la versión en español. *Rev Iberoam Diagn Eval Psicol.* 2015;2:103-113.
25. Alonso J. La versión española del "SF-36 Health Survey" (Cuestionario de Salud SF-36): un instrumento para la medida de los resultados clínicos. *Med Clin (Barc).* 1995;104:771-776.
26. IBM Corp, IBM Corp (2017) IBM SPSS Statistics for Windows, Version 22.0.
27. Hayes A. *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach.* New York, NY: Guilford Press; 2013.
28. Hu L, Bentler P. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternative. *Struct Equ Modeling.* 1999;6:1-55.
29. Baron R, Kenny D. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *J Pers Soc Psychol.* 1986;51:1173-1182.
30. Hao S, Hong W, Xu H, Zhou L, Xie Z. Relationship between resilience, stress and burnout among civil servants in Beijing, China: mediating and moderating effect analysis. *Pers Individ Differ.* 2015;83:65-71. <https://doi.org/10.1016/j.paid.2015.03.048>
31. Hart PL, Brannan JD, De Chesnay M. Resilience in nurses: an integrative review. *J Nurs Manag.* 2014;22:720-734. <https://doi.org/10.1111/j.1365-2834.2012.01485.x>
32. Leng M, Wei L, Shi X, et al. Mental distress and influencing factors in nurses caring for patients with COVID-19. *Nurs Crit Care.* 2021;26: 94-101. <https://doi.org/10.1111/nicc.12528>
33. Babanataj R, Mazdarani S, Hesamzadeh A, Gorji MH, Cherati JY. Resilience training: effects on occupational stress and resilience of critical care nurses. *Int J Nurs Pract.* 2019;25:e12697. <https://doi.org/10.1111/ijn.12697>
34. Flanders S, Hampton D, Missi P, Ipsan C, Gruebbel C. Effectiveness of a staff resilience program in a pediatric intensive care unit. *J Pediatr Nurs.* 2020;50:1-4. <https://doi.org/10.1016/j.pedn.2019.10.007>
35. Fadaei M, Torkaman M, Heydari N, Kamali M, Ghodsbin F. Cognitive behavioral therapy for occupational stress among the intensive care unit nurses. *Indian J Occup Environ Med.* 2020;24:178-182. https://doi.org/10.4103/ijoem.IJOEM_286_19
36. Terp U, Hjärthag F, Bisholt B. Effects of a cognitive behavioral-based stress management program on stress management competency, self-efficacy and self-esteem experienced by nursing students. *Nurse Educ.* 2019;44:E1-E5. <https://doi.org/10.1097/NNE.0000000000000492>
37. Ogińska-Bulik N, Michalska P. Psychological resilience and secondary traumatic stress in nurses working with terminally ill patients—the mediating role of job burnout. *Psychol Serv.* 2020. <https://doi.org/10.1037/ser0000421>
38. Hemmingsson E. A new model of the role of psychological and emotional distress in promoting obesity: conceptual review with implications for treatment and prevention. *Obes Rev.* 2014;15:769-779. <https://doi.org/10.1111/obr.12197>
39. Chew NWS, Lee GKH, Tan BYQ, 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>
40. Wu W, Zhang Y, Wang P, et al. Psychological stress of medical staffs during outbreak of COVID-19 and adjustment strategy. *J Med Virol.* 2020;92:1962-1970. <https://doi.org/10.1002/jmv.25914>
41. Antonijevic J, Binic I, Zikic O, Manojlovic S, Tosic-Golubovic S, Popovic N. Mental health of medical personnel during the COVID-19 pandemic. *Brain Behav.* 2020;10:e01881. <https://doi.org/10.1002/brb3.1881>
42. Kang L, Li Y, Hu S, et al. The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. *Lancet Psychiatry.* 2020;7:e14. [https://doi.org/10.1016/S2215-0366\(20\)30047-X](https://doi.org/10.1016/S2215-0366(20)30047-X)
43. Kim JS, Kim J, Gelegjants D. Knowledge, attitude and self-efficacy towards palliative care among nurses in Mongolia: a cross-sectional descriptive study. *PLoS One.* 2020;15:e0236390. <https://doi.org/10.1371/journal.pone.0236390>
44. Lopes AR, Nihei OK. Burnout among nursing students: predictors and association with empathy and self-efficacy. *Rev Bras Enferm.* 2020;73: e20180280. <https://doi.org/10.1590/0034-7167-2018-0280>

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