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RESEARCH ARTICLE

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Self-efficacy as a psychological resource in the management of stress suffered by ICU nurses during the COVID-19 pandemic: A prospective study on emotional exhaustion

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Abstract

Background: Intensive care unit (ICU) nurses have experienced a high degree of stress during the COVID-19 pandemic. While the literature on the consequences on emotional symptomatology is abundant, studies on the protective psychosocial variables that have contributed to buffering these consequences are scarcer.

Aim: This study analyses the role of self-efficacy as a protective personality trait in ICU nurses during the COVID-19 pandemic, using a moderated mediation model that begins with the stress and anxiety experienced at the onset of the pandemic and concludes with the emotional exhaustion experienced 6 months later.

Study Design: Prospective longitudinal study with two data collection periods during the COVID-19 pandemic: (1) from 5 May to 21 June 2020 and (2) a follow-up 6 months after the state of alarm finalized (January–April 2021). These were both very stressful periods for ICU staff because of the COVID-19 pandemic.

This study was conducted with 129 ICU nurses (a non-probabilistic convenience sample in the Spanish health care system). Socio-demographic, occupational and psychosocial variables (i.e. stress, anxiety, self-efficacy and emotional exhaustion) were assessed. Descriptive analyses, Pearson correlations, covariate analyses (i.e. Student's *t*-test, one-factor ANOVA) and moderated mediation analyses were carried out (SPSS PROCESS macro, model 7). STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) reporting guidelines were followed.

Results: It shows that the higher the self-efficacy score, the lower the effect of stress on anxiety ($p < .001$); likewise, the moderating role of self-efficacy was equally valid for the whole final model ($F = 8.790$, $p < .001$), showing self-efficacy to be a good buffer for emotional exhaustion derived from the stress suffered in the ICU.

Conclusions: Self-efficacy (i.e. the belief of being able to do certain tasks successfully) is shown to be a highly relevant trait to enhance among ICU nurses during the COVID-19 pandemic, allowing them to manage work stress effectively and thus buffering the development of anxiety in the short term and emotional exhaustion in the long term.

Relevance to Clinical Practice: Our results point to the need to assess and take action on self-efficacy in ICU nurses in highly stressful situations such as the COVID-19 pandemic. As a psychological variable, self-efficacy refers to beliefs and therefore has to be trained by evidence-based psychological techniques, such as cognitive behavioural therapy. In addition, previous literature has pointed out that previous experience or specific training is an influential (although not a determining) factor in self-efficacy, so specialization for ICU nurses could also be considered.

KEYWORDS

anxiety, nursing, pandemics, self-efficacy, stress

1 | INTRODUCTION

Previous literature has highlighted how nurses who work in the intensive care unit (ICU) are subjected to different care tasks, which, because of their high complexity, can generate additional stressful situations for health care professionals.[1] The ICU is characterized by numerous factors including caring for patients with life-threatening health problems, the need for intensive nursing vigilance, managing highly complex devices and making decisions accurately and safely for the patient. In this context, a nurse providing care to highly complex patients may experience stress from insecurities such as fear of medication errors, the critical care setting, care of infectious patients and emotional labour.[2,3]

This significant emotional burden has been associated in numerous research studies with burnout syndrome, a specific type of chronic work-related stress associated with the health care profession.[4] Among the risk factors identified in relation to the syndrome for health care workers (HCWs), we can highlight the stress suffered in patient care, the instability of a shift rotation and night work.[5–7] Throughout the COVID-19 pandemic, an increase in burnout syndrome has been described among HCWs.[8–11] Recent reviews[8,11] have delved into the risk factors to burnout during the COVID-19 pandemic, pointing out the relevance of age (i.e. being younger), working for long periods of time with infectious patients, lack of material resources or lower level of specialized training regarding COVID-19 (specifically in areas of high complexity such as the ICU). Within burnout, emotional exhaustion is one of the most characteristic and most distinctive dimensions, and it is associated with stress and anxiety experienced by the ICU nurse.[12] In fact, previous literature coincides in identifying emotional exhaustion as the key component of burnout[13–15] with numerous studies pointing to its precursor role in the medium to long term with respect to the other components of

What is known about the topic

- The ICU work environment is a major source of stress because of bedside work with critically ill patients and the high complexity of the ICU.
- Current evidence shows the high emotional burden ICU nurses have endured during the COVID-19 pandemic. Important consequences derived from this emotional burden have been documented, such as an increase in burnout syndrome, an increase in the intention to leave the profession or elevated levels of stress, anxiety and depression.
- Thus, it is clear that ICU nurses have suffered a high physical and psychological toll during the pandemic.

What this paper adds

- Self-efficacy in ICU nurses plays an important role in the relationship between stress, anxiety and the development of emotional exhaustion, being able to buffer this relationship and decrease the development of emotional exhaustion after stress suffered from a stressful work situation such as the COVID-19 pandemic.
- Obtaining adaptive resources through self-efficacy makes ICU nurses able to cope positively with stressful situations such as those resulting from the COVID-19 pandemic.
- It is necessary to promote self-efficacy in ICU nurses including psychological interventions and adequate specialized training for care demands.

burnout.[16,17] Perhaps for this reason, many studies focus on this component in HCWs, with numerous studies about emotional exhaustion during the COVID-19 pandemic.[18–20] Such is its relevance within the burnout syndrome that there are specific instruments designed for its assessment.[14]

To counteract the effects of burnout, it is relevant to analyse the strengths described by Seligman within the context of positive psychology,[21] trying to delve into the emotions, processes and conditions that promote the so-called 'well-being' of people and optimal functioning.[21] However, despite the fact that the study of positive psychology can promote the improvement in certain psycho-emotional alterations derived from the stress suffered during ICU care practice, and in particular, in the context of the COVID-19 pandemic, few studies focus their interest on this approach, with the majority of studies focusing on the negative consequences derived from a stressful work situation.

Among the positive psychology variables, self-efficacy is decisive in this area as its use can be observed from two different perspectives: 'task self-efficacy', which refers to the perceived ability to perform a particular behaviour linked to success in the task; and 'coping self-efficacy', which denotes the perceived ability to prevent, control or cope with the potential difficulties that may be encountered when performing a particular action.[22] Ultimately, self-efficacy assessment aims to establish the individual's general belief in the efficacy of coping with difficult situations, as well as the ability to organize and execute the actions necessary to achieve certain outcomes.[23] In the context of the search for evidence-based actions to promote positive development within the nursing profession, both perspectives are very useful.

Previous studies have associated self-efficacy with the professional's training, showing that if someone has received training, they are more likely to feel self-effective and therefore more confident in making decisions linked to improving a patient's health.[24] Trained professionals feel confident, which increases their self-efficacy and, in turn, has an impact on improving the quality of care. In the context of nursing, self-efficacy has been described as a very important variable that directly affects the motivation to care, thought processes and decision-making, as well as improving the prioritization of different interventions and encourages nurses to continue caring for patients despite possible difficulties or failures.[25,26] Specifically, in the care of critically ill patients, different emergency situations may arise that require precise and appropriate rapid intervention by nurses, making self-efficacy an important trait that directly influences the ability to carry out this type of work.[27]

In this context, and taking into account the scarce research carried out within positive psychology on adaptive coping among health care personnel, it would be of interest to analyse the role of self-efficacy as a protective personality trait in nursing, specifically in the face of stress suffered in the ICU, reducing anxiety symptoms (as a short-term negative consequence) and emotional exhaustion (as a long-term characteristic symptom of burnout). To this end, through a prospective longitudinal design (6 months), the aim of this study was to assess the moderating role of self-efficacy as a nursing resource in buffering the relationship between stress and anxiety at the same time (1 June to 21 June 2020) and its long-term consequences on emotional exhaustion (January–March 2021).

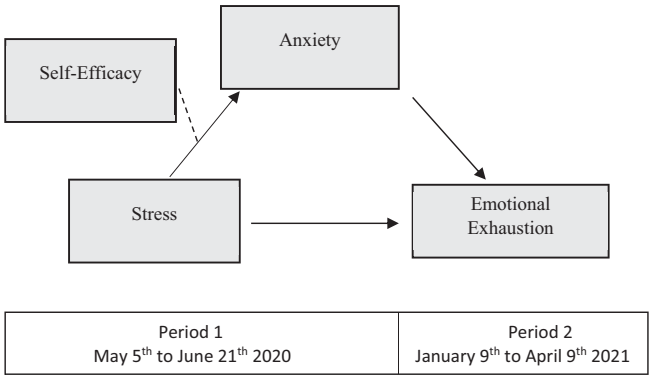

FIGURE 1 Hypothesized model of the moderated mediated effect of stress on emotional exhaustion by anxiety at different levels of self-efficacy.

In short, the theoretical model proposed (Figure 1) is based on the stress experienced at the beginning of the COVID-19 pandemic as a generator of anxiety, triggering anxiety 6 months later in emotional exhaustion. Likewise, in this model, self-efficacy is proposed as a buffer for the relationship between stress and anxiety so that the lower the self-efficacy, the greater the relationship between the two variables and vice versa.

2 | MATERIALS AND METHODS

2.1 | Design, setting and participants

This prospective research is part of a larger project that assesses the emotional health of HCWs during the COVID-19 pandemic and the post-pandemic period from May 2020 to July 2022, including three measures over time: (1) between 5 May and 21 June 2020, (2) 6 months after the end of the state of alarm (January–April 2021) and (3) 1 year after this second assessment (April–July 2022). Specifically, the data presented here correspond to the first two temporary measures: (1) from 5 May to 21 June 2020 (Spain was in a phase of confinement, final phase of the state of alarm declared in Spain on 14 March) and (2) a follow-up 6 months after the state of alarm (January–April 2021). During the first phase of the study, Spain was in the COVID-19 containment period, with 245 268 positive cases and 27 136 deaths recorded as of 18 June 2020. During the second data collection period, Spain was still under a complicated COVID-19 situation, with 3 275 819 positive cases recorded in March 2021, despite all the contingency measures employed. Data collection was carried out by means of an online electronic questionnaire designed for this purpose by the research team. The objective of the study was presented at the beginning of the questionnaire, and informed consent was requested to use the data of the participants in the study. For the proper design and preparation of the online questionnaire, existing

recommendations on the matter were taken into account. The design of the electronic questionnaire prevented missing data, as the evaluation protocol did not allow page advancement if all the questions on the previous page were not answered.

The sample was selected by non-probabilistic convenience sampling, sending the link to nurses in the Spanish health care system who carried out their care work in ICUs and circulating it through social networks (Facebook, Twitter, LinkedIn and WhatsApp), as well as through corporate emails from public and private health care services in the Spanish system.

For the diffusion of the evaluation protocol at the second time point, the emails of the ICU nurses who participated in the first time point were used, thus requesting, once again, their participation in this second phase of the study.

Exclusion criteria took into account the change of service during the data collection period, working as a nurse manager in the ICU or working in the paediatric ICU.

A minimum sample size was established on the basis of methodological criteria. In Spain, there is no registry of ICU nurses, the only approximation being the one provided by the Spanish Society of Intensive Care Nursing and Coronary Units (SEEIUC) which informed of 815 ICU nurses associated (September 2024). For this reason, we decided to follow a methodological criterion based on the analyses to be carried out (regression analysis), a sample of $n = 120$ being considered appropriate for this type of analysis.[28] The establishment of this sample size ($n = 120$) is based in turn on methodological criteria that suggest having at least 10–20 observations per independent variable.[29] In our case, we had three independent variables under study (stress, anxiety, self-efficacy), in addition to different socio-demographic variables to be controlled in the analyses. According to the Raosoft sample size calculator (http://www.raosoft.com/samplesize.html), our initial sample set ($n = 120$) and our final response rate ($n = 129$) yield a 8.92% and 8.60% of margin error, respectively, which is acceptable at the 95% confidence interval.

On the other hand, as previous literature has shown, a low response rate is a characteristic of health worker surveys.[30] This fact, together with the longitudinal design of the research and the contextual variables (COVID-19), points to the need for an increase in the sample to compensate for the sample loss. Previous studies in HCWs, and in particular in nursing, with similar time points for data collection to those of the present research, indicate response rates of 30%[31] and 50%[32] at the following time points with respect to the first time point. Methodologically, it is recommended to add 10%–20% of participants to the initial estimate.[29] Given that the overall study has three time points, further separated by 6 months and 1 year, a 60% sample loss was estimated.

Thus, according to the above considerations, a minimum sample size of 300 participants was established at the first time point, obtaining a final sample of 334. Of these, at the second time point, 6 months later, 137 nurses participated. An initial exploratory analysis of the sample distribution, carrying out the Kolmogorov–Smirnov test, led us to eliminate eight extreme cases, ensuring that the data were normally distributed. It should be noted that no statistically significant differences were observed in the variables of interest (anxiety and self-efficacy) between the participants who did not complete the study (participating only in the first time point, $n = 205$) and those who completed the study ($n = 129$).

The STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) guidelines for cross-sectional studies were followed and applied in this study.[33]

2.2 | Variables and data collection

Socio-demographic and occupational variables: Socio-demographic data were collected (gender, age, marital status) and occupational data (years of work experience as a nurse, transfer from their usual unit to the ICU because of the COVID-19 pandemic, employment status and Spanish Regions (Autonomous Communities) to which their hospital belongs). An ad hoc questionnaire developed by the research team was used to collect these data.

2.2.1 | Outcome variables

Stress and anxiety

The Spanish version of the Depression, Anxiety and Stress Scale (DASS-21)[34] was used[35]; this scale is designed to evaluate states of depression, anxiety and stress. Each dimension consists of seven items with a Likert-type response format of four alternatives ranging from 0 ('it has not happened to me') to 3 ('it has happened to me a lot' or 'most of the time'). The score for each of the variables assessed with the DASS-21 ranged from 0 to 21 points. The stress and anxiety scales were used in this study. The cut-off points established in the present study for stress were: 0–7 normal stress, 8–9 mild stress, 10–12 moderate stress, 13–16 severe stress and 17 or more extremely severe stress. The cut-off points established for anxiety were: 0–3 normal anxiety, 4 mild anxiety, 5–7 moderate anxiety, 8–9 severe anxiety and 10 or more extremely severe anxiety.[34]

Self-efficacy

The General Self-Efficacy Scale (GSES)[36] in its Spanish version[37] was used, composed of 10 items that measure the perception of competence to handle life situations, with a 4-point Likert-type response format between 1 ('not at all true') and 4 ('completely true'). The total score ranges from 10 to 40; a higher score indicates higher levels of self-efficacy.

Emotional exhaustion

The Spanish version of the Maslach Burnout Inventory instrument for health professionals (MBI-HSS)[38] was used to assess this dimension of burnout syndrome. The MBI-HSS is a validation of the MBI[39] in Spanish HCWs composed of 22 items that uses a Likert-type scale with seven options, from 0 ('never') to 6 ('every day'). The

questionnaire is divided into three subscales: emotional exhaustion (nine items), depersonalization (five items) and low personal fulfilment at work (eight items). The dimension of emotional exhaustion was selected for the present research; high emotional exhaustion is established at scores above 27.[38–40]

As noted, given the prospective longitudinal design of the study, the instruments were administered at two time points so that the DASS-21 (stress and anxiety) and the GSES (self-efficacy) were completed at the first time point (5 May to 21 June 2020) and the MBI-HSS (emotional exhaustion) at the second time point (January–April 2021).

2.3 | Data analysis

To present the sample characteristics and the descriptive statistics of outcomes variables, frequencies (*n*), percentages (%), means and standard deviations (SDs) were used. To determine the reliability of the scales in our sample, Cronbach's alpha analysis was performed. To detect possible covariates through the bivariate association between variables, the χ^2 test, Student's *t*-test, one-factor ANOVA and Pearson's correlation were used, according to the nature of the variables analysed. Pearson's correlation analysis was used to analyse the relationships between the variables of interest. Finally, different multivariate regressions were carried out using the SPSS PROCESS macro, specifically through a moderated mediation analysis (model 7). In this model, stress assessed at the first time point was proposed as a predictor variable, anxiety assessed in the same period as a mediator, and emotional exhaustion 6 months later (second time point), as the outcome variable. Self-efficacy measured at the first time point was considered as a moderating variable (see Figure 1). Statistical analysis was carried out with the Statistical Package for the Social Sciences (SPSS) version 21 for Windows. The results were considered statistically significant for values of $p < .05$.

2.4 | Ethical considerations

The study was approved by the Ethics and Clinical Research Committee of the Hospital Universitario Fundación Alcorcón [*omitted for blind review*] Hospital (Reference 20/88, date 4 May 2020), and informed consent was obtained from the participants before conducting the questionnaire.

This study was conducted in accordance with the national and international guidelines of the code of ethics, the Declaration of Helsinki, the code of good practice and SAS Order 3470/2009. The processing of personal data collected in this study complied with the Organic Law 3/2018 of 5 December on the Protection of Personal Data (LOPD) and the Regulation (EU) No. 2016/679 of the European Parliament and of the Council of 27 April 2016 on Data Protection (GDPR). All information has been collected, stored and processed anonymously. In addition, this study was endorsed by the Spanish Society of Intensive Care Nursing and Coronary Units (SEEIUC).

3 | RESULTS

3.1 | Characteristics of the sample

The final sample included a total of 129 ICU nurses; 88.4% ($n = 114$) were women. The mean age was 40.41 (SD = 10.01). The mean years of work experience as a nurse was 11.76 (SD = 9.36). 58.9% ($n = 76$) had a permanent contract. About a quarter of the sample 22.5% ($n = 29$) had been transferred from their referral service to the ICU for care during the first year of the pandemic; the remaining 77.5% ($n = 100$) belonged to the ICU.

66.7% ($n = 86$) were living with a partner compared with 33.3% ($n = 43$) who were without a partner. The majority of the sample was concentrated in the Community of Madrid (45.7%; $n = 59$), followed by Catalonia (21.7%; $n = 28$), while the rest of the sample was distributed in small percentages throughout the rest of Spain (32.6%; $n = 42$).

3.2 | Descriptive statistics and correlations between variables of interest

Table 1 shows the mean values for the variables analysed in the study. Moderate scores were observed for stress, anxiety and self-efficacy. The scores observed for emotional exhaustion, evaluated 6 months later (second time point), reflect values that correspond to high emotional exhaustion (scores above 27[38,40,41]).

Specifically, according to the established classification, the distribution of stress is as follows: normal (26.4%, $n = 34$), mild (20.2%, $n = 26$), moderate (20.9%, $n = 27$), severe (28.7%, $n = 37$) and extremely severe (3.9%, $n = 5$). The distribution of anxiety is as follows: normal (30.2%, $n = 39$), mild (7.8%, $n = 10$), moderate (28.7%, $n = 37$), severe (14.7%, $n = 19$) and extremely severe (18.6%, $n = 24$). More than half of the participants (52.7%, $n = 68$) had emotional exhaustion, according to the established cut-off point.

The correlation analysis showed significant positive relationships between stress and anxiety ($p < .001$) with a large effect size and between stress and emotional exhaustion ($p < .001$) with a medium effect size. Self-efficacy showed significant negative relationships with stress ($p < .001$), anxiety ($p < .001$) and emotional exhaustion ($p < .001$), in all cases with small and medium effect sizes.

3.3 | Associations between the variables of interest and the socio-demographic and occupational variables: Covariate analysis

We proceeded to analyse the associations between the variables of the proposed model (stress, anxiety, emotional exhaustion and self-efficacy) with age, years of experience as a nurse, gender, Spanish Regions (Autonomous Communities), marital status (with partner vs. without partner), employment status (permanent vs. non-permanent workers) and transfer from their usual service to the ICU

TABLE 1 Descriptive data, Cronbach's alpha and correlations between variables ($n = 129$).

	α	Mean (SD)	Range min, max	Median	Self-efficacy	R^2 [95% CI: LLCI to ULCI] Anxiety	Emotional exhaustion
1. Stress[a]	.82	10.33 (3.97)	1–20	10	−0.28** [−0.53 to −0.13]	.64** [.52 to .79]	.42** [.08 to .18]
2. Self-efficacy	.86	29.22 (3.35)	20–40	30		−.38** [−.64 to −.25]	−.33** [−.13 to −.04]
3. Anxiety[b]	.77	6.09 (3.94)	0–17	6			.51** [.11 to .21]
4. Emotional exhaustion[c]	.90	26.88 (12.63)	0–52	27			

Abbreviations: α, Cronbach's alpha coefficient in our sample; 95% CI: LLCI to ULCI, 95% confidence interval lower limit to upper limit; Range (min, max), minimum and maximum value of the variable in our sample; R^2, Pearson correlation; SD, standard deviation.
[a]Stress cut-off points: 0–7 normal stress, 8–9 mild stress, 10–12 moderate stress, 13–16 severe stress, 17 or more extremely severe stress.
[b]Anxiety cut-off points: 0–3 normal anxiety, 4 mild anxiety, 5–7 moderate anxiety, 8–9 severe anxiety, 10 or more extremely severe anxiety.
[c]Cut-off points for emotional exhaustion: 0–18 low, 19–26 medium, 27–54 high.
**$p < .01$.

during the pandemic (see Table 2). Negative associations between age and stress ($p = .007$) and age and anxiety ($p = .002$) were observed. Years of experience as a nurse showed significant negative associations with stress ($p = .036$) and anxiety ($p = .027$).

Gender showed a significant relationship with stress ($p = .010$) and with anxiety ($p = .016$), with higher scores for women in both cases.

Employment status (permanent vs. non-permanent contract) showed a significant association with stress ($p = .019$) and with anxiety ($p = .003$), with higher scores for non-permanent nurses in both cases.

The largest effect sizes (medium-high) are observed for differences in anxiety (Cohen's $d = 0.75$) and stress (Cohen's $d = 0.65$) with respect to gender.

3.4 | Moderate mediation analyses

Table 3 shows the regression analyses performed on the prediction of emotional exhaustion (second data collection period) through stress (first data collection period), using anxiety (first data collection period) as the mediating variable, including self-efficacy (first data collection period) as the moderating variable.

After controlling for the possible effect of the covariates identified in the bivariate analyses (age, years of experience as a nurse, gender and employment status), the results of our moderated mediation model revealed that the proposed model was significant ($F = 8.790$, $p < .0001$). The effect of stress on emotional exhaustion was fully mediated by anxiety, the direct stress-emotional exhaustion effect not being significant ($p = .075$). The results showed that the moderating role of self-efficacy in the association between stress and anxiety was statistically significant ($p < .001$). Regarding the moderating role of self-efficacy in the relationship between stress and anxiety, significant interaction effects were observed ($p = .042$). Specifically, the higher the self-efficacy score, the lower the effect of stress on anxiety.

This moderating role of self-efficacy was equally valid for the whole final model (LLCI-ULCI = −.12/−.01). The percentage of variance of anxiety explained by the initial part of the model was 49% (explanation of anxiety generated from stress and the moderating effect of self-efficacy), taking the same year as the prediction period. The final model, after controlling for covariates, was significant ($p < .001$), explaining 30% of the variance for emotional exhaustion 6 months later, taking stress, anxiety and self-efficacy as variables.

4 | DISCUSSION

There is no doubt about the devastating mental health effects of the COVID-19 pandemic on HCWs. Several reviews and meta-analyses have looked at the psychological effects in this population, studying different symptomatologies such as anxiety[42,43] and post-traumatic stress.[44,45] Likewise, numerous reviews highlight the consequences of the pandemic on HCWs in terms of burnout syndrome,[46,47] showing that, among its dimensions, emotional exhaustion is one of the most affected.[8] These emotional consequences can even be exacerbated in highly complex units such as critical care units. Some research indicates that HCWs in emergency rooms or ICU reported significantly higher burnout rates and insomnia than other HCWs.[48,49]

In this context, and from a person–environment interactionist perspective, it is even more necessary to devote efforts to the analysis of protective variables in the prevention of this emotional symptomatology. Although less abundant than research examining the devastating effects on the mental health of HCWs, different studies have explored the protective role of certain psychosocial variables in this context. Thus, resilience,[50] adaptive coping strategies (basically focused on physical exercise and distraction),[51] the appropriate use of empathy,[52] social support[53] and emotional regulation[54] are some of the variables that have been shown to play a role as protective variables in the mental health of HCWs during the COVID-19 pandemic. In addition to the paucity of previous research, much of it is

TABLE 2 Relationships between outcome variables and socio-demographic and occupational variables.

				Stress			Anxiety			Emotional exhaustion			Self-efficacy		
		f (%)	Mean (SD)	Mean (SD)	R^2/ Cohen's *d*	*p* value	Mean (SD)	R^2/ Cohen's *d*	*p* value	Mean (SD)	R^2/ Cohen's *d*	*p* value	Mean (SD)	R^2/ Cohen's *d*	*p* value
Age (years)			40.41 (10.01)		−.239	.007		−.269	.002		−.010	.910		.030	.733
Experience (years)			11.76 (9.36)		−.185	.036		−.195	.027		−.033	.710		.090	.309
Gender	Male	15 (11.6)		8.33 (2.74)	.65	.010	3.80 (2.81)	.75	.016	23.00 (13.22)	.34	.206	29.94 (3.24)	.24	.380
	Female	114 (88.4)		10.59 (4.05)			6.40 (3.97)			27.40 (12.52)			29.12 (3.36)		
Marital status	Without partner	43 (33.3)		10.79 (4.27)	.17	.349	6.63 (4.31)	.19	.277	29.74 (11.36)	.35	.069	28.56 (3.77)	.28	.114
	With partner	86 (66.7)		10.09 (3.82)			5.83 (3.74)			25.45 (13.05)			29.55 (3.09)		
Employment status	Non permanent	53 (41.1)		11.30 (4.37)	.41	.019	7.30 (4.19)	.52	.003	28.28 (13.24)	.18	.295	28.72 (3.52)	.25	.157
	Permanent	76 (58.9)		9.65 (3.54)			5.25 (3.54)			25.91 (12.17)			29.57 (3.20)		
Transfer to ICU	No	100 (77.5)		10.22 (3.81)	.11	.577	5.84 (3.90)	.28	.176	27.23 (12.69)	.12	.565	29.33 (3.39)	.15	.479
	Yes	29 (22.5)		10.69 (4.55)			6.97 (4.01)			25.69 (12.57)			28.83 (3.22)		
Regions	Madrid	59 (45.7)		10.70 (4.07)	.23	.070	6.36 (4.35)	21	.271	27.17 (13.67)	.10	.413	29.17 (3.35)	.08	.729
	Cataluña	28 (21.7)		11.71 (3.05)			6.71 (3.75)			29.07 (11.41)			29.64 (2.92)		
	Others	42 (32.6)		8.88 (4.02)			5.31 (3.37)			25.02 (11.86)			29.00 (3.64)		

TABLE 3 Moderate mediation model: regression of stress and anxiety (mediator) on emotional exhaustion with self-efficacy as moderator ($n = 129$).

Regression of stress, self-efficacy and interaction on anxiety				
Outcome variable: anxiety				
	***B* (SE)**	***t***	***p***	**[LLCI-ULCI]**
X: stress (SS)	1.82 (.64)	2.88	.005	[0.57/3.08]
Mo: self-efficacy (SE)	.22 (.24)	0.90	.371	[−0.26/0.70]
SS × SE (interaction)	−.04 (.02)	−2.06	.042	[−0.09/−0.00]
Gender (covariate)	1.03 (.82)	1.26	.209	[−0.59/2.65]
Age (covariate)	−.05 (.04)	−1.09	.280	[−0.13/0.04]
Nursing professional experience (covariate)	.014 (.04)	0.33	.741	[−0.07/0.09]
Employment status (covariate)	−.28 (.68)	−0.41	.685	[−1.62/1.07]
Model summary $R = .70$	$R^2 = .49$	$F = 16.64$	$p < .0001$	
Conditional effects of the focal predictor (SS) at values* of the moderator (SE) on emotional exhaustion				
27*	.65 (.09)	7.07	<.001	[0.46/0.83]
30*	.52 (.07)	7.29	<.001	[0.38/0.66]
32*	.43 (.08)	5.05	<.001	[0.26/0.60]
Regression of stress and anxiety on emotional exhaustion				
Outcome variable: emotional exhaustion				
	***B* (SE)**	***t***	***p***	**[LLCI-ULCI]**
Stress (SS)	.57 (.32)	.1.79	.076	[−0.06/1.22]
M: anxiety (A)	1.41 (.33)	4.34	<.001	[0.78/2.06]
* Gender	−.25 (3.10)	−.081	.938	[−6.39/5.89]
* Age (covariate)	.26 (.16)	1.68	.094	[−0.04/0.58]
* Nursing professional experience (covariate)	−.03 (.15)	−.213	.831	[−0.34/0.27]
* Employment status (covariate)	−1.70 (2.55)	−.665	.507	[−6.77/3.36]
Model summary $R = .55$	$R^2 = .30$	$F = 8.79$	$p < .0001$	
Indirect effects at values* of SE				
SE value	**Effect (BootSE)**			**[BootLLCI, BootULCI]**
27*	.91 (.24)			[0.48/1.44]
30*	.73 (.19)			[0.39/1.16]
32*	.61 (.18)			[0.30/1.02]
Index of moderated mediation				
	Index (BootSE)		**[BootLLCI, BootULCI]**	
	−.06 (.03)		[−0.12/−0.01]	

Note: Model 7 from process. Conditional effects of the focal predictor at values* of the moderator (SE); indirect effects of stress (SS) on emotional exhaustion at values* of SE. Employment status: permanent versus non-permanent contract.
Abbreviations: BootLLCI, bootstrapping lower limit confidence interval; BootULCI, bootstrapping upper limit confidence interval; LLCI, lower limit confidence interval; M, mediator; Mo, moderator; SE, standard error; ULCI, upper limit confidence interval; X, predictor.

correlational in nature and has been carried out only in the early phases of the COVID-19 pandemic. With the intention of providing additional research on the role of people as active agents of their health in highly stressful situations, such as the COVID-19 pandemic for HCWs, our study is proposed.

In particular, the main objective of our research was to evaluate self-efficacy as a nursing resource for better management of the stress suffered in certain situations in the ICU, specifically in the context of the COVID-19 pandemic, observing its effect on the reduction of anxiety associated with stress and on the development of burnout (specifically focused on the characteristic of emotional exhaustion) 6 months later. It is, therefore, with the aim of overcoming some of the limitations of the preceding research, of proposing a prospective model that includes both the initial phase (of greater intensity and more studied) of the COVID-19 pandemic as well as a later phase, 6 months after it. Based on a sequential model (stress–

anxiety–emotional exhaustion) widely documented in the literature,[55] the role of self-efficacy is proposed as the main contribution of this research.

This objective marks a distinct departure line of the most common line of research from what has previously been described in the literature regarding how ICU health care personnel are affected in situations with increased stress.[2,56] Directing the study towards positive psychology, which is highly relevant within this context, allows us to identify traits or protective factors of psycho-emotional health within ICU nursing staff. By shifting our focus on to this, we can create tools to prevent the possible later effects of burnout by targeting stress management and thus reducing the subsequent consequences.[57] Previous reviews on mental health carried out in HCWs during the COVID-19 pandemic point out the abundance of research focused on symptomatology and risk factors compared with the scarcity of studies focused on protective personal variables.[58,59] They also insist that this second line of research is especially relevant in the design of preventive measures for these professionals.

Our results support the model that proposed stress-anxiety-emotional exhaustion in the specific context of ICU nurses during the COVID-19 pandemic. As noted, these relationships have been widely documented in previous literature, showing that inadequate management of work-related stress suffered by nursing staff can lead to burnout syndrome,[8] and specifically to emotional exhaustion.[8,60] Additionally, our results indicate significant and negative relationships between self-efficacy and stress, anxiety and emotional exhaustion. The existing literature has already described this relationship in ICU health care personnel, stating that higher perceived self-efficacy is related to less emotional exhaustion, depersonalization and greater personal fulfilment at work.[61,62]

The proposal of a prospective model, which includes the evaluation of emotional symptomatology variables at two different moments in time, provides interesting data for reflection. In general terms, the results show that higher levels of self-efficacy weaken the association between stress and anxiety in the short term and between anxiety and emotional exhaustion 6 months later, revealing, in accordance with our initial approach, that self-efficacy is a resource in the face of adverse work situations among ICU nurses. However, as an interesting result, self-efficacy alone has no effect on anxiety; it is the interaction of stress with self-efficacy that creates this significant effect. This interaction only occurs when stress management uses self-efficacy as a resource; when this happens, it explains practically half of the variance of anxiety. Along the same lines, another especially interesting finding is the absence of a direct relationship in the prospective model proposed between stress at the beginning of the pandemic and emotional exhaustion 6 months later. This result emphasizes the importance of the individual as an active agent in stress processes, already evident in the differences established in their conceptualization between eustress and distress[63] and the basis of the interactionist models proposed by Lazarus.[64]

Within the proposed model, self-efficacy demonstrates a clear protective role, both in the relationship between stress and anxiety during the most critical initial stage of the COVID-19 pandemic and in relation to emotional exhaustion six months later. Different review studies that analyse the mental health of HCWs during the COVID-19 pandemic have highlighted the role of self-efficacy as a protective variable.[58,59] Other research of a correlational nature, carried out at the beginning of the COVID-19 pandemic, points out the role of self-efficacy in predicting stress in nurses[65] or the negative correlations that self-efficacy maintains with anxiety and depression in HCWs in direct contact with COVID-19 patients.[66]

Another relevant finding of the model derives from the control of the covariates, that is, the model is significant when including age, gender, years of experience and employment status, so it could be said that the model is generalizable to ICU nurses who worked during the data collection period. The model as a whole provides an explanation of 30% of the variance of emotional exhaustion (over the time course of 6 months), demonstrating that self-efficacy has a clear buffering effect on emotional exhaustion derived from a stressful work situation in the ICU, including anxiety as an intermediate variable.

Ultimately, the results of this study, at the applied level, highlight the need to promote self-efficacy in ICU nurses. Specific research carried out in HCWs during the COVID-19 pandemic has revealed that specific training programmes (i.e. telemedicine education programme aimed to support HCWs in managing patients with COVID-19) had a positive impact on HCWs' self-efficacy and satisfaction.[67] Given that self-efficacy has been associated in previous literature with knowledge,[68] the present findings may provide a further argument for the need for ICU nursing specialization. Qualitative studies analysing the experience of the novice nurse entering the ICU report high levels of frustration and lack of knowledge in the field, in addition to feeling a lack of confidence in patient care.[69,70] Different studies indicate that establishing adaptation periods is not entirely satisfactory, as after the adaptation period, ICU nurses continue to feel insecure, in addition to reporting anxiety in independently managing their first ICU patient.[70] Along the same lines, previous studies indicate that establishing theoretical-practical programmes for nurses entering the ICU improves care and reduces the level of stress.[71]

Given that the present study highlights the relevance of increasing self-efficacy among ICU nurses, lines of intervention should be established using cognitive behavioural therapy (CBT) aimed at enhancing this trait among ICU nurses. In turn, specialized and quality training for nurses working in this area can be proposed as a line of work, because of its relationship with self-efficacy. Studies carried out in the United States have found that nurses with a specialty in ICU report higher values of self-efficacy.[72]

Finally, it is necessary to point out that previous literature shows that self-efficacy not only improves the health of our professionals, but that higher levels of self-efficacy on the part of nursing staff are associated with better quality patient care, because nurses with higher levels of self-confidence show greater competence in developing appropriate and safe interventions, as well as greater confidence in making correct decisions.[73] According to the literature, nurse–patient interaction is defined by four domains: clinical care, relational care, humanistic care and comforting care, all of which correlate positively with the level of self-efficacy perceived by the nurse.[74]

We can thus conclude that self-efficacy is an important trait for the management of work-related stress suffered in the ICU, in addition to being a clear enhancer of the nurse's confidence in how they carry out their work, thus improving their psycho-emotional health and the quality of care.

5 | LIMITATIONS

Because this is a probability sample by convenience, the sample is mainly concentrated in Madrid and Catalonia, with data from the rest of the Spanish Regions (Autonomous Communities) of Spain being less representative. This limitation must be taken into account when generalizing the results. The use of self-report questionnaires for the measurement of anxious symptoms can be considered a bias, although it is the most common and established form of assessment with adequate indicators of validity and reliability based on the assessment instrument used. Finally, it would have been of interest to take into account the emotional symptoms of the participants prior to the pandemic in order to include whether they are a covariate.

6 | IMPLICATION FOR CLINICAL PRACTICE

The results obtained have, in our opinion, important practical implications. Although previous research describes the negative impact that the COVID-19 pandemic has had on nurses, few studies under the positive psychology approach promote the development of interventions aimed at cushioning the consequences of a stressful work event. Under this perspective, our study emphasizes the moderating effect that self-efficacy has on the management of stress caused by a stressful work event such as the COVID-19 pandemic, which can buffer or reduce the subsequent development of emotional exhaustion. Indeed, self-efficacy as a healthy variable has attracted much research interest in terms of its promotion through learning. Most of the research has been carried out in the educational environment, analysing the learning environments that most promote self-efficacy and the most appropriate strategies. Relatively independent of the teaching-learning methodology employed, the results show that strategies based on self-regulated learning,[75] peer review[76] and metacognitive learning strategies[77] positively influence self-efficacy learning.

In the occupational setting and in particular in the nursing context, different intervention programmes have been carried out to improve self-efficacy. Most of them are educational intervention or based on CBT under stress management models. Among the educational ones, some are based on three main components of educational methods: case-based discussion and reflexive practice, expert–novice mentoring and peer learning[78] and specifically others that through a simulation education programme included lectures, skill demonstration, skill training, team-based practice and debriefing have been carried out among nurses in intensive care units.[79]

Among those based on CBT, we find those that employ programmes based on relaxation and physical exercise (warm-up and tension-releasing exercises and mood adjustment)[80] or general stress management programmes.[81]

Overall, the results of such interventions point to significant improvement in the nurses' self-efficacy and clinical performance in management situations, although further research is needed on the contextual and personality variables influencing the results.

It is therefore of particular relevance to promote the implementation of programmes based on improving the nurses' self-efficacy, through psychological interventions such as CBT, or organizational actions aimed at improving the knowledge and training of ICU nurses.

7 | CONCLUSIONS

During the COVID-19 pandemic, self-efficacy was shown to be a highly relevant trait to enhance among ICU nurses, allowing them to manage the work stress suffered in the ICU in an effective way and thus cushioning the development of anxiety and emotional exhaustion in the short and long term, respectively. A self-effective nurse is, according to previous literature, a confident nurse able to deal with difficult situations accurately and effectively, as well as being able to prioritize with confidence. Promoting self-efficacy in nursing clearly benefit both the health care personnel and the patients.

AUTHOR CONTRIBUTIONS

Conceptualization, Fernanda Gil-Almagro and Cecilia Peñacoba-Puente; methodology, Cecilia Peñacoba-Puente; software, Fernanda Gil-Almagro and Cecilia Peñacoba-Puente; validation, Fernanda Gil-Almagro, Fernando J. García-Hedrera, F. Javier Carmona-Monge, and Cecilia Peñacoba-Puente; formal analysis, Cecilia Peñacoba-Puente; investigation, Fernanda Gil-Almagro, Fernando J. García-Hedrera, F. Javier Carmona-Monge, and Cecilia Peñacoba-Puente; resources, Fernanda Gil-Almagro, Fernando J. García-Hedrera, F. Javier Carmona-Monge, and Cecilia Peñacoba-Puente; data curation, Fernanda Gil-Almagro, Fernando J. García-Hedrera, F. Javier Carmona-Monge, and Cecilia Peñacoba-Puente; writing—original draft preparation, Fernanda Gil-Almagro and Cecilia Peñacoba-Puente; writing—review and editing, Cecilia Peñacoba-Puente; visualization, Fernanda Gil-Almagro, Fernando J. García-Hedrera, F. Javier Carmona-Monge, and Cecilia Peñacoba-Puente; supervision, Fernando J. García-Hedrera, F. Javier Carmona-Monge, and Cecilia Peñacoba-Puente; project administration, Fernanda Gil-Almagro, Fernando J. García-Hedrera, F. Javier Carmona-Monge, and Cecilia Peñacoba-Puente; funding acquisition, Fernando J. García-Hedrera. All authors have read and agreed to the published version of the manuscript.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

PATIENT CONSENT FOR PUBLICATION

Participants consented to the publication of the results.

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