ORIGINAL ARTICLE

Impact of the COVID-19 pandemic on stress, resilience and depression in health professionals: a cross-sectional study

Isabel Manzanares RN MSc[1,2] | Sonia Sevilla Guerra RN PhD[2,3] | María Lombraña Mencía RN PhD[2,3] | Nihan Acar-Denizli PhD[4] | Josep Miranda Salmerón RN MSc[2,3] | Gemma Martinez Estalella RN MSc[2,3]

[1]Epilepsy Unit, Department of Neurology, Hospital Clínic de Barcelona, Barcelona, Spain

[2]Institut d'Investigacions Biomediques August Pi i Sunyer (IDIBAPS, Barcelona, Spain

[3]Nursing Administration, Hospital Clínic de Barcelona, Barcelona, Spain

[4]Department of Statistics, Mimar Sinan Fine Arts University, Istanbul, Turkey

Correspondence
Isabel Manzanares, and Sonia Sevilla Guerra, Hospital Clinic de Barcelona. C/Villarroel 170, Barcelona 08036, Spain.
Emails: imanzana@clinic.cat (IM) and sevilla@clinic.cat (SSG)

Funding information
This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Abstract

Aim: To describe the impact of the COVID-19 pandemic on stress, resilience and depression in health professionals from a public hospital in Barcelona, Spain after the first peak of pandemic.

Background: The COVID-19 pandemic in Spain has pushed boundaries in health systems and, especially, for health professionals. Analysis of resilience as an individual resource and it is essential to understand the mechanisms that make staff react unfavourably to stressors caused by the pandemic.

Design: A descriptive cross-sectional study was designed.

Participants: Health professionals supervised by the nursing department, including registered nurses, health care assistants, health technicians, final year nurse student nurses, foreign nurses, and other nurse-related health workers.

Methods: The study complies with the STROBE checklist for cross-sectional studies. An online survey was administered to all health professionals supervised by the nursing department between 6 and 27 May 2020. The survey included the ER-14 Resilience Scale, the widely-used PHQ-9 depression scale, the Spanish version of the Nursing Stress Scale, and an *ad-hoc* questionnaire to obtain sociodemographic and occupational variables.

Results: A total of 686 participants answered the survey. Resilience was high or very high in health professionals, with an inverse correlation with stress and depression scores. Personal on fixed shifts showed better resilience. The most stressed health professionals were full-time registered nurses, followed by health care assistants. Up to 25% of nursing professionals had depression.

Conclusion: Our study showed a high degree of resilience among nurse professionals despite the overwhelming nature of the COVID-19 pandemic. Relevant signs of depression and stress were detected among participants. Occupational factors heavily influenced nurses' resilience, stress and depression.

Implications for Nursing & Health Policy: Government policy shifts are needed in Spain to improve nurses' workforce conditions, enhance the ratio of nurses to patient numbers, and avoid workforce losses. Maintaining the resilience of health professionals would assist in improving their health and their capacity to possible future emergency situations.

KEYWORDS
COVID-19, depression, healthcare workers, nursing workforce, nurses, resilience, stress

INTRODUCTION

In late December 2019, new pneumonia was described in the Chinese city of Wuhan; (Li et al., 2020) and was confirmed to cause severe acute respiratory syndrome due to coronavirus 2 (SARS-CoV)-2. The infection became known as COVID-19. It is rapidly transmitted by person-to-person contact and presents with influenza-like symptoms which may be severe in those at high risk (Du et al., 2020; Pascarella et al., 2020).

The COVID-19 pandemic was declared an international public health emergency by the World Health Organization (WHO) in January 2020 (Sohrabi et al., 2020). In Spain, an upward curve of COVID-19 infections reached a peak on 29 March, with a mortality rate of approximately 11%, compared with 13% in Italy and 15% in France (Ceylan, 2020). With more than 11 000 cases and 491 deaths as of 17 March 2020, the Spanish government declared a 15-day national emergency (Royal Decree 463/2020), which was later extended to 21 June (Smith et al., 2020). In this scenario, Spanish nurses faced a great challenge, given the significant chronic deficit in nurses, compared with similar countries (Cruz Lendinez et al., 2019). Spain has 5.2 nurses per 1000 persons, compare with a mean of 8.2 in Europe and 15.4 in Denmark (Consejo General de Enfermería de España, 2020). Spain does not comply with standard care recommendations, with >2 patients per nurse (Cruz Lendinez et al., 2019). For years, high unemployment, bad working conditions and the economic crisis have resulted in major workforce losses through the emigration of nurses (Galbany-Estragués et al., 2019).

In Barcelona, the hardest-hit province in Catalonia, tertiary referral hospitals worked closely with the Department of Health to manage the health crisis and ensure the best possible care for the entire population. The pandemic has put the spotlight on health professionals and, in particular, the potential of health workers, who have borne the burden of care.

The value of nursing professionals, who comprise about half the health workforce, has been invaluable in meeting the challenges posed by health care demands (The Lancet, 2019). However, nursing staff, before the health crisis, had been identified as those exposed to high levels of stress and anxiety, specifically in services with the greatest challenges and highest demands (Alharbi & Alshehry, 2019; Chatzigianni et al., 2018).

Health professionals face daily stressful situations and care pressures that can lead to emotional exhaustion/burnout (Seidler et al., 2014). Stress, defined as mental or emotional strain or tension due to adverse or demanding circumstances, may be understood as the balance between effort-reward, or the interaction between the characteristics of the situation and individual resources. The main ways of preventing stress come from balancing two dimensions –effort and reward - which interact with a third variable - overcommitment or involvement with work or intrinsic effort and which considers the number of tasks, the rate at which they are performed and the interruptions suffered during work (Siegrist, 1996).

Pre-pandemic studies found that nurses' health and wellbeing, manifested as physical or psychological stress in response to working environments with high work pressure and insufficient resources, may be affected (Lim et al., 2019). Studies of nursing professionals in direct contact with patients with COVID-19 found they have borne a particularly high psychological burden (Lai et al., 2020; Mo et al., 2020).

Recent studies have measured stress in health professionals during the pandemic and found that the hours worked weekly, and anxiety were the main variables associated with stress in nurses caring for COVID-19 patients (Vindegaard & Benros, 2020). Other studies found that a high proportion of healthcare professionals experienced significant levels of anxiety, depression and insomnia during the COVID-19 pandemic (Pappa et al., 2020), while others have proposed measures to reduce stress levels (Bohlken et al., 2020; von Elm et al., 2014). The balance between stress and depression in health workers and their individual resources requires close examination. Likewise, analysis of resilience as an individual resource is essential to understand the mechanisms that make staff react unfavourably to stressors caused by the pandemic. Resilience is defined as a positive adaptation to adversity (Fleming & Ledogar, 2008). There is growing interest in the health community about workers' resilience, together with the individual, community and cultural factors that may promote it. The study of resilience has the potential to increase understanding of processes that affect at-risk individuals but may remain a limited aspect if it remains only conceptual and is not supported by scientific methodology (Luthar et al., 2000). Factors that protect against lost resilience are social support, personal resources such as a thought patterns and feelings that help alleviate stress and overcome psychological barriers (Ungar & Theron, 2020). Other factors, such as peer support and crisis communication strategies have also been mentioned as possible factors that promote resilience (Wu et al., 2020). However, to improve understanding of the positive or negative response of health workers to adversity and to improve understanding of how health professionals can help combat stress, it is necessary to study the specific factors that promote it and describe the resilience of health professionals against stress and depression during the COVID-19 pandemic.

The main objective of this study was to describe the impact of the COVID-19 pandemic on the stress, resilience, and depression of health professionals in a tertiary referral hospital. More specifically, the study analysed stress and depression in health professionals with respect to their ability to adapt to adversity (resilience) during the COVID-19 pandemic.

METHODS

Study Design

This was a descriptive, cross-sectional study. The study complies with the STROBE checklist for cross-sectional studies (Appendix S1).

Setting and data collection

Data collection took place between 6 and 27 May 2020. Figure S1 shows the period of data collection with respect to the evolution of the pandemic in Spain.

The study was carried out in a highly complex, tertiary referral hospital in Barcelona city, Spain, and which had 713 beds and 4635 health professionals. During the first wave of the pandemic, the hospital was completely reorganized, with protocols of action and clinical practice updated including the introduction of specific pathways to cope with the COVID-19 pandemic. Sugeries were limited to urgent cases, in order to cope with patients with COVID-19. Health professionals were also reorganized, trying to maintain a nurse-patient ratio of 1:2, especially in the ICUs. Psychological support was offered to health professionals who sought help to cope with the stress caused by the pandemic (Estalella et al., 2020).

Sample

All 2531 health professionals attached to the Nursing Directorate were invited, including registered nurses, health care assistants, health technicians (radiotherapy, laboratory, radiodiagnosis), social workers, physiotherapists, speech and language therapists, and other professional degrees, including final year student nurses and foreign nurses awaiting permission to work who were allowed to work as nursing support during the pandemic.

All staff were invited to participate in the study through an online mail to their corporate email addresses, with a link to a web-based survey using LimeSurvey software (Version 3.22.24 + 200630). The mail included study information, a link to the questionnaire, the consent form and the study questionnaires, guaranteeing anonymity and data protection. Two reminders were sent to increase the participation rate. The study information and the link to questionnaire were also placed on the Nursing Directorate's intranet.

Instruments

The resilience of nursing professionals was measured using the validated ER-14 Resilience Scale (Sánchez-Teruel & Robles-Bello, 2015), which measures personal competence (self-confidence, independence, decision-making, ingenuity and perseverance) and the acceptance of oneself and life (adaptability, balance, flexibility and a stable life perspective). The scale ranges from 14 points (minimum) to 98 points (maximum) and is categorized as very high (82–98), high (64–81), normal (49–63), low (31–48) and very low (14–30).

Stress was analysed using the validated Spanish version of the Nursing Stress Scale (Más Pons & Agüir, 1998), which measures how often situations are perceived as stressful by nurses. The scale has 34 items with 4 response options

(0: never, 1: sometimes, 2: often, 3: always). The total score ranges from 0 to 102 points, with higher values representing greater stress. As the scale was validated specifically for nurses before the study, we validated the content in other healthcare professionals.

Depression was assessed using the validated and widely-used PHQ-9 Depression Scale (Arrieta et al., 2017; Spitzer et al., 1999), that rates depressive symptoms corresponding to the DSM-IV criteria for depression. The PHQ-9 evaluates the presence of the criteria for major depressive disorder in the previous two weeks using nine items. Each item is scored on a range of 0 to 27, and rated on a 4-point scale, from 0 (not at all) to 3 (nearly every day). Greater severity of symptoms represents a greater probability of major depressive disorder. A cutoff of 10 or more is reported as diagnostic (Kroenke et al., 2001).

An ad-hoc survey was carried out to collect the following sociodemographic and occupational variables: age, sex, number of children, children living at home, older or dependent persons living at home, occupation, work position, schedule, shift, ward, and an open-ended question for any other comments.

Data analysis

Descriptive data are presented as means and standard deviation (SD) for continuous variables and numbers and percentages (%) for categorical variables. The t-test for independent samples or one-way ANOVA was used to identify sociodemographic and occupational variables associated with resilience, stress and depression. Outcomes with a p-value <0.1 were entered in multiple linear regression models to determine significant predictive factors of resilience, stress, and depression. The stepwise Akaike information criterion (AIC) was used for model selection. At the end of the questionnaire, an open-ended question "Do you have any other comments?" was included to allow participants to amplify the closed questions and/or identify new issues. The frequency of terms was computed after lemmatization. The stop words were removed. The remaining terms, repeated at least 10 times, were represented using a word cloud to identify the main themes. A correlation analysis was made between resilience, stress, and depression using Spearman's coefficient. All tests of significance were two-tailed and statistical significance was established as $p < 0.05$. The analyses were made using the R statistical software package version 3.6.0 for Windows.

Ethical considerations

The study was conducted in compliance with the Helsinki Declaration and complied with the protocol and the relevant legal requirements, according to Law 14/2007 of July 3, on Biomedical Research. Informed consent was requested from participants before completing the study questionnaires. The

online Lyme Survey questionnaire guaranteed the confidentiality of respondents. The study was approved by the Ethics Research Committee of the Hospital Clinic of Barcelona (Reg. HCB/2020/0527).

RESULTS

Sociodemographic and occupational characteristics

All healthcare categories supervised by the Nursing Directorate were represented. Of the 2531 health workers invited to participate, 686 (27.1%) answered the survey. Table 1 shows the sociodemographic and occupational characteristics: 585 (85%) were female, with a mean age of 39.4 years (SD 1.8). Most were married (38.8%) or lived with a partner (34%), half had no children and 87 (12.7%) had dependent adults in the home during the pandemic. In terms of occupation, 415 (60.5%) were nurses and 103 (15%) were health care assistants. More than 50% were directly working with COVID-19 patients during the pandemic (24.1% COVID-19 wards, 19.1% ICU and 8.3% emergencies).

According to hospital data, during the pandemic 192 contracts were signed by nursing management, including 99 nursing aides/final year student nurses, 48 registered nurses, 37 healthcare assistants and 8 others, including health technicians. Nearly half (43.7%) of the health professionals who participated were temporary workers (31.8% long-term and 4.9% short-term contracts) or had been hired as support nurses due to the pandemic (6.6%).

Of the participants, 49% worked the morning shift, 21.9% the night shift, 19.7% the afternoon shift and 6.4% the weekends. Regarding the hours worked before and after the pandemic, most participants worked, in both cases, between 22 and 40 h per week, but there was a significant increase in staff working >40 h per week after the pandemic onset than beforehand (19.2% vs. 9.5%, respectively). This reflects the hospital's effort to maintain nurse/patient ratios during the pandemic. A quarter (25.2%) of the sample was off work for some period during the pandemic, of which 104 were due to COVID-19 infection (including 68 registered nurses).

Resilience, stress, and depression

Mean resilience on the ER-14 scale was 81.1 points (SD 11.7): 37.3% showed high resilience and 57.1% very high resilience (Table 2). The mean stress score was 26.1 points (SD 11.4). Of the 35 stressors assessed, interruptions (91.8%), patient suffering (88.8%), lack of patient improvement (83.1%), understaffing (82.5%) and lack of task time (81%) were the items with the highest percentage of perceived stress (Figure S2). The PHQ-9 scale score was 6.8 points (SD 4.9), with 25% of nurses diagnosed with depression. There was a negative low correlation between resilience and stress ($r = -0.202$, $p < 0.001$) and between resilience and depression ($r = -0.268$,

TABLE 1 Sociodemographic and occupational characteristics ($n = 686$)

Variable	
Age, mean (SD)	39.4 (11.8)
Female	585 (85.3%)
Marital status	
Married	266 (38.8%)
Single with partner	233 (34.0%)
Single without partner	114 (16.6%)
Separated/Divorced/Widowed	66 (9.6%)
Other	7 (1.0%)
Number of children	
0	343 (50.0%)
1	125 (18.3%)
2	192 (28.0%)
<2	26 (3.7%)
Dependent adults in the home	
0	599 (87.3%)
1	48 (7.0%)
2	28 (4.0%)
>2	11 (1.7%)
Occupation	
Registered nurse	415 (60.5%)
Health care assistant	103 (15.0%)
Health technician (radiotherapy, laboratory, radiodiagnosis)	65 (9.5%)
Auxiliary nurse	33 (4.8%)
Nursing aide	31 (4.5%)
Other health grades	39 (5.7%)
Where did you work in the last 4–6 weeks?	
COVID-19 ward	165 (24.1%)
First line-UCI	131 (19.1%)
Non-COVID-19 conventional ward	77 (11.2%)
First line – emergency room	57 (8.3%)
Other	256 (37.3%)
Weekly hours worked (before the pandemic)	
None or sporadic	28 (4.0%)
≤21 h a week	56 (8.2%)
22–40 h a week	537 (78.3%)
>40 h a week	65 (9.5%)
Weekly hours worked (during the pandemic)	
None or sporadic	7 (1.0%)
≥21 h a week	41 (6.0%)
22–40 h a week	506 (73.8%)
>40 h a week	132 (19.2%)
Shift	
Morning	336 (49.0%)
Night	150 (21.9%)

(Continues)

TABLE 1 (Continued)

Variable	
Evening	135 (19.7%)
Weekend shift	44 (6.4%)
No fixed shift	21 (3.0%)
Job stability	
Indefinite contract	389 (56.7%)
Substitute with permanent contract	218 (31.8%)
COVID-19 pandemic auxiliary nurse contract	45 (6.6%)
Temporary substitute	34 (4.9%)
Have you been off work since the coronavirus pandemic began?	173 (25.2%)

TABLE 2 Resilience, stress and depression results

Variable	
Resilience (ER-14), mean (SD)	81.1 (11.7)
Very low (14–30)	8 (1.2%)
Low (31–48)	3 (0.4%)
Normal (49–63)	27 (4.0%)
High (64–81)	256 (37.3%)
Very high (82–98)	392 (57.1%)
Stress (NSS), mean (SD)	26.1 (11.4)
Depression (PHQ-9), mean (SD)	6.8 (4.9)
No depression (0–9)	515 (75.0%)
Depression (10–27)	171 (25.0%)

$p < 0.001$). By contrast, there was a positive moderate correlation ($r = 0.402$, $p < 0.001$) between stress and depression (Figure S3).

Relationship between sociodemographic variables and resilience, stress, and depression

There was a significant relationship between marital status and resilience ($p = 0.001$), with health professionals who were single or who answered "other" having less resilience (Table 3). Participants with more children had greater resilience ($p = 0.035$). Females had a higher level of stress than males (26.6 vs 23.1, $p = 0.005$).

Relationship between occupational variables and resilience, stress, and depression

The workplace was the only occupational factor associated with resilience ($p = 0.002$): participants working on non-COVID-19 wards had less resilience than those who worked directly with COVID-19 patients (COVID-19 wards, ICU and emergency room) (Table 3). Most occupational factors were related to stress and depression. The groups with the highest levels of stress and depression were registered nurses

(29.3 stress points and 7.1 depression points) and healthcare assistants (26.5 stress points and 8.3 depression points). Participants who worked in the ICU and emergency rooms also had a higher degree of stress and depression compared with those who worked in COVID-19 wards or conventional wards ($p < 0.001$). A greater number of hours worked during the pandemic was associated with increased stress and depression ($p < 0.05$). The timing of shift worked was associated with depression ($p = 0.033$) with nursing professionals working the afternoon shift having a higher degree of depression (7.8 points) and those working weekends with a lower degree (5.7 points). In terms of job stability, temporary workers with a long-term contract had the highest levels of stress and depression and those with a COVID-19 pandemic contract had the lowest levels.

Predictive factors of resilience, stress, and depression

Multiple linear regression analysis showed that significant predictive factors of resilience were marital status, place of working and shift (Table 3). Participants working on non-COVID-19 wards, those who worked in the ICU and had a fixed shift (morning, night, evening, or weekend) had greater resilience compared with reference categories. Occupation and place of work were both independent factors for stress and depression. Registered nurses (beta coefficients: 11.76 for stress and 2.20 for depression), health care assistants (beta coefficients: 8.33 for stress and 3.25 for depression), and ICU and emergency room staff were the best predictive factors for stress and depression. Working ≤21 h a week during the pandemic (beta coefficient −4.35) was the only significant protective factor against depression.

Open-ended question

With 204 qualitative comments, most of the 63 terms repeated at least 10 times were representative of the quantitative results (Figure S4). Some comments reflect work-related issues and especially focussed on *lack* of *material*, *lack* of healthcare *workers*, but also *patients*, *partners* and *team*. Participants also commented on their positive (*thanks*, *believe*, *best*) and negative (*fear*, *stress*, *anxiety*) feelings. Some examples are shown in Table S1. *Situation*, *hospital*, *pandemic* and *days* were the other frequently-mentioned words.

DISCUSSION

Many studies of stress and depression in health professionals have emerged recently. However, few have measured in depth the resilience of nursing staff with respect to specific aspects, occupational circumstances, and the stressors that favoured depression during the COVID-19 pandemic

TABLE 3 Association between sociodemographic and occupational variables and resilience, stress and depression

	Resilience (ER-14)			Stress (NSS)			Depression (PHQ-9)		
	Univariate analysis		Multiple regression	Univariate analysis		Multiple regression	Univariate analysis		Multiple regression
Variables	Mean (SD)	P	β Coefficient	Mean (SD)	P	β Coefficient	Mean (SD)	P	β Coefficient
Sex		0.117			0.005			0.173	
Female	80.9 (12.1)			26.6 (11.3)			6.9 (4.8)		
Male	82.5 (9.3)			23.1 (11.2)			6.1 (5.1)		
Marital status		0.001			0.437			0.106	
Married	82.8 (10.6)		**12.79**	25.6 (10.7)			6.8 (4.7)		
Single with partner	80.3 (11.4)		**10.187**	27.1 (12.3)			6.5 (5.1)		
Single without partner	79.0 (11.3)		**9.087**	26.3 (10.9)			7.0 (4.8)		
Separated/ Divorced/ Widow	82.3 (14.1)		**11.991**	24.5 (11.1)			6.8 (4.6)		
Other	69.6 (25.8)		REF	24.0 (13.3)			11.6 (7.0)		
Number of children		0.035			0.124			0.173	
0	80.0 (11.4)			27.0 (11.4)			7.1 (5.1)		
1	81.7 (12.1)			25.2 (11.2)			6.2 (4.6)		
>2	82.6 (11.8)			25.2 (11.3)			6.7 (4.7)		
Dependent adults at home		0.141			0.789			0.614	
0	81.2 (11.5)			26.2 (11.5)			6.7 (4.8)		
1	83.1 (8.5)			25.1 (11.7)			7.5 (5.4)		
>2	78.2 (16.3)			25.7 (9.0)			6.7 (5.1)		
Occupation		0.315			<0.001			<0.001	
Registered nurse	80.5 (12.6)			29.3 (10.3)		**11.756**	7.1 (4.7)		**2.199**
Health care assistants	81.3 (12.3)			26.5 (9.7)		**8.332**	8.3 (5.5)		**3.25**
Health technicians (radiotherapy, laboratory, radiodiagnosis)	83.3 (8.8)			15.8 (11.7)		0.693	6.1 (4.5)		**2.494**
Auxiliary nurse	82.6 (8.4)			19.3 (8.4)		2.149	5.6 (4.5)		0.92
Nursing aid	80.5 (8.7)			22.6 (11.8)		**4.997**	3.0 (3.6)		−1.935
Other health grades	83.6 (7.7)			16.6 (9.7)		REF	4.6 (4.0)		REF
Where have you worked for the last 4–6 weeks?		0.002			<0.001			<0.001	
COVID-19 ward	81.0 (12.6)		−2.002	26.5 (10.3)		**2.934**	6.8 (5.3)		**1.661**
First line – ICU	80.5 (11.6)		**−2.522**	29.8 (10.5)		**4.767**	8.5 (5.0)		**2.732**
Non-COVID-19 conventional ward	76.8 (15.1)		**−5.905**	28.4 (10.8)		**4.53**	7.1 (5.3)		**2.046**
First line – emergency room	81.0 (9.5)		−1.98	30.8 (10.2)		**6.532**	8.1 (4.7)		**2.374**
Other	82.8 (10.1)		REF	22.1 (11.6)		REF	5.5 (4.1)		REF

(Continues)

TABLE 3 (Continued)

| Variables | Resilience (ER-14) | | | Stress (NSS) | | | Depression (PHQ-9) | | |
| | Univariate analysis | | Multiple regression | Univariate analysis | | Multiple regression | Univariate analysis | | Multiple regression |
	Mean (SD)	P	β Coefficient	Mean (SD)	P	β Coefficient	Mean (SD)	P	β Coefficient
Weekly hours worked (before the pandemic)		0.825			0.051			0.003	
None or sporadic	81.1 (8.0)			21.5 (11.9)			3.9 (4.2)		
≤21 h a week	79.7 (10.1)			26.9 (12.7)			6.3 (5.1)		
22–40 h a week	81.3 (11.3)			25.9 (11.0)			6.8 (4.7)		
>40 h a week	81.4 (16.6)			28.4 (12.2)			8.0 (5.6)		
Weekly hours worked (during the pandemic)		0.969			0.029			0.001	
None or sporadic	82.7 (7.3)			23.3 (13.1)			7.6 (6.5)		REF
≤21 h a week	80.5 (8.9)			22.9 (13.1)			4.3 (3.9)		**−4.351**
Between 22 and 40 h a week	81.1 (11.1)			25.8 (11.0)			6.7 (4.8)		−1.734
More than 40 h a week	81.3 (14.6)			28.3 (11.8)			7.8 (5.2)		−0.591
Shift		0.076			0.096			0.033	
Morning	81.6 (12.0)		**6.295**	24.9 (11.8)			6.4 (4.6)		
Night	81.9 (11.5)		**8.09**	27.0 (11.2)			7.1 (5.2)		
Evening	80.3 (10.2)		**6.528**	27.6 (10.0)			7.8 (5.4)		
Weekend	79.9 (10.5)		**6.556**	25.9 (12.5)			5.7 (4.0)		
No fixed shift	74.9 (17.6)		REF	28.5 (9.5)			6.3 (4.5)		
Job stability		0.268			0.009			<0.001	
Indefinite contract	81.7 (12.1)			25.9 (11.3)			6.7 (4.9)		
Substitute with permanent contract	80.5 (11.0)			27.5 (11.6)			7.7 (4.8)		
COVID-19 pandemic health aid contract	81.5 (8.8)			21.3 (10.9)			3.6 (3.7)		
Temporary substitute	78.0 (14.3)			25.0 (9.8)			6.5 (4.5)		
Have you been off work leave since the coronavirus pandemic began?		0.704			0.404			0.061	
No	81.2 (11.6)			25.9 (11.5)			6.6 (4.7)		
Yes	80.8 (12.0)			26.7 (11.1)			7.4 (5.2)		

In bold, statistically significant factors associated with resilience, stress and depression.

(Ungar & Theron, 2020). This article describes the activities that caused the most stress in relation to family and occupational factors and demonstrates the individual resilience of health professionals as a factor negatively correlated with stress and depression. This may be seen in the context of the theory of stress as an interaction between the characteristics of the situation and the resources available to the individual to deal with these situations during the pandemic.

Working hours rose considerably during the crisis reflecting the fact that almost all areas of our hospital saw substantially increased activity during the pandemic. Given that practically the whole hospital saw a substantial increase in activity to care for patients with COVID-19, the results

showed an increase of >40 h of work a week, reflecting the doubling of care in both hospitalization and critical care units. This represents an adaptation to respond firmly to the health crisis, offering dynamism and immediacy to daily clinical practice, safety, and care quality. Our results reflected a rapid adaptation of wards and increased numbers of health professionals and their hours of work to maintain nurse-patient care ratios, especially considering a future characterized by a lack of nurses in Spain (Galbany-Estragués et al., 2019). Some comments also reflect this situation:

> I think we are working very well as a team and with much dedication, but the lack of rest is overtaking us, and I am afraid that when this is over, we will have health problems.

Similar to other studies, the results also showed that health professionals who were on the front line against COVID-19 were generally under pressure, with half showing symptoms of depression (Mo et al., 2020). The main stressors during the pandemic were, 'frequent on-the-job interruptions', 'watching patients suffer' and 'feeling powerless when patients did not improve'. These are described as regular stressors in nurses in other studies (Piñeiro Fraga, 2013). Some stressors could be due more to the pandemic situation and the lack of nurses:'lack of staff to adequately cover the service' and consequently, the lack of time to perform tasks and give emotional support to patients. The stressors detected indicate overcommitment as a response during the pandemic (Siegrist, 1996). Other stressors may be seen as indicators of the great responsibility and weight that falls on care staff, such as 'the fear of making mistakes', 'causing pain' or 'facing the death of a patient', showing additional moral distress in nursing professionals not sufficiently prepared for or protected against a public health emergency (Turale et al., 2020).

Participants' commented on stress levels to highlight some of the difficulties:

> It has been very hard and stressful especially the first two weeks of uncertainty. I had a lot of anxiety' or 'it has been very stressful not knowing what you are going to find at work and doing a job we are not used to doing. I have not been able to sleep at night thinking of work.

Despite the reinforcement of hospital staff, with a large increase in staffing levels and the commitment, involvement and efforts of staff, the results show these measures were not sufficient in many cases, although they justify our better results compared with other studies (Lai et al., 2020).

The rate of depression in nursing staff (25%) was lower than that of other studies evaluating depressive symptoms in nurses and physicians in the pandemic period (up to 50%) (Lai et al., 2020). However, this may have been influenced by the variety of professional care categories included in our study and variations in direct contact with patients (e.g. health technician, other health grades).

The most important result of this study was the quantitative demonstration of the high level of resilience of nursing staff. This may be explained by the theory of resilient reintegration, in which confrontation with adversity results in a new level of internal growth (Fleming & Ledogar, 2008). The stress generated in many nurses and manifested in individual comments in the survey, such as:

> "Difficulty in disconnecting from the pandemic in general and from work in particular. I dream about the hospital often, and this is not usual" or "I've been worried about my family, colleagues and myself, about possible contagion and uncertainty..."

Occupational conditions have been shown to heavily influence nurses' resilience. Nurses on fixed shifts showed better resilience than those working *ad-hoc* shifts and temporary staff. Those nurses on long-term contracts showed the reality of expert and trained nurses who had the greatest stress. Staff resilience was also influenced by the pressure of care conditions together with the lack of staff and material resources. Some comments showed this situation:

> "the burden of care, together with the lack of qualified personnel has been very stressful personally, due to the overload and enormous responsibility we were exposed to", "… the lack of adaptation to the peaks in activity… a lack of provision of materials and protective equipment…a feeling of improvisation…"

Females had greater stress and registered nurses and health care assistants had greater stress and depression than other categories of workers. Undoubtedly, the added responsibilities and the increased demand for care in wards, and ICUs and emergency rooms had a deeper impact on these professionals.

Increases in depressive symptoms and COVID-related stressors require measures to aid nurses' health. The reward may be a compensation for stress: however, although the social response to health workers during the pandemic was a moral reward, tangible rewards have been lacking.

Preventive measures should consider organizational occupational factors (Hasselhorn et al., 2006). According to this theory, given the increased effort and the lack of reward, our results showed that nurses reacted by overcommitting during the pandemic, and this was reflected in the items that caused the most stress, such as involvement in work or intrinsic effort, considering the increase in tasks, the pace of work and the interruptions.

LIMITATIONS

The stress scale was originally designed for registered nurses and nurse technicians and its reliability has not

been validated in Spanish for other healthcare professionals. Therefore, we limited ourselves to using the items which showed content validity after its adaptation to Spanish.

CONCLUSIONS

Health workers and nurses have shown great resilience in the COVID-19 pandemic. Their ability to adapt to adversity demonstrates their strength and involvement when faced with a crisis in a public health system which had undergone severe economic cuts in recent years. Stressors, coupled with the occupational instability and precariousness of nursing staff in Spain, require interventions that help stabilize the stress-balance of health professionals who have resisted the impact of the pandemic, but whose health may be affected in the future. The results show an increase in stress and depression that reflects the need for in-depth analysis of the introduction of preventive measures and the need for studies of the working conditions of staff exposed to exceptional risks and overloads in their normal activity in times of crisis. Staff rest, access to personal protection and psychological support are needed (Kisely et al., 2020), as are positive reinforcements in the form of incentives and job improvements to ensure continued staff resilience and strength in possible future health crises. Improving the frontline nurse-patient ratio is needed to maintain the resilience of health professionals. The general results show the ability of an organisation to prepare, respond, and adapt to exponential care demands and the sudden disruptions caused by the COVID-19 pandemic, which were insufficient in most cases, given the real-life working conditions.

IMPLICATIONS FOR NURSING & HEALTH POLICY

The resilience of healthcare workers and, especially, nursing staff should be reinforced to ensure their capacity to resist possible future emergency situations, such as pandemics. Their health should be monitored after exposure to this type of emergency, as should signs of depression, burnout, stress, and anxiety. Government policy shifts are required in Spain to improve nurses' working conditions, including improving the nurse-patient ratio and avoiding workforce losses. Maintaining health professionals' resilience could help guarantee their health and ensure their ability to resist possible future emergency situations.

ACKNOWLEDGEMENT

CONFLICT OF INTEREST
The authors declare no conflict of interest regarding the publication of this paper.

ORCID
Isabel Manzanares https://orcid.org/0000-0001-9317-3565
Sonia Sevilla Guerra https://orcid.org/0000-0002-1322-8907
Nihan Acar-Denizli https://orcid.org/0000-0002-0012-8632
Josep Miranda Salmerón https://orcid.org/0000-0001-5860-792X
Gemma Martinez Estalella https://orcid.org/0000-0002-5742-8919

REFERENCES
Alharbi, H. & Alshehry, A. (2019) Perceived stress and coping strategies among ICU nurses in government tertiary hospitals in Saudi Arabia: A cross-sectional study. *Annals of Saudi Medicine*, 39(1), 48–55.

Arrieta, J., Aguerrebere, M., Raviola, G., Flores, H., Elliott, P., Espinosa, A. et al. (2017) Validity and Utility of the Patient Health Questionnaire (PHQ)-2 and PHQ-9 for screening and diagnosis of depression in rural Chiapas, Mexico: a cross-sectional study. *Journal of Clinical Psychology*, 73(9), 1076–1090.

Bohlken, J., Schömig, F., Lemke, M.R., Pumberger, M. & Riedel-Heller, S.G. (2020) COVID-19 pandemic: Stress experience of healthcare workers. *Psychiatrische Praxis*, 47(4), 190–197.(in German).

Ceylan, Z. (2020) Estimation of COVID-19 prevalence in Italy, Spain, and France. *Science of the Total Environment*, 729, 138817. https://doi.org/10.1016/j.scitotenv.2020.138817

Chatzigianni, D., Tsounis, A., Markopoulos, N. & Sarafis, P. (2018) Occupational stress experienced by nurses working in a Greek regional hospital: a cross-sectional study. *Iranian Journal of Nursing and Midwifery Research*, 23(6), 450–457.

Consejo General de Enfermería de España (2020) *El ministro reconoce que españa está a la cola en número de enfermeros.* Available at: https://www.consejogeneralenfermeria.org/sala-de-prensa/noticias/item/7421-la-ratio-de-enfermeros-espanoles-a-la-cola-de-europa-una-vez-mas accessed January 2021.

Cruz Lendínez, A.J., Gascón, M.L.G., García, F.P., Fernández, C.H., Montoro, P.A., Ramiro, G. et al. (2019) Allocation of nurses by acute or intensive care units in Spain. *Index De Enfermería*, 28(3), 147–151. (in Spanish).

Du, Z., Wang, L., Cauchemez, S., Xu, X., Wang, X., Cowling, B.J. et al. (2020) Risk for transportation of coronavirus disease from Wuhan to other cities in China. *Emerging Infectious Diseases*, 26(5), 1049–1052.

Estalella, G.M., Zabalegui, A. & Guerra, S.S. (2020) Management and leadership of nursing services in the emergency plan for the pandemic Covid-19: the experience of the Clinic Hospital of Barcelona. *Enfermería Clínica* (in Spanish). https://doi.org/10.1016/j.enfcli.2020.05.002

Fleming, J. & Ledogar, R.J. (2008) Resilience, an evolving concept: a review of literature relevant to aboriginal research. *Pimatisiwin*, 6(2), 7–23.

Galbany-Estragués, P., Millán-Martínez, P., Del Mar Pastor-Bravo, M. & Nelson, S. (2019) Emigration and job security: An analysis of workforce trends for Spanish-trained nurses (2010–2015). *Journal of Nursing Management*, 27(6), 1224–1232. https://doi.org/10.1111/jonm.12803

Hasselhorn, H.M., Tackenberg, P., Kuemmerling, A., Wittenberg, J., Simon, M., Conway, P.M. et al. (2006) Nurses' health, age and the wish to leave the profession-Findings from the European NEXT-Study. *La Medicina del Lavoro*, 97(2), 207–214.

Kisely, S., Warren, N., McMahon, L., Dalais, C., Henry, I. & Siskind, D. (2020) Occurrence, prevention, and management of the psychological effects of emerging virus outbreaks on healthcare workers: rapid review and meta-analysis. *BMJ*, 369, m1642.

Kroenke, K., Spitzer, R.L. & Williams, J.B. (2001) The PHQ-9. Validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16(9), 606–613.

Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N. et al. (2020) Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Network Open*, 3(3), e203976.

Li, Q., Guan, X., Wu, P., Wang, X., Zhou, L., Tong, Y. et al. (2020) Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *New England Journal of Medicine*, 382(13), 1199–1207.

Lim, S., Han, K., Cho, H. & Baek, H. (2019) Shift-work nurses' work environments and health-promoting behaviours in relation to sleep disturbance: A cross-sectional secondary data analysis. *Journal of clinical nursing*, 28(9–10), 1538–1545. https://doi.org/10.1111/jocn.14769

Luthar, S.S., Cicchetti, D. & Becker, B. (2000) The construct of resilience: a critical evaluation and guidelines for future work. *Child Development*, 71(3), 543–562.

Más Pons, R. & Escribà Agüir, V. (1998) The Spanish version of the "Nursing Stress Scale". A cross-cultural adaptation process. *Revista Espanola de Salud Publica*, 72(6), 529–538.(in Spanish).

Mo, Y., Deng, L., Zhang, L., Lang, Q., Liao, C., Wang, N. et al. (2020) Work stress among Chinese nurses to support Wuhan in fighting against COVID-19 epidemic. *Journal of Nursing Management*, 28(5), 1002–1009.

Pappa, S., Ntella, V., Giannakas, T., Giannakoulis, V.G., Papoutsi, E. & Katsaounou, P. (2020) Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: a systematic review and meta-analysis. *Brain, Behavior, and Immunity*, 88, 901–907.

Pascarella, G., Strumia, A., Piliego, C., Bruno, F., Del Buono, R., Costa, F. et al. (2020) COVID-19 diagnosis and management: a comprehensive review. *Journal of Internal Medicine*, 288(2), 192–206.

Piñeiro Fraga, M. (2013) Stress and related factors in psychiatric hospitalization personal health: a study of prevalence. *Enfermeria Global*, 12(31), 125–150.(in Spanish).

Sánchez-Teruel, D. & Robles-Bello, M.A. (2015) 14-item Resilience Scale (RS-14): Psychometric Properties of the Spanish Version. *Revista Iberoamericana de Diagnóstico y Evaluación - e Avaliação Psicológica*, 2(40), 103–113.(in Spanish).

Seidler, A., Thinschmidt, M., Deckert, S., Then, F., Hegewald, J., Nieuwenhuijsen, K. et al. (2014) The role of psychosocial working conditions on burnout and its core component emotional exhaustion - a systematic review. *Journal of Occupational Medicine and Toxicology*, 9(1), 10.

Siegrist, J. (1996) Adverse health effects of high-effort/low-reward conditions. *Journal of Occupational Health Psychology*, 1(1), 27–41.

Smith, G.D., Fowie, N., & Ho Cheung Li, W. (2020) COVID-19: Emerging compassion, courage and resilience in the face of misinformation and adversity. *Journal of Clinical Nursing*, 29(9–10), 1425–1428.

Sohrabi, C., Alsafi, Z., O'Neill, N., Khan, M., Kerwan, A., Al-Jabir, A. et al. (2020) World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). *International Journal of Surgery*, 76, 71–76.

Spitzer, R.L., Kroenke, K. & Williams, J.B. (1999) Validation and utility of a self-report version of PRIME-MD: the PHQ primary care study. Primary Care Evaluation of Mental Disorders. Patient Health Questionnaire. *JAMA*, 282(18), 1737–1744.

The Lancet (2019) 2020: Unleashing the full potential of nursing. *The Lancet*, 394(10212), 1879.

Turale, S., Meechamnan, C. & Kunaviktikul, W. (2020) Challenging times: Ethics, nursing and the COVID-19 pandemic. *International Nursing Review*, 67(2), 164–167. https://doi.org/10.1111/inr.12598

Ungar, M. & Theron, L. (2020) Resilience and mental health: How multisystemic processes contribute to positive outcomes. *The Lancet Psychiatry*, 7(5), 441–448.

Vindegaard, N. & Benros, M.E. (2020) COVID-19 pandemic and mental health consequences: Systematic review of the current evidence. *Brain, Behavior, and Immunity*, 89, 531–542.

von Elm, E., Altman, D.G., Egger, M., Pocock, S.J., Gøtzsche, P.C. & Vandenbroucke, J.P. (2014) The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: Guidelines for reporting observational studies. *International Journal of Surgery*, 12(12), 1495–1499.

Wu, A.W., Connors, C. & Everly, G.S. Jr (2020) COVID-19: Peer support and crisis communication strategies to promote institutional resilience. *Annals of Internal Medicine*, 172(12), 822–823.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.