
Stress and anxiety in nursing students during the first wave of the COVID-19 pandemic

Estrés y ansiedad en estudiantes de enfermería durante la primera ola de la pandemia de COVID-19

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Resumen

Objetivo: Comparar los niveles de ansiedad y estrés agudo entre los/las estudiantes de enfermería que se incorporaron al trabajo durante la primera ola de la pandemia de COVID-19 y aquellos que no lo hicieron.

Métodos: Estudio descriptivo transversal multicéntrico realizado en tres universidades públicas españolas. Un total de 216 estudiantes de enfermería participaron en nuestro estudio. La recopilación de datos se realizó mediante un formulario en línea. Se recopilaron variables relacionadas con las condiciones para ingresar al mercado laboral y se incluyó la Escala de Autoevaluación de Ansiedad de Zung y el Cuestionario de Reacción Aguda al Estrés de Stanford. Se llevaron a cabo análisis univariados y multivariados.

Resultados: El 42,6% de los estudiantes ingresaron al mercado laboral. La puntuación global de ansiedad fue $\bar{x}=36,31$ (DE=5,71) y la puntuación de estrés fue $\bar{x}=82,39$ (DE=30,84). Los niveles más bajos de ansiedad se encontraron en aquellos que se incorporaron al mercado laboral ($\bar{x}=35,67$; DE=5,78), en comparación con aquellos que no lo hicieron ($\bar{x}=36,73$; DE=5,67). El 92,4% del total de alumnos presentaron estrés agudo. El estrés agudo fue mayor en aquellos que no trabajaron ($\bar{x}=84,35$; DE=32,38), y significativamente en mujeres.

Conclusiones: Los estudiantes de enfermería mostraron ser capaces de hacer frente al estrés en situaciones como la pandemia de COVID-19. No se puede descartar un efecto del trabajador sano. El estrés y ansiedad de los estudiantes de enfermería deben tenerse en cuenta por los tutores de prácticas clínicas y cuando se incorporan al mercado laboral por primera vez.

Palabras clave: Ansiedad; COVID-19; Estudiantes de enfermería; Salud mental; Trastornos de estrés.

Abstract

Objective: To compare anxiety and acute stress levels among nursing students who joined the labour market during the first wave of the COVID-19 pandemic and those who did not.

Methods: A cross-sectional, multicentre descriptive study across three Spanish public universities. A total of 216 nursing students participated in our study. Data collection was carried through an online questionnaire, that included variables on conditions for entering the labour market, the Zung Anxiety Self-Assessment Scale and the Stanford Acute Stress Reaction Questionnaire. We performed univariate and multivariate analyses.

Results: Overall, 42.6% (n=92) of the students entered the labour market during the first wave of the COVID-19 pandemic. The global anxiety score was $\bar{x}=36.31$ (SD=5.71) and the stress score was $\bar{x}=82.39$ (SD=30.84). Lower anxiety levels were observed among those who joined the labour market ($\bar{x}=35.67$; SD=5.78) as compared to those who did not ($\bar{x}=36.73$; SD=5.67). Overall 92.4% of the students were acutely stressed. Acute stress was higher among those who did not work ($\bar{x}=84.35$; SD=32.38) and significantly in women.

Conclusions: Nursing students were able to cope with stress in situations such as the COVID-19 pandemic. A healthy worker effect could not be ruled out. Stress and anxiety

among nursing students should be considered by clinical practice preceptors and at the time students first enter the labour market.

Keywords: anxiety; COVID-19; nursing students; mental health; stress disorders.

Introduction

The health emergency resulting from the coronavirus disease pandemic 2019 (COVID-19) led to the suspension of in-person teaching activities in all educational establishments in March 2020^(1,2). The pressure on the healthcare system made it necessary to reorganize clinical practice and training and mobilize all available material and human resources. In Spain, the staff shortage in healthcare centers led to the involvement of health science students in caring for patients admitted to hospitals and other resources, as they were deployed to work before completing their degrees and training⁽³⁾. This measure was also adopted in other countries, such as the United Kingdom⁽⁴⁾, Italy⁽⁵⁾, and the United States⁽¹⁾.

In Spain and under Order SND/232/2020 of 15th March for the adoption of measures in terms of human resources and means for the management of the health crisis situation caused by COVID-19⁽⁶⁾, Medicine and Nursing students in their final years were offered voluntary employment in the health systems of different autonomous communities, mainly contracted under the call for 'health assistance,' to carry out their healthcare activity in a support capacity and always under the supervision of a qualified health professional. Student nurses, in particular, were integrated into the staff of healthcare resources, such as hospitals, residences, and medicalized hotels^(7,8). Until then, they had completed all their theoretical training before finishing their Final Degree Project and part of their practical training⁽⁹⁾. Several studies have measured perceived stress⁽¹⁰⁾ and anxiety⁽¹¹⁾ levels during the first months of the COVID-19 pandemic. In nursing students, stress and anxiety increased during the pandemic due to academic uncertainty and the health situation experience⁽¹²⁾.

The present study aimed to compare anxiety and acute stress levels among nursing students who joined the labour market during the first wave of the COVID-19 pandemic with those who did not.

Methods

Design of the study

We designed a cross-sectional multicentre study. It was reported following the strengthening of the reporting of observational studies in epidemiology (STROBE) statement (Supplementary file 1).

Population

The study population comprised nursing students from three public universities in Spain located in three different autonomous regions of Spain where nursing students were called to join the labour market during the pandemic. Inclusion criteria included that the students had to be in the third or fourth year of their nursing degree with the possibility of entering the workplace during the first wave of the pandemic. The process of entering employment was voluntary and initiated at the suggestion of healthcare institutions, always in collaboration with the universities.

Variables and instruments

The following variables were collected: sex, year of nursing degree (third or fourth), university of origin; Autonomous University of Madrid (AUM), University of Lleida (UdL), and University of Basque Country (UPV/EHU), incorporation into the labor market (yes/no), job characteristics such as time elapsed since incorporation, type of contract, destination service or unit, length of working day, level of responsibility and whether or not they cared for patients with COVID-19.

The dependent variables were the scores obtained by the students on the Zung Anxiety Self-Assessment Scale⁽¹³⁾ and on the Stanford Acute Stress Reaction Questionnaire (SASRQ)^(14,15).

The Zung Anxiety Self-Assessment Scale, validated in a Spanish-speaking population with good psychometric properties⁽¹⁶⁾, consists of 20 items referring to psychological and somatic anxiety symptoms. Responses are scored on a four-point scale, with 1 = never or rarely experiencing the explained symptom and 4 = constantly or almost always experiencing the described symptom. The score range is 20–80, with anxiety levels rated as no anxiety (< 45), moderate anxiety (45–59), severe anxiety (60–74), and clinically significant anxiety (\geq 75). Participants were asked to respond to each item based on their experience in the past month.

According to the DSM-IV criteria for acute stress disorder, the SASRQ^(14,15) was developed to measure anxiety and dissociative symptoms in people who have experienced traumatic events. The researcher establishes a time during which stressful events may have occurred, and the person is asked to describe the most disturbing event and the degree of disturbance it caused. Then, taking this event into account, the person scores the 30 items of the questionnaire according to the experienced frequency. Finally, the person is asked to identify how many days they have experienced the distress in the set time. A total score can be obtained from the sum of the items, or an acute stress disorder can be diagnosed when the items are dichotomized⁽¹⁷⁾. Each item is then scored on a 6-point Likert scale where 0 = never and 6 = very often, giving a mean of acute stress out of a maximum of 150 (with a cut-off point of over 40)⁽¹⁷⁾. This questionnaire has been adapted and translated into Spanish by Cardeña and Maldonado⁽¹⁸⁾. Students were asked to recall stressful events over the previous month of their lives and to score each item of the questionnaire (range 0-5) based on the extent to which it described their experience during and/or after the previously described event.

Procedure

Data collection was carried out in April–May 2020, distributing an online form through each participating university's virtual and institutional mail. A welcome page with information about the study and informed consent was used. Only students who had previously read and understood the conditions and voluntarily agreed to participate in the survey through an initial form with information about the study that was sent along with the survey could access and complete the questionnaire.

Ethical aspects

Permission was obtained from the three universities, with approval of the Ethics Committee of the AUM. Informed consent was obtained from all participants, and anonymity was guaranteed during the analysis. It is worth noting that, even in cases of universities with small sample sizes, strict data anonymization and confidentiality protocols have been implemented to ensure the protection of participant identification details. These protocols include techniques such as data encryption, de-identification of personally identifiable information, and restricted access to sensitive data, all of which aligned with recognized best practices for protecting participant privacy.

Data analysis

Basic descriptive statistical methods were used for data analysis using SPSS 23.0 for Windows. Comparison between groups (gender, year, university, and employment or non-employment) was carried out using the chi-square test and Student's *t*-test or ANOVA according to the characteristics of the variables. Statistical significance was set at $p < 0.05$.

Results

The questionnaire was sent to 413 students, and a total of 240 questionnaires were collected, with a response rate of 52.3%. Of those, 24 were excluded because of missing information, resulting in 216 valid questionnaires. The distribution of the students in the sample by university was 20.3% from UAM, 43.1% from University Y and 36.6% from UPV/EHU. Most participants were female (88.3%), and 88.5% were in final-year (4th year).

A total of 42.6% of respondents had entered the labour market in healthcare before completing their undergraduate degree. Among students at UdL (25.0%) started working the week before data collection, whereas 85.7% of the students at UAM and 65.0% at UPV/EHU had been working already for one month or more (Table 1). The type of contract differed between students at different universities; 66.7% from X and 60% from Z were employed as health assistants, whereas for Y, the most common contract was as a nurse (50.0%), these differences being statistically significant ($p = 0.047$).

Table 1. Sociodemographic characteristics of the nursing students from three universities participating in the study, by university and variables related to labour market entry.

VARIABLES		TOTAL*	UAM n (%)	UdL Universityn n (%)	UPV/EHU n (%)	p
Total		216 (100.0)	44 (20.3)	93 (43.1)	79 (36.6)	
Sex	Female	191 (88.3)	43 (97.7)	82 (89.13)	66 (83.5)	0.570
	Male	24 (11.7)	1 (2.27)	10 (10.86)	13 (16.4)	
Academic year	Third year	27 (12.5)	0 (0.0)	27 (29.34)	0 (0.0)	0.840
	Fourth year	189 (87.5)	44 (100)	66 (71.7)	79 (100)	
Entering employment into health care	Total	92 (42.6)	23 (25.0)	24 (26.1)	45 (48.9)	0.755
	Male	14 (15.2)	1 (4.3)	6 (25.0)	7 (15.6)	
	Female	77 (83.7)	22 (95.7)	17 (70.8)	38 (84.4)	
Time in labour market	1–6 days	6 (7.4)	1 (4.8)	5 (25.0)	0 (0.0)	0.001
	7–14 days	7 (8.6)	0 (0.0)	4 (20.0)	3 (7.5)	
	15 to 30 days	14 (17.3)	2 (9.5)	1 (5.0)	11 (27.5)	
	> 1 month	54 (66.7)	18 (85.7)	10 (50.0)	26 (65.0)	
Labour contract	Nurse	23 (27.7)	4 (19.0)	11 (50.0)	8 (20.0)	0.046
	Nursing assistant	16 (19.3)	3 (14.3)	5 (22.7)	8 (20.0)	
	Health assistance	44 (53.0)	14 (66.7)	6 (27.3)	24 (60.0)	
Attending (potential) COVID-19 patients	Yes	70 (84.3)	19 (90.5)	16 (72.7)	35 (87.5)	0.029
	No	10 (12.0)	1 (4.8)	5 (22.7)	4 (10.0)	
	Other	3 (3.6)	1 (4.8)	1 (4.5)	1 (2.5)	
Type of work performed	Reinforcement to other nurses	47 (56.6)	11 (52.4)	10 (45.5)	26 (65.0)	0.029
	Patients under their full care	20 (24.1)	2 (9.5)	9 (40.9)	9 (22.5)	
	Other	16 (19.3)	8 (38.1)	3 (13.6)	5 (12.5)	
Received information on protection against infection	Yes	34 (42)	12 (57.1)	8 (40.0)	14 (35)	0.245
	No	47 (58)	9 (42.9)	12 (60.0)	26 (65)	
Access to necessary protective measures	Yes	44 (54.3)	12 (52.1)	13 (65.0)	19 (47.5)	0.759
	No	27 (33.3)	7 (33.3)	5 (25.0)	15 (37.5)	
	Not always	10 (12.3)	2 (9.5)	2 (10.0)	6 (15)	
Destination services	Medical hotels	6 (7.32)	6 (23.8)	1 (4.8)	0 (0.0)	0.004
	Field hospitals	1 (1.22)	0 (0.0)	0 (0.0)	1 (2.5)	
	Intensive Care	8 (9.76)	2 (9.5)	1 (4.8)	5 (12.5)	
	Emergency Dept.	4 (4.9)	1 (4.8)	0 (0.0)	3 (7.5)	
	Hospital wards	4 (51.2)	11 (52.4)	8 (38.1)	23 (57.5)	
	Other **	21 (25.6)	2 (9.5)	11 (52.4)	8 (20.0)	

* Number of missing data: Sex = 1; Entering employment into health care by sex = 1; Time in labour market=11; Type of labour contract= 9; Attending (potential) COVID-19 patients = 9; Type of work performed = 9; Received information on protection against infection = 11; Access to necessary protective measures = 11; Destination services = 10.

** Other destination services: residential homes, COVID test centres, mental healthcare.

Statistically significant differences ($p = 0.004$) were found among universities, depending on the service the students joined: for UAM, medicalized hotels were the most common type of service provided (23.8%), whereas for Y, it was other health-care centers (52.4%) and for Z it was hospitalization wards (57.5%).

Globally, 70 (84.3%) students attended patients suffering from COVID-19, with no statistically significant differences among universities ($p = 0.464$). In addition, 47 (56.6%) participants from the three universities acted as backup for another nurse. However, 9 (40.9%) students from UdL had full responsibility for patients' care, while this was 22.5% of students from UPV/EHU and 9.5% for UAM participants, and being these differences statistically significant ($p = 0.029$).

For 47 (58%) students who entered employment, no specific information relating to protection against infection was received from their employing institution, with no significant differences between universities ($p = 0.245$). A total of 44 (54.3%) respondents considered that they had the necessary protective measures to carry out their work safely, with the higher value ($n=13$, 65%) for the students from UdL.

The Zung Anxiety Self-Assessment Scale was responded by 168 (78%) participants, and the Stanford Acute Stress Reaction Questionnaire (SASRQ) by 157 (77%). The results show that 84 (50%) students were anxious. The mean obtained value corresponds to a low level of anxiety ($\bar{x} = 36.31$; $SD = 5.71$), with no statistically significant sex differences ($p = 0.057$) among participants from the three universities. The highest values were found among the students from UPV/EHU ($\bar{x} = 37.44$; $SD = 6.31$), with no statistically significant differences ($p = 0.139$) with the other two universities. Students who joined the workforce ($\bar{x} = 35.67$; $SD = 5.78$) had lower levels of anxiety compared to those who did not join ($\bar{x} = 36.73$; $SD = 5.67$), but these differences were not statistically significant ($p = 0.237$). Among the entering employment students, females obtained higher values ($\bar{x} = 36.31$; $SD = 5.71$) of anxiety compared to males ($\bar{x} = 33.90$; $SD = 4.6$), and this situation was repeated in those not entering employment ($\bar{x} = 36.99$; $SD = 5.78$ vs. $\bar{x} = 33.87$; $SD = 5.7$). None of these differences were statistically significant among the students from the three universities ($p = 0.274$; $p = 0.138$) (Table 2).

The mean acute stress score in the surveyed students ($n = 157$, 59 students did not answer this scale), was 82.39 ($SD = 30.84$). Globally, 92.4% of students experienced acute stress (score of 40 or more). 91,5% of the newly entering employment students presented acute stress, while 93% of the students out of employment. Scores were higher in female students ($\bar{x} = 84.46$; $SD = 30.80$) than in male students ($\bar{x} = 67.37$; $SD = 27.38$), and these differences were statistically significant ($p=0.023$). The highest mean values were found in students from UdL ($\bar{x} = 83.51$; $SD = 31.97$), with no significant differences between universities ($p = 0.747$). It was observed that students who entered the labour market had lower levels of stress ($\bar{x} = 80.01$; $SD = 28.92$) compared to those who did not ($\bar{x} = 84.35$; $SD = 32.38$), although these differences were not significant ($p = 0.382$). Female students had higher stress scores than males in both the entering employment and not entering employment groups, these values being statistically significant in the not entering employment group ($p = 0.017$). Caring for patients with COVID-19 was not significantly related to stress or anxiety (table 2).

Table 2: Anxiety and stress mean levels, measured with the Zung Anxiety Self-Assessment Scale⁽¹³⁾ and the Stanford Acute Stress Reaction Questionnaire (SASRQ)^(14,15), respectively, among nursing students from three universities (X, Y and Z) participating in the study (N= 216).

		Anxiety x̄ (SD)* n= 168**	p	Stress x̄ (SD)* n=157**	p		
TOTAL		36.31 (5.7)		82.39 (30.8)			
	Female	36.60 (5.8)	0.057	84.46 (30.8)	0.023		
	Male	33.89 (3.9)		67.37 (27.4)			
University	UAM	35.94 (5.5)	0.139	78.84 (30.0)	0.773		
	UdL	35.51 (5.2)		83.51 (30.6)			
	UPV/EHU	37.44 (6.3)		82.98 (32.0)			
Academic year	4 th year	36.33 (5.9)	0.919	82.58 (30.6)	0.827		
	3 rd year	36.18 (3.8)		80.89 (33.8)			
Work entering	Yes	35.67 (5.8)	0.237	80.01 (28.9)	0.382		
	No	36.73 (5.7)		84.35 (32.4)			
Participants in employment	UAM	35.53 (5.7)	0.192	73.24 (27.3)	0.484		
	UdL	33.76 (4.3)		79.47 (27.2)			
	UPV/EHU	36.83 (6.3)		83.60 (28.9)			
	Female	36.06 (5.9)		0.274		81.15 (28.4)	0.443
	Male	33.90 (4.6)				73.82 (32.3)	
Participants not in employment	Female	36.99 (5.8)	0.138	87.00 (32.5)	0.017		
	Male	33.87 (3.2)		58.50 (16.7)			

* x̄ = mean; SD = standard deviation; ** Number of *missings*: Anxiety = 48; Stress = 59.

A high level of anxiety (moderate, severe or clinically significant) was reported by 36.4% of respondents who believed they had the essential protective measures in place compared to 51.5% of those who did not or not always, and this difference was statistically significant ($p = 0.005$). Regarding stress, the difference between having or not having protective measures was not statistically significant ($p = 0.291$). (Table 3).

Table 3: Anxiety and stress levels, measured with the Zung Anxiety Self-Assessment Scale⁽¹³⁾ and the Stanford Acute Stress Reaction Questionnaire (SASRQ)^(14,15), respectively, among nursing students from three universities participating in the study, in relation to access to protective measures (Do you think you have the necessary protective measures to practice safely?) (n = 92).

Protective measures	ANXIETY				STRESS			
	No n (%)	Yes n (%)	Total n (%)	P	No n (%)	Yes n (%)	Total n (%)	P
Yes	29 (72.5)	12 (36.4)	41 (56.2)	0.005	5 (83.3)	33 (50.8)	38 (53.5)	0.291
No	8 (20.0)	17 (51.5)	25 (34.2)		1 (16.7)	24 (36.9)	25 (35.2)	
Not always	3 (7.5)	4 (12.1)	7 (9.6)		0 (0.0)	8 (12.3)	8 (11.3)	

Number of *missings* on protective measures: Anxiety = 19; Stress = 21.

Discussion

The study results showed that nursing students, whether they had entered clinical practice or not during the final two years of their studies, experienced levels of anxiety and stress during the first wave of the pandemic, especially female students not entering employment.

Several international studies have shown how the mental health of health science students worsened during the pandemic, with varying degrees of depressive symptoms, anxiety, and stress^(9,10,19,20,21). In line with our results, another study found that the stress level of female students was higher than that of male students⁽²⁰⁾. Similarly, anxiety levels among female students were not only higher during the pandemic, but previous studies have shown that anxiety levels among female students are higher than among male students under normal conditions⁽²²⁾. Moreover, among students who carried out their internships during the pandemic, women were found to have higher stress levels and psychological difficulties in coping with their work⁽²³⁾.

Studies carried out in the Spanish context indicate that, during the pandemic, nursing students were at greater risk of suffering mental health problems -specifically two times higher as many as their peers on the same course in previous years⁽²⁴⁾. In Spain, students lived under great uncertainty due to the initial lack of clarity about the end of the academic year and how their pending subjects were going to be assessed⁽²⁵⁾, as well as concern about the knowledge not acquired due to the interruption of their clinical practice, in line with what happened in other European countries⁽³⁾.

The results suggest that, despite the potentially stressful experiences in healthcare institutions, those who started their careers perceived positive aspects of this incorporation that helped reduce their anxiety levels. Despite the negative emotions and their consequences, they developed coping strategies and saw the experience as a learning opportunity, reinforcing the feeling of being useful at a crucial time for public health⁽²⁶⁾.

However, for student nurses, although the experience of the pandemic may have contributed to reinforcing their desire to become nurses⁽²⁵⁾, other research found that high anxiety levels led to greater reluctance to practice their profession in the future⁽¹¹⁾.

On the other hand, the results may suggest a healthy worker effect⁽²⁷⁾ so that the high levels of anxiety and stress could explain why some students decided not to join the labour market. It is possible that, based on their high self-perceived levels of anxiety and stress, students decided not to participate in the work activity, making their self-care prevail at that moment, as final-year students were forced to choose between the option of being confined at home or starting their professional career under adverse conditions⁽²⁸⁾.

Although not statistically significant, the students at UPV/EHU scored the highest on stress and anxiety. This could be explained by a possible delay in communica-

tion from the university on how to compensate for pending assessments and the offer of contracts by the regional health system⁽²⁹⁾.

It is worth reflecting on the suitability of interventions described in other countries to alleviate the psychological effects. For example, psychological support programmes for students^(11,23) and nurses⁽³⁰⁾, in order to help them cope with the fear, anxiety and stress caused by the pandemic and the resulting work situation, should focus on building resilience⁽²²⁾ and the importance of taking care of oneself in order to care for the patients⁽³¹⁾.

Universities should protect the health and well-being of their students⁽³²⁾ and address the possible emotional consequences by opening lines of research in this regard and implementing intervention programmes.

The study has some limitations mainly due to its cross-sectional nature not allowing us to determine how long the high levels of anxiety and stress lasted or whether there were any specific mental health problems developed since the pandemic in these students. It would, therefore, be interesting to analyze the medium- and long-term mental health consequences, including potential post-traumatic stress disorder.

In a pandemic, online teaching made it challenging the recruitment of a larger sample of nursing students. Another bias may be convenience sampling through the virtual campus and institutional email since only the students who use these online communications choose to participate, compared to others with connectivity problems. Aware of it, we sent several emails to encourage students to participate.

Among the strengths of the study, the geographical location of the participating universities in three different autonomous communities where students were entering employment offered the opportunity to enter into clinical practice, providing a greater diversity of participant profiles. In contrast, other studies in Spain have been carried out only in one region^(8,25,26). The data collection between April and May 2020 allowed us to gather impressions close to the cessation of face-to-face teaching for the whole group of students and the moment of incorporation for the entering employment students.

In conclusion, the pandemic exposed nursing students to a new situation that caused stress and anxiety. Despite students entering the workplace showed lower anxiety and stress levels, both students in employment and not presented acute stress levels. On the other hand, a healthy worker effect could not be ruled out. This study also showed the ability of nursing students who joined the workforce to cope with stress in exceptional situations such as the COVID-19 pandemic.

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Conflict of interests

The authors have no conflict of interest to declare.

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