ORIGINAL ARTICLE

The influence of COVID-19 on the mental health of final-year nursing students: comparing the situation before and during the pandemic

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ABSTRACT: *The COVID-19 pandemic has had an important impact on the academic world. It is known that university studies can influence the mental health of students, and especially those studying health sciences. In this study, we therefore sought to analyse whether the current pandemic has affected the mental well-being of final-year nursing students. This was a multi-centre study, with a descriptive, longitudinal, and prospective design. Mental well-being was evaluated using the General Health Questionnaire. A total of 305 participants were included in the study, of whom 52.1% had experienced the COVID-19 pandemic. Statistically significant differences were found between the two groups analysed in terms of age, access to university, average marks, mental well-being self-esteem, emotional exhaustion, and sense of coherence. In the case of mental well-being, a direct association was found with both the pandemic situation*

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(OR = 2.32, P = 0.010) and emotional exhaustion scores (OR = 1.20, P < 0.001), while an inverse association was found with sense of coherence scores (OR = 0.45, P < 0.001). This study shows that the mental health of students is a significant factor and one that must be taken into consideration when training nursing staff at university. There is a need to promote healthy habits and provide appropriate coping strategies. It is also important to train and prepare students for pandemic situations as these can have an important impact on the mental health of both the members of the public who will be treated by these future nursing professionals and the students themselves.

KEY WORDS: *coronavirus, mental health, mood, nursing students, pandemic.*

INTRODUCTION

The situation caused by the COVID-19 pandemic, which has included enforced confinement, has led to the closure of presential teaching activity of universities in many countries (Sahu, 2020). This has forced lecturers to modify their teaching approaches and to give classes using virtual formats. Similar solutions have also been used in more practical disciplines, such as health sciences, which usually rely on face-to-face tuition. Many universities have had to adopt novel strategies and introduce digital tools to provide adequate support for their students and teaching staff. This has entailed finding pragmatic, yet workable, solutions for the current situation and the complex problems that it poses (Choi et al., 2020; Hsieh *et al.*, 2020; Leigh *et al.*, 2020; Morin, 2020).

Nursing and medical students have also had their clinical practice sessions interrupted. This has been the result of decisions taken by government bodies (in different autonomous communities) and/or universities, which were subsequently ratified by a ministerial order (Cervera-Gasch *et al.*, 2020). At the same time, the Spanish authorities have legally regulated the contracting of final-year health sciences students. This has allowed them to work as auxiliary health staff and to carry out support activities under the direct supervision of experienced professionals (Ministry of Health, 2020). In this way, many students have effectively entered the world of work without having finished their official training. However, this has left questions regarding their final evaluations, and as to whether they possess the academic competencies required to finish their degree studies and the practical skills needed to do certain tasks. These students also suffer the added worries of possibly transmitting the virus to other members of their families; this is a problem that has been previously reported in studies of other healthcare pandemics (Wong *et al.*, 2004).

BACKGROUND

The beginning of their university studies is a critical period for the onset of mental illness in young people (American Psychiatric Association, 2013). The impact of academic life on the mental health of university students has already been widely reported (Pasic *et al.*, 2020). Poor mental health has been associated with a significant deterioration in academic performance (Hysenbegasi *et al.*, 2005) and also with students abandoning certain studies (Bakker *et al.*, 2020; Bowman *et al.*, 2020). This phenomenon is particularly relevant in degrees associated with health, such as nursing and medicine (Hughes & Byrom, 2019). In fact, higher levels of depression and anxiety have been reported in students studying these subjects than other academic disciplines (Bakker *et al.*, 2020; Iorga *et al.*, 2018; Mitchell, 2018; Tung et al., 2018).

Several studies have reported higher than average levels of depression amongst first-year medical students prior to them do periods of clinical practice. Similarly, medical students exhibit higher levels of anxiety during the final year of their studies (Iorga *et al.*, 2018). In the case of nursing, students usually begin their clinical practice sessions in the first year of their degree, often having to combine them with a heavy academic workload. This makes first-year nursing students particularly sensitive to stress (Ríos-Risquez *et al.*, 2018), which can have a direct impact on their mental health. A wide range of factors have been reported as potential sources of this stress, including academic requirements, social conditions, and clinical factors. The first of these is the most commonly cited factor and is related to doing examinations and written works. Social sources of stress include having to make new friends, work with

strangers, and manage finances related to university life. Amongst the clinical factors responsible for student stress, the most important are the sensation of lacking the knowledge and expertize required to take care of real patients and having to work under the supervision of tutors (Jimenez *et al.*, 2010; Pulido-Martos *et al.*, 2012). This third factor tends to be experienced with greater intensity than the other two. The end result is academic burnout and emotional exhaustion, which have been shown to be relevant problems for nursing students (Ríos-Risquez *et al.*, 2016) and related to psychological distress.

Even so, a number of elements have been identified that have the capacity to protect human health and prevent problems related to stress (Antonovsky, 1993). One of these is self-esteem, which has been widely studied in relation to coping with stress and maintaining general health status (Ni *et al.*, 2010; Yıldırım *et al.*, 2017). It is also considered an important safety factor for protecting nursing students. Another important element is the sense of coherence (SOC), which is a dynamic concept that changes over the course of one's life (Antonovsky, 1987). SOC measures a person's capacity to cope with difficult and stressful situations. There is a link between SOC and physical and psychological well-being, the use of adaptive coping strategies, and personality-related measures (Pallant & Lae, 2002). In nursing students, having a strong SOC has been associated with exhibiting a greater resistance to stress (Colomer-Pérez et al., 2019).

The current pandemic situation caused by COVID-19 has affected the lives of many young people through enforced confinement and social isolation. As a result, they often show higher levels of hostility, anxiety, and interpersonal sensitivity than older adults (Becerra-García et al., 2020; Usher et al., 2020). In the case of university students, it has been possible to observe these effects in a very clear and evident way. Results relating to the effects of confinement have shown the negative impact that this has had on many students' mental health. Furthermore, being at a more advanced stage in their studies has proved a reliable predictor for the onset of symptoms of anxiety and depression, as well as other mental health-related complaints (Li et al., 2020; Wang & Zhao, 2020). Even so, it is important to highlight the highly exceptional nature of the current situation being experienced by students in the final year of their nursing degree studies and the fact that has hardly been studied. It must similarly be stressed that their experience has not been compared with that of others who have not experienced a pandemic. Some final-year nursing students studying in Spain joined hospital units where they provided medical support and helped to cover some of the public health requirements arising due to the pandemic. In contrast, other final-year students were subject to lockdown, like the majority of the Spanish population. It should also be added that although the university's clinical practice sessions were suspended, most of its other academic activities continued, via distance learning, and virtual sessions.

For this reason, we thought it is necessary to conduct a more detailed study of the effects that the pandemic has had on nursing students in their final year at university. It was also with this in mind that the present study sought to establish whether the situation provoked by the COVID-19 pandemic has affected the mental well-being of university students studying the final year of nursing.

METHODS

Study design

A transversal descriptive study was carried out, using data from a larger, multi-centre, longitudinal, and prospective study carried out at the Nursing Faculties of the Universitat de Lleida, the Universitat Rovira I Virgili (Tarragona) and the Universitat de Girona, all of which are located in Catalonia (Spain). The wider study began in 2017 and focuses on emotional exhaustion related to academic activity in students of nursing. Data were collected from all of the students, studying in each course, of the Degree in Nursing. First-year students of nursing were monitored through their time at university until they finished their studies after four years.

Participants and data collection

The data used in the present study were obtained from two different groups of students in their final year of nursing studies at two different points in time. The first data set was obtained from people who were fourth-year students in May 2017 (when there was no COVID-19 pandemic), using a standard, written questionnaire. The second set was also obtained from fourth-year students, but in May 2020: in the middle of a pandemic. The second set had to be obtained via an online questionnaire because of the prevailing state of alarm and lockdown. The two questionnaires included the same variables, although the latter also included specific questions about COVID-19.

Measures

The dependent variable was mental well-being, which was evaluated using the General Health Questionnaire (GHQ) (Goldberg and Hillier, 1979; Lobo and Pérez-Echeverría, 1986). We took a total score of over 23 points as the threshold for the presence of mental health problems. The main independent variable was whether the student was assessed at the time of the pandemic.

All the other variables selected were classified according to sociodemographic, academic or related to health status.

- Sociodemographic variables: age, sex, marital status, number of children, and employment status.
- Academic variables: university of origin, how the student entered university, grade point average (GPA), means of financing their studies, and whether they had a grant to pay for their studies.
- Health status variables: perceived level of stress associated with the training and evaluative activities; academic emotional exhaustion, measured by the Emotional Exhaustion Scale (ECE) (Ramos *et al*., 2005); self-esteem, measured by the Rosenberg self-esteem scale (Atienza, 2000; Rosenberg, 1965); and SOC, evaluated with the Sense of Coherence Scale (SOC-13) (Antonovsky, 1993; Vega Martínez *et al*., 2019).

Ethical considerations

Before beginning the study, we sought authorization from the deans of the respective faculties. All the students were informed of the aim of the study via a fact sheet. Written informed consent was obtained from all those participating, prior to data collection. The students were also offered the possibility to withdraw from the study at any time.

With regard to data protection and confidentiality, it was not possible to include any form of individual identification at the transversal design stage. As a result, anonymity was maintained and guaranteed at all times. During the longitudinal design phase, an identity number was assigned to each student (registering their day and month of birth and including the last three digits of their national identity document). This allowed us to follow the group over the four years of the study while maintaining the anonymity of individual students.

Data analysis

A descriptive analysis was made of the variables that were the objective of the study, which were divided according to whether they had experienced the pandemic. This included measurements of the distribution frequencies and of the central tendency and dispersion and was based on the nature of each of the variables. To identify factors associated with mental well-being, we either analysed them based on the nature of the different variables (chi-square or *T*-test) or, when the criteria for applying the analyses were not met, on their equivalents. Then, any variables that obtained a level of statistical significance of <0.05 were incorporated into the regression logistic in order to identify the factors that were independently associated with general health; this was done using several different models. We introduced the independent variable, which was whether or not the student experienced the pandemic, into model 1. In model 2, we included variables used to assess sociodemographic and academic factors and also the level of stress generated by academic activities and evaluations. Model 3 was used to examine the rest of the variables relating to health status.

The data were analysed using version 23 of the IBM SPSS statistics program. The level of significance for acceptance was established as $P < 0.05$.

RESULTS

Sample characteristics

A total of 305 participants were included in the study. Their academic, sociodemographic, and health-related characteristics are presented in Table 1. 32.8% of the participants were students from the Universitat de Lleida (UdL), 30.5% were from the Universitat Rovira i Virgili (URV), and 36.7% were from the Universitat de Girona (UdG). The median age was 24 years old. The vast majority of students were women (86.5%), most of whom were single and did not have any children. 72.5% of the sample had entered university after passing the standard university entrance examination (PAU).

The group formed by participants who answered the questionnaire outside the COVID-19 pandemic period represented 47.9% of the whole cohort. The other group consisted of 52.1% of those who answered the questionnaire during the pandemic period. We performed an analysis to study differences between the

TABLE 1: *The characteristics of the participants and the differences between those who answered the questionnaire outside and during the COVID-19 pandemic*

	All participants (n = 305)	No COVID-19 (n = 146)	During COVID-19 (n = 159)	P
Sociodemographic characteristics				
Median Age [IQR]	24 [22–26]	25 [25–28]	22 [22–24]	0.000*
Sex				
Female	224 (86.5)	120 (83.9)	104 (89.7)	0.179
Male	35 (13.5)	23 (16.1)	12 (10.3)	
Marital status				
Single	260 (85.5)	130 (89.7)	130 (81.8)	0.162
Married	9 (3.0)	4 (2.8)	5 (3.1)	
Free union	33 (10.9)	11 (7.6)	22 (13.8)	
Divorced	2 (0.7)	0 (0.0)	2 (1.3)	
Number of children				
0	288 (96.0)	135 (95.7)	153 (96.2)	0.484
1	10 (3.3)	6 (4.3)	4 (2.5)	
2	1 (0.3)	0 (0.0)	1 (0.6)	
3	1 (0.3)	0 (0.0)	1 (0.6)	
Work				
Yes	129 (42.4)	59 (40.7)	70 (44.0)	0.557
No	175 (57.6)	86 (59.3)	89 (56.0)	
Academic characteristics				
University				
UdL	100 (32.8)	53 (36.3)	47 (29.6)	0.378
URV	93 (30.5)	40 (27.4)	53 (33.3)	
UdG	112 (36.7)	53 (36.3)	59 (37.1)	
Way of getting into university				
University access examination (PAU)	221 (72.5)	6 (65.8)	125 (78.6)	0.007*
Another university degree	11 (3.6)	5 (3.4)	6 (3.8)	
Vocational training	62 (20.3)	42 (28.8)	20 (12.6)	
Over 25 years	9 (3.0)	2 (1.4)	7 (4.4)	
Over 45 years	2 (0.7)	1 (0.7)	1 (0.6)	
Grade Point Average [IQR]	7.90 [7.30–8.10]	7.98 [7.44–8.20]	7.88 [7–8]	0.008*
Source of finance				
Family	72 (23.6)	35 (24.0)	37 (23.3)	0.411
Mixed	175 (57.4)	79 (54.1)	96 (60.4)	
Own	58 (19.0)	32 (21.9)	26 (16.4)	
Grant				
Yes	165 (54.1)	77 (52.7)	88 (55.3)	0.648
No	140 (45.9)	69 (47.3)	71 (44.7)	
Health status characteristics				
Levels of stress				
Lectures				
Low	279 (91.5)	135 (92.5)	144 (90.6)	0.553
High	26 (8.5)	11 (7.5)	15 (9.4)	
Seminars				
Low	213 (69.8)	99 (67.8)	114 (71.7)	0.460
High	92 (30.2)	47 (32.2)	45 (28.3)	
Problem-Based Learning				
Low	126 (42.3)	63 (45.3)	63 (39.6)	0.320
High	172 (57.7)	76 (54.7)	96 (60.4)	
Laboratory work/Simulation				
Low	104 (34.3)	47 (32.6)	57 (35.8)	0.557
High	199 (65.7)	97 (67.4)	102 (64.2)	

(Continued)

TABLE 1: (Continued)

	All participants (n = 305)	No COVID-19 (n = 146)	During COVID-19 (n = 159)	P
Clinical practices				
Low	126 (41.4)	55 (37.9)	71 (44.7)	0.235
High	178 (58.6)	90 (62.1)	88 (55.3)	
Team work				
Low	177 (58.0)	89 (61.0)	88 (55.3)	0.321
High	128 (42.0)	57 (39.0)	71 (44.7)	
Examinations				
Low	19 (6.2)	11 (7.5)	8 (5.0)	0.366
High	286 (93.8)	135 (92.5)	151 (95.0)	
Written work				
Low	128 (42.0)	60 (41.1)	68 (42.8)	0.768
High	177 (58.0)	86 (58.9)	91 (57.2)	
Oral presentations				
Low	53 (17.4)	22 (15.1)	31 (19.5)	0.308
High	252 (82.6)	124 (84.9)	128 (80.5)	
Goldberg score				
Median [IQR]	23 [15–32]	19 [14–28]	23 [18–36.5]	0.000*
Median Rosenberg score [IQR]	32 [27–38]	31 [25–38]	34 [29–38]	0.029*
Median ECE score [IQR]	30 [23–35]	28 [23–33]	31 [24–36]	0.025*
Median SOC-13 score [IQR]	66 [57–75]	68 [60–76]	63 [54–71]	0.000*

Qualitative variables are expressed with absolute frequency (percentage), while quantitative variables are expressed with median [IQR].
* p<0.05

two groups. We found statistically significant differences in their ages, ways of entering university, GPA, and Goldberg, Rosenberg, ECE, and SOC-13 scores. The mean age was lower in the group of students who answered the questionnaire during the pandemic period ($P < 0.001$). This was also the group containing the most students who had entered university via the university entrance examination (PAU) ($P = 0.007$), and their GPA was lower ($P = 0.008$). The Rosenberg and ECE scores were higher for the period corresponding to the COVID-19 pandemic ($P = 0.029$ and $P = 0.025$, respectively), whereas the SOC-13 score was lower ($P < 0.001$).

In the case of mental health status, 48.5% of the sample obtained a score of over 23 in the GHQ-28 test. Table 2 shows data on the sociodemographic, academic and health status characteristics, based on mental health status. When we analysed the differences between the two groups relating to participants with total Goldberg scores that were under and over 23, respectively, we found statistically significant differences between several variables. These included the pandemic situation, age, and the level of stress caused by certain academic and evaluation activities, the ECE score, and the SOC-13 score. We observed that during the pandemic, there was a greater percentage of students with high total Goldberg scores than outside the

COVID-19 pandemic period ($P < 0.001$). The median age was observed to be a little lower in the group with higher total Goldberg scores ($P = 0.046$). We also found that students with higher total Goldberg scores registered higher levels of stress related to their academic and evaluation activities: lectures ($P = 0.027$), seminars ($P = 0.036$), laboratory work/simulations ($P = 0.008$), clinical practices ($P = 0.020$), team work ($P = 0.005$), written work ($P = 0.001$), and oral presentations ($P = 0.028$). In the case of the ECE and SOC-13 scores, the students with the highest Goldberg scores also registered the highest and lowest scores on these scales ($P < 0.001$), respectively.

In the case of the regression logistic, the first model only included the pandemic situation variable; it showed that the COVID-19 pandemic was statistically significant and increased the probability of having a higher total Goldberg score by a factor of 2.62 (OR = 2.62, $P < 0.001$). The second model included the levels of stress caused by academic and evaluation activities that had been shown to be statistically significant according to the previous analysis. These results revealed that the pandemic situation still remained statistically significant, and it was associated with a higher total Goldberg score (OR = 3.00, $P < 0.001$). With regard to the different evaluation activities, only stress caused by laboratory work/simulations and by written

TABLE 2: *Differences in characteristics between patients with total Goldberg scores of under and over 23*

	Goldberg ≤ 23 (n = 155)	Goldberg > 23 (n = 146)	P
Sociodemographic characteristics			
Pandemic situation			
Yes	64 (41.3)	95 (65.1)	0.000*
No	91 (58.7)	51 (34.9)	
Median age [IQR]	24 [22–26]	23.5 [22–25]	0.046*
Sex			
Female	114 (84.4)	106 (88.3)	0.368
Male	21 (15.6)	14 (11.7)	
Marital status			
Single	135 (87.1)	124 (85.5)	0.691
Stable partner	20 (12.9)	21 (14.5)	
Children			
Yes	8 (5.2)	8 (5.5)	0.902
No	147 (94.8)	138 (94.5)	
Work			
Yes	69 (44.5)	59 (40.7)	0.503
No	86 (55.5)	86 (59.3)	
Academic characteristics			
University			
UdL	42 (27.1)	57 (39.0)	0.087
URV	51 (32.9)	41 (28.1)	
UdG	62 (40.0)	48 (32.9)	
Way of getting into university			
University access examination (PAU)	107 (69.0)	112 (76.7)	0.135
Others	48 (31.0)	34 (23.3)	
Grade Point Average [IQR]	7.89 [7.20–8.19]	7.90 [7.39–8.00]	0.860
Source of finance			
Own	34 (21.9)	37 (25.3)	0.487
Family/Mixed	121 (78.1)	109 (74.7)	
Grant			
Yes	79 (51.0)	84 (57.5)	0.253
No	76 (49.0)	62 (42.5)	
Health status characteristics			
Levels of stress			
Lectures			
Low	147 (94.8)	128 (87.7)	0.027*
High	8 (5.2)	18 (12.3)	
Seminars			
Low	117 (75.5)	94 (64.4)	0.036*
High	38 (24.5)	52 (35.6)	
Problem-Based Learning			
Low	70 (46.1)	54 (38.0)	0.164
High	82 (53.9)	88 (62.0)	
Laboratory work/Simulation			
Low	64 (41.6)	39 (26.9)	0.008*
High	90 (58.4)	106 (73.1)	
Clinical practices			
Low	74 (47.7)	50 (34.5)	0.020*
High	81 (52.3)	95 (65.5)	
Team work			
Low	102 (65.8)	73 (50.0)	0.005*
High	53 (34.2)	73 (50.0)	
Examinations			
Low	10 (6.5)	9 (6.2)	0.918
High	145 (93.5)	137 (93.8)	

(Continued)

TABLE 2: (Continued)

	Goldberg ≤ 23 ($n = 155$)	Goldberg > 23 ($n = 146$)	P
Written work			
Low	79 (51.0)	48 (32.9)	0.001*
High	76 (49.0)	98 (67.1)	
Oral presentations			
Low	34 (21.9)	18 (12.3)	0.028*
High	121 (78.1)	128 (87.7)	
Median Rosenberg score [IQR]	34 [27–38]	31 [27–36]	0.073
Median ECE score [IQR]	24 [20–30]	34 [31–38]	0.000*
Median SOC-13 score [IQR]	72 [65–78]	58 [50–66]	0.000*

Qualitative variables are expressed with their absolute frequency (percentage), and the differences between groups are calculated using the chi-squared test, while quantitative variables are expressed with the median values [IQR] and the differences between groups are calculated using the Mann–Whitney *U*-test.

* p<0.05

work proved significant, with both being inversely associated with total Goldberg scores (OR = 0.55, $P = 0.030$; and OR = 0.57, $P = 0.041$, respectively). The ECE and SOC-13 scales were included in the third model. As a result, we found a direct association between total Goldberg scores of above 23 and variables relating to the pandemic situation (OR = 2.32, $P = 0.010$) and the ECE score (OR = 1.20, $P < 0.001$). We also found an inverse association between higher total Goldberg scores and the SOC-13 score (OR = 0.45, $P < 0.001$) (Table 3).

DISCUSSION

This study sought to analyse whether the situation caused by the COVID-19 pandemic had affected the mental well-being of final-year nursing students. The results were compared with those of final-year students whose data had been collected three years earlier (2017) and who had not therefore experienced the pandemic situation. We also took into consideration other factors that could have affected the mental health of these students. These included sociodemographic and academic variables, and also other factors related to their mental health: the level of stress caused by different academic and evaluative activities, and their emotional exhaustion, self-esteem and SOC. The results of our study show that nursing students who experienced the pandemic in the final year of their studies reported higher scores on the GHQ-28 scale. They perceived a two-times greater risk of suffering mental health problems than their counterparts who did not have this experience. This indicates that the pandemic has had a negative effect on the mental well-being of these

students. Our findings suggest that emotional exhaustion could serve as a significant factor for predicting psychological distress. We also noted that a high SOC could be regarded as a protective factor when estimating the risk of mental illness.

The mental health of healthcare professionals presents a challenge that the academic world urgently needs to confront because these are future nurses for our health system and will have to take care of our society (Fernandez et al., 2012). It has been seen how the pandemic has had an important impact on the health of a large part of the population. This impact has not only been physical; it has also had an important effect on people's mental health (Brooks *et al.*, 2020). Final-year nursing students have been particularly affected by this situation, with many of them being employed within the health system without having finished their training. Some final-year students have continued their academic work while subject to isolation. Others, like many healthcare professionals, have been employed at the front line and in direct contact with the virus. They have therefore been exposed to the risk of contagion and to other side-effects of the current sanitary crisis. At the individual level, these factors can cause increased anxiety (Dong et al., 2020; Dubey et al., 2020; Fowler & Wholeben, 2020; Jung & Jun, 2020; Ma *et al.*, 2020).

In our study, 48.5% of the sample obtained a GHQ-28 score of over 23, which was higher than that obtained by other populations of nursing students (Mohebbi et al., 2019; Xu *et al.*, 2014). Of all the variables that could have influenced these higher scores, whether contextually and environmentally, the pandemic situation could have been the most important.

TABLE 3: *Logistic regression models with total Goldberg scores of above 23 categorised the dependent variable, with (1) the pandemic situation as the independent variable; (2) the pandemic situation and levels of stress caused by evaluation activities, including lectures, seminars, laboratory work/simulations, clinical practices, team work, written work and oral presentations as independent variables; (3) the pandemic situation, the levels of stress caused by evaluation activities, including lectures, seminars, laboratory work/simulations, clinical practices, team work, written work and oral presentations, and the ECE scores and SOC-13 scores as independent variables*

	OR	95% CI	Standard error	P
Model 1				
Pandemic situation	2.62	1.63–4.23	0.244	0.000*
Model 2				
Pandemic situation	3.00	1.80–5.01	0.262	0.000*
Levels of stress of				
Lectures	0.43	0.15–1.23	0.533	0.115
Seminars	1.03	0.57–1.85	0.300	0.930
Laboratory work/ Simulations	0.55	0.32–0.94	0.275	0.030*
Clinical practices	0.67	0.40–1.12	0.267	0.128
Team work	0.82	0.48–1.40	0.272	0.462
Written work	0.57	0.34–0.98	0.273	0.041*
Oral presentations	0.57	0.28–1.15	0.364	0.116
Model 3				
Pandemic situation	2.32	1.22–4.40	0.326	0.010*
Levels of stress				
Master classes	0.28	0.07–1.03	0.674	0.056
Seminars	1.51	0.72–3.20	0.382	0.278
Laboratory work/ Simulations	0.78	0.40–1.55	0.347	0.481
Clinical practices	1.07	0.54–2.14	0.351	0.838
Team work	1.17	0.60–2.26	0.338	0.650
Written work	0.66	0.34–1.30	0.341	0.231
Oral presentations	0.94	0.37–2.38	0.472	0.901
ECE score	1.20	1.13–1.27	0.029	0.000*
SOC-13 score	0.94	0.91–0.97	0.016	0.000*

R^2 of model 1 = 0.074.
R^2 of model 2 = 0.189.
R^2 of model 3 = 0.545.
* $p < 0.05$

This conclusion is largely based on the fact that no other changes had been made to either the curricula or the internal organization at any of the universities monitored in the study. A high percentage of the students who experienced the pandemic (59.7%) scored more than 23 in the GHQ-28 test, while only 35.9% of those who had not experienced it registered scores above this threshold value. The academic year that the nursing students were in may also have been an important factor, as some authors regard the last year of a nursing degree as the one in which students face the greatest risk of suffering a deterioration in their psychological well-being (Smith & Yang, 2017). Others, however,

believe that students experience higher levels of stress in their first year at university, given the fact that it is the course in which they must cope with the greatest academic workload (Wang & Zhao, 2020). The students who scored more than 23 in the GHQ-28 test mentioned feeling more stress in the majority of their training and evaluation activities than those who registered lower scores. Even so, the regression model showed that the simulations and written work contributed negatively to the perceived mental well-being of the students. This was probably related to the fact that students mainly do their clinical practice in their fourth year, when they must also present the bachelor's thesis. This could be one of the main causes of the greater workload, coinciding with practical work that includes simulations.

Emotional exhaustion has already been reported in the literature as a predictor for psychological distress (Ríos-Risquez *et al.*, 2018). The most eagerly expected moment for fourth-year students is when they finish their training and can move into professional work. In the year of the study, this wait was cut short by the onset of the pandemic. On the one hand, this led to them quickly becoming nurses, following the suspension of their final clinical practices (Fowler & Wholeben, 2020). On the other hand, the situation could have produced the sensation of there being a lack of control over the organization of the course and this could also have influenced the levels of anxiety that students reported experiencing during the most decisive months of their university studies (Gibbons, 2010) which, in turn, was linked to greater emotional exhaustion. Such a loss of control can also result in a loss of confidence and cause a deterioration in student performance (Fowler & Wholeben, 2020).

Finally, our results also seem to show that those students who did not experience the pandemic had a greater SOC. In fact, subsequent analyses confirmed that a greater SOC served as a protective factor and made a positive contribution to psychological well-being. This would suggest that those with the greatest SOC tend to have a permanent feeling of confidence and of having the necessary resources to tackle the challenges, in both internal and external environments, that they encounter in the course of their working lives. In fact, they come to see such demands as '*challenges, worthy of investment and engagement*' (Antonovsky, 1993).

The COVID-19 pandemic has caused anxiety, fear, insecurity, and a certain intolerance of uncertainty amongst the general population (Fowler & Wholeben,

2020; Usher et al., 2020). In the case of nursing students, it may also cause a loss of professional orientation and lead them to have doubts about their chosen profession, deriving from the risks it involves. It has been shown that a strong SOC contributes to better mental health and may even improve the capacity of nurses to resist stress (Ward *et al*., 2014). In fact, a SOC helps nursing students to obtain satisfactory academic results while feeling at ease with their chosen profession, despite its considerable emotional demands (Colomer-Pérez et al., 2019). This should therefore be regarded as a very important aspect to work on with nursing students.

It is also necessary to bear in mind some of the limitations of our study. One of the main ones was related to its transversal design, which made it difficult to make causal inferences. Even so, given the nature of the variables considered, and thanks to the evidence and theoretical explanation of the factors, it has been possible to interpret the causal relationship between them. It is also necessary to mention that all of the scales used were self-reported. This means that although universally accepted in the scientific literature, they may have been influenced by the psychological state of each individual and/or by the level of insight that this person had into their own state of health. This could potentially have produced some biased answers (Demetriou *et al*., 2015). That said, self-reported measures tend to provide very accurate information and offer one of the most realistic approximations to what the person who is being surveyed actually experiences at first hand. We should add that given the type of variables analysed in our study, the anonymity provided by self-reporting probably enabled us to obtain more honest answers.

CONCLUSION

The current study reveals the influence that the COVID-19 pandemic has had on the mental health of final-year nursing students. It shows that those who experienced the outbreak of the pandemic situation had twice as high a risk of suffering mental health problems than those who did not. However, although emotional exhaustion has an adverse effect on mental health, SOC acts as a protective factor. We therefore believe that it could be appropriate to take both into consideration when planning the training of nursing students. It should also be underlined that the group of students who experienced the abrupt incursion of the pandemic has now been incorporated into the

health system under circumstances that were highly conditioned by outbreaks of COVID-19. Despite the discomfort that the pandemic caused these students at the end of their university studies, the circumstances will, in turn, have enabled them to develop better coping strategies. As a result, it may well prove interesting to follow up on the mental well-being of these recently incorporated professionals in future research.

RELEVANCE FOR CLINICAL PRACTICE

Almost half of the final-year nursing students who had to become nursing professionals in less than a month presented signs of impaired mental health. This shows that the mental health of students is something that must be taken into consideration within the programmed training of future nursing staff delivered at universities. It is important to promote healthy habits and coping skills in order to combat this type of problem and to provide future professionals with the tools they will need to deal with extreme situations, such as those experienced during the pandemic. Taking care of those who have to look after others is a responsibility that, as university lecturers and professionals, we must take into consideration within our study plans. We must bring into the classroom techniques and strategies for dealing with stress and depression, such as mindfulness, that have already been shown to be effective with university students (Fowler & Wholeben, 2020; Song & Lindquist, 2014; Usher et al., 2020).

The strong association between mental health problems with the pandemic situation has also revealed the need to include specialized training in pandemics in the nursing curriculum. Above all, there is a need to include content on managing emotions and developing the coping strategies required to deal with this type of situation. This is not only important because of the impact that the pandemic has had on the mental health of students. It is also important because of its effects on the population in general, who will be the patients treated by these future nursing professionals. The after effects of this crisis will have a long-lasting impact on the lives of both the students (who are now active professionals) and their patients. It is therefore necessary to deal with this problem during the training of nurses as part of their preparation as future health professionals.

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ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The participation of the subjects in the survey was voluntary, and all the responses were anonymized. The questionnaire included an introductory statement regarding the purpose, intent, and use of data. This study was approved by the Ethics and Biosafety Committee of the University of Girona, and written informed consent was obtained from all students participating in the study. The ID protocol of the study was CEBRU0015-2019 code 07/2019.

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