Original Article

Anxiety, Depression, and Resilience in Pediatric Nurses During the COVID-19 Pandemic in Greece

Olga-Maria Koutantelia, RN, MSc, MSc
Pediatric Nurse, Private Hospital "MITERA", Athens, Greece

Constantinos Togas, SW, Psychologist, MSc, MSc, PhD, Postdoc
Ministry of Public Order, Megalopolis, Arkadia, Greece

George Alexias, PhD
Professor, Department of Psychology, Panteion University of Social and Political Sciences, Athens, Greece. Faculty of Social Sciences Hellenic Open University, Patras, Greece

Sofia Triantafyllidou, Psychologist, PhD
Faculty of Social Sciences, Hellenic Open University, Patras, Greece

Correspondence: Togas Constantinos, Andrea Labrou, Megalopolis, Arkadia, Greece, Postal Code=22200, e-mail:togascostas@yahoo.gr

Abstract
Introduction: After the emergence of the first COVID-19 case, the mental health of nurses was significantly impacted.
Aim: To investigate the levels of anxiety, depression, and resilience among pediatric nurses.
Methods: A cross-sectional descriptive study was conducted over a five-month period in one private and two public pediatric hospitals in Greece, involving a sample of 158 pediatric nurses. The data collection tool included sections for demographic and work-related information, as well as the Hospital Anxiety and Depression Scale (HADS), and the Connor-Davidson Resilience Scale (CD-RISC).
Results: More than half of the participants reported normal levels of depression and anxiety. However, around one in five presented borderline abnormal levels of depression (22.2%) and anxiety (21.5%). The total score on the Connor-Davidson Resilience Scale was 67.8. Women scored significantly higher than men in both depression and anxiety, but lower in resilience. Significant differences in depression, anxiety, and resilience were also found based on various demographic and work-related characteristics. Multiple linear regression analyses revealed a significant negative association between certain CD-RISC subscales and both Depression ($R = 0.562$, $R^2 = 0.316$, Adjusted $R^2 = 0.294$) and Anxiety ($R = 0.608$, $R^2 = 0.370$, Adjusted $R^2 = 0.349$).
Discussion: Approximately 20% of pediatric nurses experienced borderline abnormal levels of depression and anxiety during the COVID-19 pandemic in Greece. These percentages are lower than those reported in studies involving other nursing populations. Future research is recommended to further investigate the demographic and work-related characteristics that significantly influence pediatric nurses' anxiety and depression levels.

Key-words: pediatric nurses, anxiety, depression, resilience, COVID-19

Introduction

The SARS-COVID-19 virus emerged in late 2019 and quickly escalated into a global pandemic, impacting millions of individuals worldwide. It triggered a significant health crisis, characterized by a sharp rise in hospitalizations, the implementation of widespread containment measures, and the tragic loss of thousands of lives (WHO, 2024).

Health professionals, particularly nurses, were at the forefront of managing the pandemic, and numerous studies have been conducted to evaluate their mental health during this time. Sampaio et al., (2021) report a positive association between the COVID-19 pandemic and symptoms of depression, anxiety, and stress among nurses. Interestingly, elevated stress levels were also observed in nurses who were not directly involved in the care of COVID-19 patients (Doo et al., 2021).

A study by Labrague & De los Santos (2020) at the onset of the pandemic revealed that anxiety rates among nurses increased from 22.6% to 36.3%. In China, various studies also reported stress rates among nurses ranging from 43.83% (Xie et al., 2020) to 85.6% (Yurtseven & Arslan, 2021). During the later waves of the pandemic, high levels of anxiety and depression were observed among nurses in other countries as well (Crowe et al., 2022; Isik et al., 2022; Kandemir et al., 2022; Martin-Rodriguez et al., 2022).

In a related study conducted in Greece, 63% of participants exhibited moderate to severe anxiety symptoms (Gavana et al., 2023). Additionally, Fountoulakis et al., (2022) found that 10.78% of female nurses and 5.64% of male nurses experienced depression. Even higher rates of depression (39.7%) were reported by Sikaras et al., (2023).

The researchers emphasize that depressive symptoms were already present among health professionals, particularly nurses, before the pandemic, but these symptoms increased significantly during the pandemic (Cheung & Yip, 2015; Côté et al., 2022; Letvak et al., 2012; Nourry et al., 2014).

A consistent finding across research is that female nurses experience higher stress levels than their male counterparts (Cag et al., 2021; Gavana et al., 2023; Sikaras et al., 2023). A major source of anxiety and depression was the fear of contracting the virus and potentially transmitting it to loved ones (Isik et al., 2022; Odom-Forren, 2020; Said & El-Shafei, 2021). Additionally, concerns such as losing a family member, the inability to meet social needs, and fear of death also significantly heightened anxiety and depression levels (Isik et al., 2022).

Additional factors linked to an increased risk of anxiety and depression among nurses during the COVID-19 pandemic included having children, being in a single-parent family, longer work hours, pre-existing psychological and psychiatric conditions, higher tobacco and alcohol consumption, and the presence of confirmed or suspected COVID-19 cases in the workplace (Cortés-Álvarez et al., 2022; Ren et al., 2021). Insufficient education in disease management and more years of experience in health care were also positively associated with increased stress (Cag et al., 2021; Yurtseven & Arslan, 2021).

In addition, nurses working in regional hospitals and those assigned to units directly caring for COVID-19 patients, such as Emergency Departments and Intensive Care Units, experienced higher levels of stress compared to their counterparts in other areas (Cag et al., 2021; Côté et al., 2022; Greenberg et al., 2021; Marcomini et al., 2021; Yurtseven & Arslan, 2021). These settings likely increased exposure to the virus and the intensity of care, contributing to elevated stress levels.

As a consequence, numerous adverse outcomes were reported, including sleep disturbances, nausea, and vomiting, increased alcohol and drug consumption, suicidal ideation, absenteeism, reduced efficiency and effectiveness, burnout, low levels of job satisfaction, and an increased intention to quit (Labrague & De Los Santos, 2020). These effects not only impacted nurses' well-being but also threatened the quality of healthcare services and overall workforce stability.

Resilience is defined as "the process in which the individual can face and overcome various stressful and unpleasant situations and become stronger through them" (Alameddine et al., 2021). Research shows that resilience is positively associated with age, overall work experience, and education (Afshari et al., 2021). However, certain factors negatively impact mental resilience, including family status, with lower resilience levels observed in single-parent families (Lekka et al., 2022). Additionally,

having children appears to reduce mental resilience, as the stress of potentially transmitting the disease to them heightens anxiety (Afshari et al., 2021).

In a related study conducted in a general hospital in Greece, it was found that male nurses and younger nurses exhibited higher mental resilience and a better quality of life. The study suggested that male nurses, compared to their female counterparts, approached patient care in a more "mechanical" manner, which was identified as a protective factor contributing to their higher resilience (Lekka et al., 2022).

Specifically for pediatric nurses, research has indicated that those working in Eastern Mediterranean countries experienced higher stress levels compared to their counterparts in Central and Northern Europe (Varghese et al., 2021). Five months after the initial wave of the COVID-19 pandemic, pediatric nurses reported experiencing stress on average 3.1 days per week, difficulties with sleep 2.7 days per week, and feelings of detachment 1.8 days per week (Lake et al., 2022). Additionally, a study focusing on pediatric nurses estimated that 32.6% experienced anxiety, with those caring for children with suspected or confirmed COVID-19 showing higher levels of anxiety. A significant stressor was the potential exposure to patients' blood and other biological fluids (Zheng et al., 2021).

In China, 15.4% of pediatric nurses reported depressive symptoms, with higher rates observed among women. Interestingly, age and educational level were not found to be associated with depression in this population (Zheng et al., 2021).

For pediatric nurses working in oncology clinics, the predominant emotions included fear, guilt, and emotional exhaustion. Additionally, mental resilience was significantly negatively correlated with being female (Baroni & Bouffet, 2022).

In Greece, pediatric nurses exhibited moderate levels of stress, primarily due to concerns about their health, the health of their families, and the potential risk of death from the disease. Additionally, pediatric nurses with more academic qualifications reported higher levels of stress (Kasidouli et al., 2024).

Consequently, few studies have examined the prevalence of stress among pediatric nurses, in Greece, particularly during the COVID-19 pandemic. Additionally, there is a notable lack of research assessing the prevalence of depression and levels of mental resilience among this group.

This study aimed to evaluate the levels of depression, anxiety, and resilience among pediatric nurses in Greece during the COVID-19 pandemic and to identify the demographic and work-related characteristics that influence these levels. Based on the literature review, the following hypotheses were formulated:

- **Hypothesis 1:** There are differences in the levels of depression and anxiety among pediatric nurses based on their demographic characteristics.
- **Hypothesis 2:** There are differences in the levels of depression and anxiety among pediatric nurses based on their work-related characteristics.
- **Hypothesis 3:** There are differences in the levels of resilience among pediatric nurses based on their demographic characteristics.
- **Hypothesis 4:** There are differences in the levels of resilience among pediatric nurses based on their work-related characteristics.
- **Hypothesis 5:** There is a correlation between anxiety/depression and resilience levels among pediatric nurses during the COVID-19 pandemic.

Methods

Participants: 158 nurses from various educational backgrounds working in pediatric departments participated in the study. Nurses who worked voluntarily were in practice or held administrative positions higher than heads of clinical departments were excluded.

Measures

A composite questionnaire was used, which included sections on demographic information, work-related details, and the Hospital Anxiety

and Depression Scale (HADS) and the Connor-Davidson Resilience Scale (CD-RISC).

Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983). The HADS is a self-report rating scale designed to offer clinicians a reliable, valid, and user-friendly tool for identifying and quantifying symptoms of anxiety and depression. It comprises 14 items, divided into two subscales: 7 items for anxiety and 7 for depression. While it is not intended for diagnosing psychiatric disorders, it serves to identify hospital patients who may require further psychiatric evaluation and support (Herrmann, 1997). Notably, the HADS excludes items related to the somatic aspects of depression, such as insomnia and weight loss. Items are rated on a 4-point Likert scale (range 0–3), with total scores computed by summing the responses. Each subscale score ranges from 0 to 21. Based on the total score, respondents are classified into the following categories: 0-7 = Normal, 8-10 = Borderline abnormal, 11-21 = Abnormal. The HADS has demonstrated good reliability and validity across various languages and populations, including general hospital patients and the general population (Bjelland, 2002; Herrmann, 1997). The Greek version of the HADS also shows strong psychometric properties and is a useful tool for assessing anxiety and depression in Greek-speaking general hospital patients (Michopoulos et al., 2008). In the present study, Cronbach's Alpha values were 0.808 for the Depression subscale and 0.804 for the Anxiety subscale.

Connor-Davidson Resilience Scale (CD – RISC) (Connor & Davidson, 2003)**:** The Connor-Davidson Resilience Scale (CD-RISC) is a widely utilized instrument designed to measure resilience in individuals facing stressful situations that could lead to depression and anxiety. It is a generic measure applicable across diverse populations, having been translated into over 50 languages and tested in various contexts, including general populations, military veterans, adolescents, university students, young and older adults, survivors of natural disasters, and individuals with chronic stress or disabilities (Anjos et al., 2019).

The scale consists of 25 items, divided into five factors:

1. Personal Competence, High Standards, and Tenacity (8 items)
2. Trust in One's Instincts, Tolerance of Negative Affect, and Strengthening Effects of Stress (7 items)
3. Positive Acceptance of Change and Secure Relationships (5 items)
4. Control (3 items)
5. Spiritual Influences (2 items)

Each item is rated on a 5-point Likert scale (0 = not true at all, 4 = true nearly all of the time). The total score ranges from 0 to 100, with higher scores indicating greater resilience (Connor & Davidson, 2003).

The CD-RISC has demonstrated robust psychometric properties in its original validation (Connor & Davidson, 2003). In the present research, the Greek version of the CD-RISC, validated by Tsigkaropoulou et al., (2018), was used. The Cronbach's Alpha reliability values for the overall questionnaire and its subscales were satisfactory: Overall questionnaire = 0.892, Personal Competence, High Standards, and Tenacity = 0.737, Trust = 0.745, Positive Acceptance of Change = 0.705, Control = 0.634, Spiritual Influences = 0.695.

Design and Procedure: A cross-sectional study was conducted over 5 months, from November 2022 to April 2023, in three pediatric hospitals located in Attica, Greece:

1. Public Hospital for Children Pentelis, Attica, Greece
2. Public Hospital for Children "P. & A. Kyriakou", Athens, Greece
3. Private Hospital "MITERA", Athens, Greece

The research was conducted by a pediatric nurse working at one of the hospitals mentioned above. The researcher personally distributed paper questionnaires to the pediatric nurses, which they completed at their convenience and returned in the following days. The questionnaires were distributed exclusively in printed form, with no option for online completion.

Data Analysis: Data analysis was performed using IBM SPSS, version 29. The normality of quantitative variables was assessed using the Kolmogorov–Smirnov test or the Shapiro–Wilk test. Frequencies and percentages (%) were used to summarize the data. **T-test** and

ANOVA were used to compare the means of two or more groups to determine if observed differences were statistically significant. Post-hoc comparisons were conducted using the Bonferroni test to identify which specific groups differed. Pearson's correlation coefficient was utilized to explore linear correlations among quantitative variables. Cronbach's Alpha coefficient was used to evaluate the internal consistency reliability of the scales. A Cronbach's Alpha value of 0.70 or higher was considered indicative of good reliability. Finally, two multiple regression analyses were performed to examine how dimensions of resilience and various demographic and work-related characteristics predicted anxiety and depression. The significance level was set at 5% (p-value < 0.05).

Ethical considerations: Approval for the study was obtained from the scientific and administrative board and the nursing service of the participating institutions. Participants were informed that completing the questionnaire was voluntary and anonymous. All participants consented to take part in the study without receiving any compensation. They were also made aware that they could discontinue the questionnaire at any time if they wished. The data collected were handled with strict confidentiality and used exclusively for the purposes of this study.

Results

Two hundred and sixty (260) questionnaires were distributed, and 158 were completed and returned, resulting in a response rate of 60.77%. Specifically, the response rate was 50% at Pentelis Children's Hospital, 58% at 'P. & A. Kyriakou' Children's Hospital, and 50% at the private hospital "MITERA".

The demographic characteristics and work-related information of the participants are detailed in Table 1.

Table 1. ***Demographic and work-related characteristics of the sample***

	Frequency	Percentage %
Gender		
Man	45	28.5
Woman	113	71.5
Marital status		
Married	69	43.7
Single	80	50.6
Divorced	9	5.7
Age		
< 25 years old	21	13.3
26-35 years old	41	25.9
36-45 years old	55	34.8
46-55 years old	32	20.3
>55 years old	9	5.7
Educational Level		
Two - Year Training	31	19.6
Technological Educational Institute	84	53.2
University	19	12
M.Sc./ Ph.D.	24	15.2
Hospital		
University Hospital	12	7.6
General Hospital	84	53.2

Private Hospital	62	39.2
Job position		
Head Nurse	14	8.9
Nurse	104	65.8
Nurse's assistant	40	25.3
Nursing department		
Nursing floor	82	51.9
Surgery, oncology nursing floor	65	41.1
Intensive Care Unit, COVID – 19 nursing floor	11	7
Work experience		
0-5 years	54	34.2
6-10 years	40	25.3
11-15 years	28	17.7
16-20 years	16	10.1
>20 years	20	12.7
Contact with COVID – 19 patients		
Yes	85	53.8
No	73	46.2

Descriptive statistics for the questionnaires are presented in Table 2. For the HADS questionnaire, the overall depression score was 7.1, which is close to the normal category. Similarly, the total anxiety score had a mean value of 7.66, near to the borderline abnormal range (8-10).

Based on their scores on the HADS-14 depression scale, participants were classified into the following categories:

- Normal: 88 (55.7%)
- Borderline abnormal: 35 (22.2%)
- Abnormal: 35 (22.2%)

Regarding the Anxiety scale, participants were classified as follows:

- Normal: 81 (51.3%)
- Borderline abnormal: 34 (21.5%)
- Abnormal: 43 (27.2%)"

More than half of the pediatric nurses reported normal levels of depression and anxiety. In contrast, 22.2% of them showed borderline abnormal levels of depression. Similarly, 21.5% presented borderline abnormal levels of anxiety, while 27.2% had abnormal levels of anxiety.

On the Connor-Davidson Resilience Scale, the total score was 67.8. The highest mean value was recorded in the "Personal Competence, High Standards, and Tenacity" subscale (22.2), while the lowest was in the "Spiritual Influences" subscale (5.4).

Table 3 presents the results of parametric tests that explore potential differences in terms of depression and anxiety.

Table 2. Descriptive statistics for the HADS and Connor-Davidson Resilience Scale and their subscales

	Mean	Std. Deviation	Minimum	Maximum	Range
Hospital Anxiety Depression Scale (HADS-14)					
Depression	7.13	4.13	0	18	18
Anxiety	7.66	3.95	0	18	18
Connor-Davidson Resilience Scale (CD-RISC)					
Total score	67.84	12.44	36	97	61
Personal competence, high standards, and tenacity	22.20	4.51	7	32	25
Trust in one's instincts, tolerance of negative affect, and strengthening effects of stress	17.56	4.02	4	28	24
Positive acceptance of change and secure relationships	14.56	3.03	5	20	15
Control	8.23	2.29	0	12	12
Spiritual influences	5.29	1.85	0	8	8

Table 3. Differences between men and women in terms of depression and anxiety.

	Depression (HADS-14)	Anxiety (HADS-14)
Gender		
Man	4.67	5.04
Woman	8.35	8.70
p	***<.001***	***<.001***
Marital status		
Married	5.59	7.13
Single	7.75	5.80
Divorced	13.33	8.76
p	***<.001***	***<.001***
Age		
< 25 years old	2.81	4.38
26-35 years old	5.66	6.76
36-45 years old	8.53	9.11
46-55 years old	8.88	8.56
>55 years old	9.11	7.33
p	***<.001***	***<.001***
Education		
Two - Year Training	7.94	9.55
Technological Educational Institute	7.19	7.71
University	5.47	6
M.Sc./ Ph.D.	7.17	6.33

p	.236	***.004***
Hospital		
University Hospital	7.67	9.08
General Hospital	7.39	7.66
Private Hospital	6.66	7.39
p	.514	.399
Job Position		
Head Nurse	5.93	7.07
Nurse	7.63	7.82
Nurse's assistant	6.25	7.45
p	.105	.748
Nursing Department		
Nursing floor	7.43	8.43
Surgery, oncology nursing floor	6.88	7.03
Intensive Care Unit/COVID-19 nursing floor	6.36	5.64
p	5.95	***.021***
Work Experience		
0-5 years	5.35	7.07
6-10 years	7.08	7.45
11-15 years	8.79	7.79
16-20 years	8.06	8.88
>20 years	8.95	8.50
p	***<.001***	.446
Contact with COVID – 19 patients		
Yes	7.24	7.37
No	7	8
p	.722	.316

Table 4. Differences in the Connor-Davidson Resilience Scale (CD-RISC) score and its subscales based on the demographic and work-related characteristics of the sample.

	Total score	**Personal competence**	**Trust**	**Positive acceptance**	**Control**	**Spiritual influences**
Gender						
Man	72.27	23.58	18.93	15.73	8.67	5.36
Woman	66.08	21.66	17.01	14.10	8.06	5.26
p	***.004***	***.015***	***.006***	***.002***	.135	.763
Marital status						
Married	71.61	22.91	18.94	15.29	8.99	5.48
Single	65.30	21.71	16.54	14.14	7.76	5.15
Divorced	61.56	21.11	16.00	12.78	6.67	5.00
p	***.002***	.205	***<.001***	***.012***	***<.001***	.503
Age						
< 25 years old	72.91	23.76	18.95	15.81	8.91	5.48
26-35 years old	67.83	22.42	17.27	14.95	8.22	4.98
36-45 years old	63.55	20.58	16.38	13.80	7.58	5.20

46-55 years old	69.66	22.88	18.13	14.44	8.72	5.50
>55 years old	75.89	25.11	20.78	15.00	9.00	6.00
p	***.005***	***.006***	***.007***	.091	.068	.522
Educational Level						
Two – year Training	60.94	20.42	14.84	13.19	7.52	4.97
Technological Educational Institute	66.74	21.60	17.51	14.35	7.94	5.35
University	71.74	24.37	18.05	15.42	8.84	5.05
M.Sc./ Ph.D.	77.54	24.92	20.83	16.42	9.71	5.67
p	***<.001***	***<.001***	***<.001***	***<.001***	***.001***	.514
Hospital						
University Hospital	64.92	20.75	16.58	13.33	8.42	5.83
General Hospital	66.31	21.79	17.42	14.12	7.81	5.18
Private Hospital	70.48	23.05	17.94	15.40	8.77	5.32
p	.093	.126	.511	***.013***	***.040***	.512
Job Position						
Head Nurse	77.71	24.79	20.71	16.36	9.50	6.36
Nurse	68.42	22.42	17.81	14.51	8.40	5.28
Nurse's assistant	62.88	20.73	15.80	14.08	7.35	4.93
p	***<.001***	.10	***<.001***	***.049***	***.004***	***.044***
Nursing Department						
Nursing floor	64.46	21.40	16.35	13.90	7.68	5.12
Surgery/Oncology nursing floor	70.29	22.72	18.48	15.00	8.69	5.40
Intensive Care Unit /COVID-19 nursing floor	78.55	25.09	21.09	16.91	9.64	5.828
p	***<.001***	***.018***	***<.001***	***.002***	***.003***	.411
Work Experience						
0-5 years	68.13	22.69	17.32	14.70	8.20	5.22
6-10 years	66.73	21.43	17.15	14.93	8.08	5.15
11-15 years	66.64	21.25	17.64	14.11	8.21	5.43
16-20 years	68.44	22.13	18.31	14.75	8.00	5.25
>20 years	70.50	23.85	18.30	13.95	8.85	5.55
P	.820	.221	.766	.703	.775	.933
Contact with COVID-19 patients						
Yes	69.57	23.00	17.91	14.75	8.49	5.41
No	65.84	21.27	17.15	14.34	7.93	5.14
p	.060	***.016***	.241	.397	.125	.355

Table 5. Correlations

	Depression (HADS-14)	Anxiety (HADS-14)
HADS-14		
Anxiety	.624**	------
CD-RISC		
Total score	-.530**	-.572**
Personal competence, high standards, and tenacity	-.453**	-.428**
Trust in one's instincts, tolerance of negative affect, and strengthening effects of stress	-.415**	-.536**
Positive acceptance of change and secure relationships	-.518**	-.536**
Control	-.450**	-.421**
Spiritual influences	-.152	-.237**

Note: ** Correlation is significant at 0.01 level

Table 6. Multiple linear regression with the score in Depression and Anxiety as the dependent variable.

Dependent variable= Depression							
Predictor	**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**	**95.0% Confidence Interval for B**	
	B	**Std. Error**	**Beta**			**Lower Bound**	**Upper Bound**
(Constant)	18.936	1,587		11.929	<,001	15.800	22.072
CD-RISC Personal competence, high standards, and tenacity	-.053	.098	-.058	-,543	.588	-.247	.141
CD-RISC Trust in one's instincts, tolerance of negative affect, and strengthening effects of stress	-.047	.099	-.045	-.469	.640	-.242	.149

CD-RISC Positive acceptance of change and secure relationships	-.475	.129	-.348	-3.679	<.001	-.730	-.220
CD-RISC Control	-.370	.172	-.206	-2.152	.033	-.710	-.030
CD-RISC Spiritual influences	.029	.157	.013	.183	.855	-.281	.338
Dependent variable= Anxiety							
(Constant)	20.122	1.461		13.777	<.001	17.236	23.007
CD-RISC Personal competence, high standards, and tenacity	.055	.090	.063	.613	.540	-.123	.234
CD-RISC Trust in one's instincts, tolerance of negative affect, and strengthening effects of stress	-.311	.091	-.316	-3.406	<.001	-.491	-.130
CD-RISC Positive acceptance of change and secure relationships	-.431	.119	-.330	-3.629	<.001	-.665	-.196
CD-RISC Control	-.132	.158	-.077	-.833	.406	-.445	.181
CD-RISC Spiritual influences	-.167	.144	-.078	-1.154	.250	-.452	.119

Discussion

This study evaluated the levels of depression, anxiety, and resilience among pediatric nurses in Greece during the COVID-19 pandemic and examined the demographic and work-related characteristics that affect these levels.

The main finding is that pediatric nurses experienced, on average, normal levels of anxiety and depression during the pandemic. Similarly, another study in Greece found that pediatric nurses presented moderate stress levels (Kasidouli et al., 2024). These results also differ from those of other studies in Greece and internationally, which reported high rates of anxiety and depression among nurses working in various departments during the pandemic (Xie et al., 2020; Yurtseven & Arslan, 2021; Crowe et al., 2022; Gavana et al., 2023). This discrepancy might be explained by the unique aspects of working with children, a population that may offer some protective effects and

enhance mental resilience. Additionally, the relatively non-severe illness of pediatric patients and the low to zero death rates in pediatric wards and Intensive Care Units, particularly in private hospitals, may have contributed to this outcome.

Various psychological, sociodemographic, and occupational factors were associated with the mental health of pediatric nurses during the COVID-19 pandemic, confirming.

Hypothesis 1. Women scored higher than men in both Depression ($t = -6.64$, $df=156$, $p < .001$, Cohen's $d = -1.170$), and Anxiety ($t = -5.754$, $df=156$, $p < .001$, Cohen's $d = -1.014$), consistent with findings from several other studies (Cag et al., 2021; Gavana et al., 2023; Sikaras et al., 2023). Regarding marital/relationship status, previous research has shown that nurses from single-parent families are at higher risk for anxiety and depression (Cortés-Álvarez et al., 2022; Ren et al., 2021). Similarly, in this study, married participants scored lower in Depression [$F(2,155) = 19.608$, $p < .001$, partial $eta^2 = 0.202$] and in Anxiety [$F(2,155) = 20.568$, $p < .001$, partial $eta^2 = 0.210$], compared to single and divorced participants. Additionally, younger participants (under 25 years old) scored lower in Depression [$F(4,153) = 14.122$, $p < .001$, partial $eta^2 = 0.270$] and in Anxiety [$F(4, 153) = 7.484$, $p < .001$, partial $eta^2 = 0.164$], compared to participants in other age categories. This finding may be related to burnout but has not been extensively examined and should be further explored in future studies. Regarding educational and work-related characteristics, pediatric nurses with a two-year training scored higher in Anxiety [$F(3,154) = 4.686$, $p = .004$, partial $eta^2 = 0.084$] compared to University graduates and M.Sc./Ph.D. holders. This result is somewhat expected and may be related to the self-confidence of pediatric nurses regarding their professional competence. However, this finding contrasts with another study in Greece, which reported that more educated pediatric nurses had higher levels of anxiety (Kasidouli et al., 2024).

Hypothesis 2: Participants working on general nursing floors scored higher in Anxiety [$F(2.155) = 3.947$, $p = .021$, partial $eta^2 = 0.048$] compared to those working in Surgery/Oncology and Intensive Care Unit/COVID-19 nursing floors. This finding contrasts with other studies, which have reported higher levels of anxiety, depression, or self-destructive thoughts among those working in units caring for COVID-19 patients, such as Emergency Departments and Intensive Care Units (Côté et al., 2022; Greenberg et al., 2021; Marcomini et al., 2021; Yurtseven & Arslan, 2021). This discrepancy may be attributed to the generally better clinical condition of pediatric patients with COVID-19 and the lower rates of severe illness and admissions.

Pediatric nurses with 11-15 years and more than 20 years of experience scored higher in Depression [$F(4,153) = 5.345$, $p < .001$, partial $eta^2 = 0.123$] compared to participants in other experience categories. This finding appears to be linked to burnout. Several studies have similarly found that more years of work in the healthcare sector were positively associated with increased stress among nurses during the COVID-19 pandemic (Cag et al., 2021; Yurtseven & Arslan, 2021). Based on these results, Hypothesis 2 is confirmed.

However, it is noteworthy that no differences were found in anxiety and depression levels between pediatric nurses working in public and private hospitals.

Hypothesis 3 concerning pediatric nurses' resilience was also confirmed. Men scored higher than women in the total score of the CD-RISC ($t = 2.886$, $df=156$, $p=.004$, Cohen's $d = .509$), as well as in Personal Competence ($t = 2.456$, $df=156$, $p=.015$, Cohen's $d = .433$), Trust ($t = 2.770$, $df=156$, $p = .006$, Cohen's $d = .488$) and Positive Acceptance ($t = 3.152$, $df=156$, $p = .002$, Cohen's $d = .556$). Married participants scored higher than single participants in the total score [$F(2,155) = 6.393$, $p=.002$, partial $eta^2 = 0.076$], as well as in Trust [$F(2,155) = 7.977$, $p < .001$, partial $eta^2 = 0.093$], and Positive Acceptance [$F(2,155) = 4.540$, $p = .012$, partial $eta^2 = 0.055$]. Additionally, single participants scored higher than both married and divorced participants in Control [$F(2,155) = 8.177$, $p < .001$, partial $eta^2 = 0.095$]. Participants aged 36-45 years

scored lower than those who were up to 25 years old and those older than 55 years in the total score [F(4,153) = 3.887, p = .005, partial eta² = 0.092], as well as in Personal Competence [F(4,153) = 3.789, p < .006, partial eta² = 0.090] and Trust [F(4,153) = 3.694, p < .007, partial eta² = 0.088]. A related study conducted in a general hospital in Greece also found that male and younger nurses exhibited higher mental resilience and better quality of life (Lekka et al., 2022). Additionally, Afshari et al. (2021) found that resilience is associated with age.

Participants with a two-year training and graduates of Technological Educational Institutes scored lower than University graduates and M.Sc./Ph.D. holders in the total score of the CD-RISC [F(4,153) = 3.887, p = .005, partial eta² = 0.092], as well as in almost all subscales (except for Spiritual Influences): Personal competence [F (3, 154) = 10.503, p <.001, partial eta² = 0.170], Trust [F (3, 154) = 7.250, p <.001, partial eta² = 0.124], Positive acceptance [F (4, 153) = 12.299, p <.001, partial eta² = 0.193], Control [F (3, 154) = 6.358, p <.001, partial eta² = 0.110]. These findings regarding educational level are consistent with those reported by Afshari et al. (2021).

Hypothesis 4: those working in general hospitals scored lower than those working in private hospitals on Positive acceptance [F (2, 155) = 4.470, p<.013, partial eta² = 0.055] and on Control [F (2, 155) = 3.288, p<.040, partial eta² = 0.041].

Nurse assistants scored lower than Head Nurses on the total score [F(2,155) = 8.440, p < .001, partial eta² = 0.098] and in almost all subscales (except for Personal Competence): Trust [F (2, 155) = 9.190, p<.001, partial eta² = 0.106], Positive acceptance [F (2, 155) = 3.074, p=.049, partial eta² = 0.038], Control [F (2, 155) = 5.709, p<.004, partial eta² = 0.069], Spiritual influences [F (2, 155) = 3.178, p=.044, partial eta² = 0.039]. They also scored lower than Nurses in the total score, as well as in Trust and Control.

Participants working on a nursing floor scored lower than those working in an Intensive Care Unit/COVID-19 nursing floor in Personal Competence [F(2,155) = 4.135, p = .018, partial eta² = 0.051] and Positive Acceptance [F(2,155) = 6.336, p = .002, partial eta² = 0.076]. Moreover, they scored lower than those working in both a Surgery/Oncology nursing floor and an Intensive Care Unit/COVID-19 nursing floor in the total score [F(2,155) = 9.232, p < .001, partial eta² = 0.106], Trust [F(2,155) = 10.803, p < .001, partial eta² = 0.122], and Control [F(2,155) = 6.088, p = .003, partial eta² = 0.073].

Those who had contact with COVID-19 patients during their work scored higher than those who did not have such contact in Personal Competence (t = 2.435, df=156, p=.016, Cohen's d =.389).

Afshari et al., (2021) found that resilience is associated with years of working experience; however, this association was not supported in the current study. This unexpected result may be explained by the specific patient population being cared for, namely pediatric patients. Additionally, many significant differences were observed in the subscales of the Connor-Davidson Resilience Scale. Overall, these results confirm Hypothesis 4.

Hypothesis 5: Depression was positively correlated with Anxiety, while both Depression and Anxiety were negatively correlated with the total score on the Connor-Davidson Resilience Scale (CD-RISC) and its subscales. The strongest negative correlation was observed between Anxiety and the total score on the CD-RISC, whereas the weakest significant correlation was found between Anxiety and the Trust subscale. Thus, Hypothesis 5 was also confirmed.

Additionally, the multiple linear regression analysis revealed that the "Positive Acceptance of Change and Secure Relationships" subscale of the CD-RISC significantly predicted the score on Depression. The proportion of variance in the Depression score accounted for was 31.6% (R = 0.562; R² = 0.316; Adjusted R² = 0.294), with the best predictor variable being the score on the "Positive Acceptance of Change and Secure Relationships" subscale. Moreover, both the "Positive Acceptance of Change and Secure Relationships" subscale and

the "Trust" subscale of the CD-RISC significantly predicted the score on Anxiety. The proportion of variance explained by all independent variables was 34.9% ($R = 0.608$; $R^2 = 0.370$; Adjusted $R^2 = 0.349$), with the best predictor variable being the score on the "Positive Acceptance of Change and Secure Relationships" subscale of the CD-RISC.

The strengths of this study include its originality in focusing on Greek pediatric nurses and its inclusion of both public and private hospitals, allowing for meaningful comparisons between them. However, there are several limitations to consider. As a cross-sectional study, it cannot establish causal relationships. Another limitation is the relatively low response rate (60.77%). Additionally, the analysis was limited to a narrow range of demographic and work-related characteristics, and the sample may not fully represent the population of pediatric nurses in Greece, which may affect the generalizability of the findings.

The COVID-19 pandemic presents an opportunity for significant changes in nursing practice (Hossain & Clatty, 2021). The findings of this research can inform policymakers in implementing measures to protect the mental health of pediatric nurses. At the individual level, adopting coping mechanisms and fostering resilience are crucial for safeguarding and enhancing their mental well-being. At the organizational and administrative levels, healthcare providers should offer psychological support and therapeutic intervention programs to help pediatric nurses manage the negative impacts of the pandemic. Additionally, training programs should be developed to improve preparedness and resilience among pediatric nurses in future health crises. It is recommended that future research involve larger samples of pediatric nurses to comprehensively examine all dimensions of their anxiety, depression, and resilience. Additionally, exploring a wider range of demographic and work-related characteristics, including organizational factors, could provide deeper insights into their mental health. Longitudinal studies could offer valuable perspectives by tracking changes in anxiety, depression, and resilience over time, both during and after the COVID-19 pandemic. Comparing these levels with those of other groups of nurses (e.g., those working with adults, in Intensive Care Units, Emergency Departments, or in primary healthcare) or with other healthcare professionals could also yield important insights.

References

Afshari, D., Nourollahi-Darabad, M., & Chinisaz, N. (2021). Psychosocial factors associated with resilience among Iranian nurses during COVID-19 outbreak. *Frontiers in Public Health*, *9*. https://doi.org/10.3389/fpubh.2021.714971

Alameddine, M., Clinton, M., Bou-Karroum, K., Richa, N., & Doumit, M. a. A. (2021). Factors associated with the resilience of nurses during the COVID-19 pandemic. *Worldviews on Evidence-Based Nursing*, *18*(6), 320–331. https://doi.org/10.1111/wvn.12544

Baroni, L. V., & Bouffet, E. (2022). The impact of the COVID-19 pandemic in pediatric oncology units: A lesson of resilience and hope. *Cancer*, *128*(7), 1363–1364. https://doi.org/10.1002/cncr.34089

Bjelland, I., Dahl, A. A., Haug, T. T., & Neckelmann, D. (2002). The validity of the Hospital Anxiety and Depression Scale. *Journal of Psychosomatic Research*, *52*(2), 69–77.

Cag, Y., Erdem, H., Gormez, A., Ankarali, H., Hargreaves, S., Ferreira-Coimbra, J., Rubulotta, F., Belliato, M., Berger-Estilita, J., Pelosi, P., Blot, S., Lefrant, J. Y., Mardani, M., Darazam, I. A., Cag, Y., & Rello, J. (2021). Anxiety among front-line health-care workers supporting patients with COVID-19: A global survey. *General Hospital Psychiatry*, *68*, 90–96. https://doi.org/10.1016/j.genhosppsych.2020.12.010

Cheung, T., & Yip, P. (2015). Depression, Anxiety and Symptoms of Stress among Hong Kong Nurses: A Cross-sectional Study. *International Journal of Environmental Research and Public Health*, *12*(9), 11072–11100. https://doi.org/10.3390/ijerph120911072

Connor, K. M., & Davidson, J. R. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety*, *18*(2), 76–82. https://doi.org/10.1002/da.10113

Cortés-Álvarez, N. Y., & Vuelvas-Olmos, C. R. (2020). COVID 19: Psychological effects and associated factors in Mexican nurses. *Disaster Medicine and Public Health Preparedness*, *16*(4),1377–1383.

Côté, J., Aita, M., Chouinard, M., Houle, J., Lavoie-Tremblay, M., Lessard, L., Rouleau, G., & Gélinas, C. (2022). Psychological distress, depression symptoms and fatigue among Quebec nursing staff during the COVID-19 pandemic: A cross-sectional study. *Nursing Open*, *9*(3), 1744–1756.

Crowe, S., Howard, A. F., & Vanderspank, B. (2022). The mental health impact of the COVID-19 pandemic on Canadian critical care nurses. *Intensive and Critical Care Nursing*, *71*, 103241. https://doi.org/10.1016/j.iccn.2022.103241

Doo, E., Kim, M., Lee, S., Lee, S. Y., & Lee, K. Y. (2021). Influence of anxiety and resilience on depression among hospital nurses: A comparison of nurses working with confirmed and suspected patients in the COVID-19 and non-COVID-19 units. *Journal of Clinical Nursing*, *30*(13–14), 1990–2000.

Anjos, J. F., Santos, M. J. H. D., Ribeiro, M. T., & Moreira, S. (2019). Connor-Davidson Resilience Scale: validation study in a Portuguese sample. *BMJ Open*, *9*(6), e026836. https://doi.org/10.1136/bmjopen-2018-026836

Fountoulakis, K. N., Apostolidou, M. K., Atsiova, M. B., Filippidou, A. K., Florou, A. K., Gousiou, D. S., Katsara, A. R., Mantzari, S. N., Padouva-Markoulaki, M., Papatriantafyllou, E. I., Sacharidi, P. I., Tonia, A. I., Tsagalidou, E. G., Zymara, V. P., Prezerakos, P. E., Koupidis, S. A., Fountoulakis, N. K., Konsta, A., Tsapakis, E. M., . . . Mossialos, E. (2021). Mental health and conspirasism in health care professionals during the spring 2020 COVID-19 lockdown in Greece. *Acta Neuropsychiatrica*, *34*(3), 132–147.

Gavana, M., Papageorgiou, D. I., Stachteas, P., Vlachopoulos, N., Pagkozidis, I., Angelopoulou, P., Haidich, A. B., & Smyrnakis, E. (2023). The psychological impact of COVID-19 pandemic on primary health care professionals in Greece. *Psychiatriki*. https://doi.org/10.22365/jpsych.2023.008

Greenberg, N., Weston, D., Hall, C., Caulfield, T., Williamson, V., & Fong, K. (2021). Mental health of staff working in intensive care during Covid-19. *Occupational Medicine*, *71*(2), 62–67.

Herrmann, C. (1997). International experiences with the Hospital Anxiety and Depression Scale-A review of validation data and clinical results. *Journal of Psychosomatic Research*, *42*(1), 17–41.

Hossain, F., & Clatty, A. (2020). Self-care strategies in response to nurses' moral injury during COVID-19 pandemic. *Nursing Ethics*, *28*(1), 23–32. https://doi.org/10.1177/0969733020961825

Isik, O., Tengilimoğlu, D., Tosun, N., Zekioğlu, A., & Tengilimoğlu, O. (2021). Evaluating the factors (Stress, anxiety and depression) affecting the mental health condition of nurses during the COVID-19 pandemic. *Evaluation & the Health Professions*, *45*(1), 86–96.

Kandemir, D., Temiz, Z., Ozhanli, Y., Erdogan, H., & Kanbay, Y. (2021). Analysis of mental health symptoms and insomnia levels of intensive care nurses during the COVID-19 pandemic with a structural equation model. *Journal of Clinical Nursing*, *31*(5–6), 601–611. https://doi.org/10.1111/jocn.15918

Karaırmak, O. (2010). Establishing the psychometric qualities of the Connor–Davidson Resilience Scale (CD-RISC) using exploratory and confirmatory factor analysis in a trauma survivor sample. *Psychiatry Research*, *179*(3), 350–356. https://doi.org/10.1016/j.psychres.2009.09.012

Kasidouli, A., Matziou, V., Zyga, S., Kasimis, I., Boutopoulou, V., Vlachioti, E., Deli, C., & Perdikaris, P. (2024). Occupational stress of pediatric emergency nurses in Greece during the COVID-19 pandemic. *Advanced Emergency Nursing Journal*, *46*(1), 82–89.

Labrague, L. J., & Santos, J. a. A. (2020). COVID-19 anxiety among front-line nurses: Predictive role of organisational support, personal resilience and social support. *Journal of Nursing Management*, *28*(7), 1653–1661. https://doi.org/10.1111/jonm.13121

Lake, E. T., Narva, A. M., Holland, S., Smith, J. G., Cramer, E., Rosenbaum, K. E. F., French, R., Clark, R. R. S., & Rogowski, J. A. (2021). Hospital nurses' moral distress and mental health during COVID-19. *Journal of Advanced Nursing*, *78*(3), 799–809. https://doi.org/10.1111/jan.15013

Lekka, D., Orlandou, K., Pezirkianidis, C., Roubi, A., Tsaraklis, A., Togas, C., Mpoulougari, S., Anagnosti, F., Darahani, D., & Stalikas, A. (2022). Health professionals in a COVID-19 reference Hospital: Post-traumatic stress disorder (PTSD) levels and their associations with psychological resilience and quality of life. *Cureus*. https://doi.org/10.7759/cureus.22473

Letvak, S., Ruhm, C. J., & McCoy, T. (2012). Depression in Hospital-Employed Nurses. *Clinical Nurse Specialist*, *26*(3), 177–

182. https://doi.org/10.1097/nur.0b013e3182503ef0

Marcomini, I., Agus, C., Milani, L., Sfogliarini, R., Bona, A., & Castagna, M. (2021). COVID-19 and post-traumatic stress disorder among nurses: a descriptive cross-sectional study in a COVID hospital. *Med Lav*, *112*(3), 241–249.

Martin-Rodriguez, L. S., Escalda-Hernandez, P., Soto-Ruiz, N., Ferraz-Torres, M., Rodriguez-Matesanz, I., & Garcia-Vivar, C. (2022). Mental health of Spanish nurses working during the COVID-19 pandemic: A cross-sectional study. *International Nursing Review*, *69*(4), 538–545. https://doi.org/10.1111/inr.12764

Michopoulos, I., Douzenis, A., Kalkavoura, C., Christodoulou, C., Michalopoulou, P., Kalemi, G., Fineti, K., Patapis, P., Protopapas, K., & Lykouras, L. (2008). Hospital Anxiety and Depression Scale (HADS): validation in a Greek general hospital sample. *Annals of General Psychiatry*, *7*(1). https://doi.org/10.1186/1744-859x-7-4

Nourry, N., Luc, A., Lefebvre, F., Sultan-Taïeb, H., & Béjean, S. (2014). Psychosocial and organizational work environment of nurse managers and self-reported depressive symptoms: Cross-sectional analysis from a cohort of nurse managers. *International Journal of Occupational Medicine and Environmental Health*, *27*(2). https://doi.org/10.2478/s13382-014-0264-x

Odom-Forren, J. (2020). Nursing resilience in the world of COVID-19. *J Perianesth Nurs, 35*(6), 555–556.

Ren, C., Zhou, D., Fan, Y., Li, B., Zhang, W., Shen, Y., Yu, S., Jiang, L., Yu, F., Duan, Y., Peng, D., Cheng, X., Wu, L., Wu, C., & Ye, D. (2021). Prevalence and influencing factors of anxiety and depression symptoms among surgical nurses during COVID-19 pandemic: A large-scale cross-sectional study. *Nursing Open*, *9*(1), 752–764. https://doi.org/10.1002/nop2.1127

Said, R. M., & El-Shafei, D. A. (2020). Occupational stress, job satisfaction, and intent to leave: nurses working on front lines during COVID-19 pandemic in Zagazig City, Egypt. *Environmental Science and Pollution Research*, *28*(7), 8791–8801. https://doi.org/10.1007/s11356-020-11235-8

Sampaio, F., Sequeira, C., & Teixeira, L. (2021). Impact of COVID-19 outbreak on nurses' mental health: A prospective cohort study. *Environmental Research*, *194*, 110620. https://doi.org/10.1016/j.envres.2020.110620

Sikaras, C., Zyga, S., Tsironi, M., Tselebis, A., Pachi, A., Ilias, I., & Panagiotou, A. (2023). The Mediating Role of Depression and of State Anxiety on the Relationship between Trait Anxiety and Fatigue in Nurses during the Pandemic Crisis. *Healthcare*, *11*(3), 367. https://doi.org/10.3390/healthcare11030367

Tsigkaropoulou, E., Douzenis, A., Tsitas, N., Ferentinos, P., Liappas, I., & Michopoulos, I. (2018). Greek version of the Connor-Davidson Resilience Scale: Psychometric properties in a sample of 546 subjects. *In Vivo*, *32*(6), 1629–1634. https://doi.org/10.21873/invivo.11424

Varghese, A., George, G., Kondaguli, S. V., Naser, A. Y., Khakha, D. C., & Chatterji, R. (2021). Decline in the mental health of nurses across the globe during COVID-19: A systematic review and meta-analysis. *Journal of Global Health*, *11*. https://doi.org/10.7189/jogh.11.05009

Velickovic, K., Hallberg, I. R., Axelsson, U., Borrebaeck, C. a. K., Rydén, L., Johnsson, P., & Månsson, J. (2020). Psychometric properties of the Connor-Davidson Resilience Scale (CD-RISC) in a non-clinical population in Sweden. *Health and Quality of Life Outcomes*, *18*(1). https://doi.org/10.1186/s12955-020-01383-3

WHO (2024). COVID-19 epidemiological update – 15 July 2024. https://www.who.int/publications/m/item/covid-19-epidemiological-update-edition-169

Xie, N., Qin, Y., Wang, T., Zeng, Y., Deng, X., & Guan, L. (2020). Prevalence of depressive symptoms among nurses in China: A systematic review and meta-analysis. *PLoS ONE*, *15*(7), e0235448. https://doi.org/10.1371/journal.pone.0235448

Yurtseven, Ş., & Arslan, S. (2021). Anxiety levels of university hospital nurses during the Covid-19 pandemic. *Perspectives in Psychiatric Care*, *57*(4), 1558–1565.

Zheng, R., Zhou, Y., Qiu, M., Yan, Y., Yue, J., Yu, L., Lei, X., Tu, D., & Hu, Y. (2021). Prevalence and associated factors of depression, anxiety, and stress among Hubei pediatric nurses during COVID-19 pandemic. *Comprehensive Psychiatry*, *104*, 152217. https://doi.org/10.1016/j.comppsych.2020.152217

Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and Depression scale. *Acta Psychiatrica Scandinavica*, *67*(6), 361–370. https://doi.org/10.1111/j.1600-0447.1983.tb09716.x