

RESEARCH ARTICLE (ORIGINAL)

Burnout in Intensive Care Nurses During the COVID-19 Pandemic: A Cross-Sectional Study

Burnout em Enfermeiros de Cuidados Intensivos Durante a Pandemia de COVID-19: Estudo Transversal

Burnout en Enfermeros de Cuidados Intensivos Durante la Pandemia de Covid-19: Estudio Transversal

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Abstract

Background: During the COVID-19 pandemic, nurses were recognized as the frontline professionals most vulnerable to burnout.

Objective: To identify work-related and personal factors associated with the COVID-19 pandemic that contributed to burnout among intensive care unit (ICU) nurses.

Methodology: A quantitative, correlational, cross-sectional, and analytical study was conducted. The Copenhagen Burnout Inventory was applied to a non-probability sample of 61 ICU nurses. Descriptive and inferential analyses were performed using IBM SPSS Statistics.

Results: Nurses with suspected or confirmed COVID-19 infection, who care for more than 100 patients, and who witnessed COVID-19 patient deaths had higher overall burnout levels.

Conclusion: Providing care during the pandemic was associated with high levels of burnout, particularly among nurses who managed high patient loads, experienced patient deaths, and feared becoming infected.

Keywords: burnout; nurses; COVID-19 pandemic; intensive care

Resumo

Enquadramento: Os enfermeiros, durante o período pandémico, foram reconhecidos como os profissionais da linha da frente com maior vulnerabilidade ao desenvolvimento da Síndrome de Burnout.

Objetivo: Identificar e analisar fatores laborais e pessoais relacionados com o contexto pandémico que contribuíram para o desenvolvimento da Síndrome de Burnout nos enfermeiros de cuidados intensivos.

Metodologia: Estudo quantitativo, correlacional, transversal e analítico. Utilizamos a *Copenhagen Burnout Inventory*, numa amostra não probabilística de 61 enfermeiros de Cuidados Intensivos. Recorremos à estatística descritiva e inferencial com recurso ao IBM SPSS Statistics.

Resultados: Da análise inferencial os enfermeiros que foram suspeitos ou confirmados de COVID-19, que acompanharam mais de 100 doentes e que experienciaram mortes por COVID-19 apresentaram níveis mais elevados da Síndrome de Burnout global.

Conclusão: A prestação de cuidados em contexto pandémico relacionou-se com níveis elevados da Síndrome de Burnout, sobretudo em enfermeiros expostos a maior carga de doentes, à experiência da morte e ao receio de infeção.

Palavras-chave: *burnout*; enfermeiros; pandemia COVID-19; cuidados intensivos

Resumen

Marco contextual: Durante la pandemia, los enfermeros fueron reconocidos como los profesionales de primera línea más vulnerables al desarrollo del síndrome de *burnout*.

Objetivo: Identificar y analizar los factores laborales y personales relacionados con el contexto pandémico que contribuyeron al desarrollo del síndrome de *burnout* en los enfermeros de cuidados intensivos.

Metodología: Estudio cuantitativo, correlacional, transversal y analítico. Utilizamos el Copenhagen Burnout Inventory en una muestra no probabilística de 61 enfermeros de cuidados intensivos. Recurrimos a la estadística descriptiva e inferencial con ayuda del programa IBM SPSS Statistics.

Resultados: Del análisis inferencial, los enfermeros de los que se sospechaba o se había confirmado que tenían COVID-19, que atendieron a más de 100 pacientes y que vivieron muertes por COVID-19, presentaron niveles más elevados del síndrome de *burnout* global.

Conclusión: La prestación de cuidados en un contexto pandémico se relacionó con niveles elevados del síndrome de *burnout*, especialmente en enfermeros expuestos a una mayor carga de pacientes, a la vivencia de la muerte y al temor a la infección.

Palabras clave: *burnout*; enfermeros; pandemia COVID-19; cuidados intensivos

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Introduction

Burnout during the COVID-19 pandemic had an impact on nurses' health. Ge et al. (2023) found that a considerable proportion of nurses experienced moderate to high levels of burnout, indicating an increasing trend. According to Galanis et al. (2023), nurses reported increased professional exhaustion and reduced job satisfaction after the pandemic, with higher burnout rates compared to other healthcare professionals.

The World Health Organization (WHO, 2020) declared the global outbreak of the novel coronavirus (SARS-CoV-2), which causes the disease known as COVID-19, to be a pandemic due to its high transmissibility and mortality.

The global impact of the COVID-19 pandemic created unprecedented challenges that tested the resilience of healthcare services and exposed vulnerabilities in care provision (Orr et al., 2025). The unpredictability of the situation and the associated risk of death, combined with media coverage, intensified fear and stress among healthcare professionals. Intensive care unit (ICU) nurses, who are already exposed to high levels of emotional distress, faced even greater challenges due to the critical demands of their work and insufficient resources (Mokaya et al., 2025; Orr et al., 2025). The fear of becoming infected and transmitting the virus to family members, the lack of personal protective equipment (PPE), and the high mortality rates increased nurses' physical and psychological exhaustion (Lee et al., 2023; Mokaya et al. 2025), ultimately contributing to the development of burnout (Barba et al., 2021).

Given this context, it is important to understand how the pandemic may have influenced the development of burnout among ICU nurses and, consequently, contribute to the development of preventive strategies.

The following objectives were defined: (1) to identify work-related and personal factors that contributed to the development of burnout in ICU nurses during the COVID-19 pandemic; and (2) to analyze the influence of these factors on the development of burnout in ICU nurses during the COVID-19 pandemic. Two research hypotheses were formulated: H1: The number of COVID-19 patients cared for, the experience of managing these patients' deaths, and identification as a suspected or confirmed COVID-19 case are associated with higher levels of burnout. H2: The perception of social recognition and the perception of having sufficient PPE are associated with lower levels of burnout.

Background

Burnout, classified in the 11th Revision of the International Classification of Diseases (ICD-11) as an occupational phenomenon, results from chronic workplace stress that exceeds an individual's ability to cope (WHO, 2019). It comprises symptoms such as malaise, fatigue, frustration, cynicism, and perceived professional inefficacy (Chen et al., 2024). Work overload, shift work,

sleep deprivation, and chronic diseases are among the primary factors contributing to burnout, particularly among healthcare professionals (Chen et al., 2024; Fei et al., 2023). The pressure of professional and social life, combined with occupational risks, has resulted in a significant increase in physical and mental fatigue among healthcare professionals. Contributing factors include highly complex work environments, high absenteeism, inadequate nurse staffing, the demands of working in an ICU, daily exposure to a closed environment, poor interpersonal relationships, insufficient rewards, and a lack of recognition and autonomy (Silva et al., 2021; Areosa & Queirós, 2020).

During the pandemic, nurses were exposed to significant psychological strain due to continuous PPE use, reassignment to unfamiliar units, increased workload, and high mortality rates among COVID-19 patients (Ehrlich et al., 2020; Hovland et al., 2024; Janeway, 2020; Musio et al., 2025). Furthermore, social preventive measures, social distancing, and prophylactic isolation (Costa et al., 2020) disrupted personal and professional balance, contributing to the development of depressive symptoms. Feelings such as fear of transmitting the virus and fear of the unknown further exacerbated burnout symptoms (Ehrlich et al., 2020; Hovland et al., 2024).

The Copenhagen Burnout Inventory (CBI) is an open-access instrument consisting of 19 items that assess three dimensions: personal burnout, work-related burnout, and client-related burnout. Its widespread use and psychometric validity justify its selection for the present study (Barton et al., 2022).

Research question/Hypotheses

"What work-related and personal factors related to the pandemic contributed to the development of burnout in intensive care nurses during the COVID-19 pandemic?" H1: The number of COVID-19 patients cared for, the experience of managing these patients' deaths, and identification as a suspected or confirmed COVID-19 case are associated with higher levels of burnout. H2: The perception of social recognition and the perception of having sufficient PPE are associated with lower levels of burnout.

Methodology

A quantitative, cross-sectional, and analytical study was conducted to address the study objectives and the research question.

For sample selection, the following inclusion criteria were defined: working in the ICU and providing direct nursing care during data collection. Professionals who did not complete the questionnaire or who were absent during the pandemic or data collection were excluded. After applying the exclusion criteria, a non-probability purposive sample of 61 ICU nurses was obtained.

The data collection instrument consisted of an initial

section with work-related independent variables containing 10 items regarding working conditions during the COVID-19 pandemic: a) average working hours per day; b) need to leave home/live alone; c) knowledge about the disease; d) identification as a suspected or confirmed COVID-19 case; e) number of COVID-19 patients cared for; f) availability of sufficient PPE; g) experience of managing COVID-19 patient deaths; h) perception of fear of infection; i) being a source of infection for family or friends; and j) perception of social recognition. The second part refers to the dependent variable (burnout), assessed using the CBI (Kristensen et al., 2005), validated for the Portuguese population (Fonte, 2011). The CBI consists of 19 items that assess three dimensions: personal burnout, consisting of six items that assess the degree of physical and psychological fatigue and exhaustion experienced by the person; work-related burnout, consisting of seven items that assess the degree of physical and psychological fatigue and exhaustion that is perceived by the person as related to his/her work; and client-related burnout, consisting of six items that assess the degree of physical and psychological fatigue and exhaustion that is perceived by the person as related to his/her work with clients.

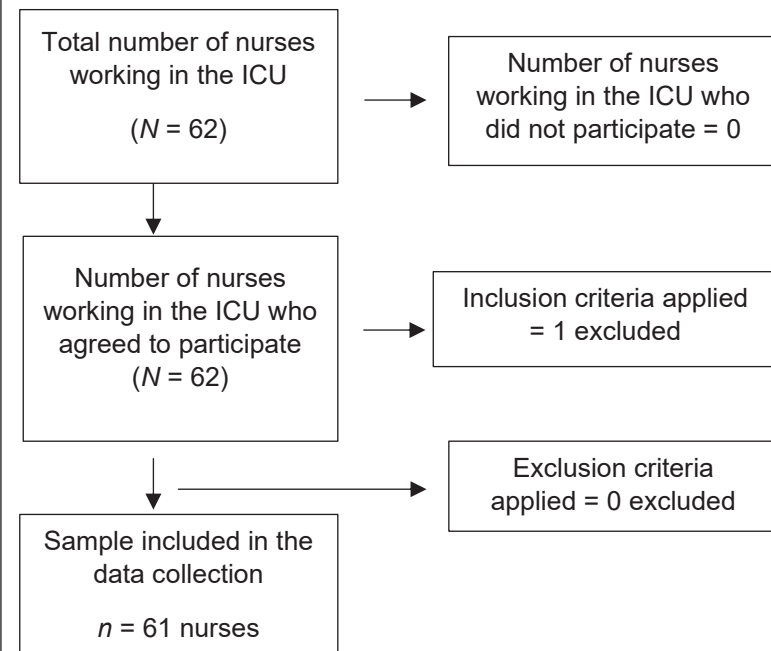
Data were collected between March and June 2022. The study received a favorable opinion (No. 1230) from the Ethics Committee of the institution where it was conducted. Authorization to carry out the study was obtained from the unit's Clinical Director and the Nurse Manager, and permission to apply the data collection instrument was obtained from its author. Formal contact was made with the nurses in the unit. The nurses were provided with the questionnaires and informed consent forms, as well

as two envelopes. After they were completed, the forms were sealed in the envelopes and placed in a locked box. Statistical analysis was performed using IBM SPSS Statistics, version 26.0 for Windows. Descriptive statistics were calculated, including absolute (n) and relative (%) frequency values, as well as minimum, maximum, mean ($\bar{x}$), and standard deviation (σ) values for continuous variables. The internal consistency of the CBI items and its three dimensions was assessed using Cronbach's alpha coefficient, with values above 0.70 indicating adequate internal consistency. The three subscales showed the following values: Personal burnout has a Cronbach's alpha of 0.845 for the total scale, with 0.803 as the lowest item value; Work-related burnout showed a Cronbach's alpha of 0.866 for the total scale, with 0.829 as the lowest item value; and Client-related burnout showed a Cronbach's alpha of 0.843 for the total scale, with 0.796 as the lowest item value. These high Cronbach's alpha values indicate good internal consistency of the European Portuguese version of the CBI.

Student's t -test and ANOVA were used to examine associations between burnout levels and the COVID-19 pandemic work-related variables. The significance level was set at 5%.

Results

The sample consisted of 61 nurses (Figure 1), most of whom were female (70.5%) and aged between 21 and 45 years (96.7%). Additionally, 19.7% held a master's degree and 26.2% had a nursing specialty.

Figure 1*Selection of the sample of ICU nurses*

Note. *N* = Population; *n* = Sample.
Source: Authors

The analysis of COVID-19 work-related variables (Table 1) shows that the majority of participants (91.8%) worked more than 10 hours per day; 68.9% cared for more than 100 patients with COVID-19; and 86.9% managed COVID-19 patient deaths. Only 13.1% reported that they had knowledge about the disease. PPE was considered

sufficient by 70.5% of participants. All nurses feared infecting family or friends, and 27.9% left home or lived alone during the pandemic. Most participants (95.1%) feared becoming infected and 47.5% were suspected or confirmed COVID-19 cases. Additionally, 73.8% felt that their work lacked social recognition.

Table 1*Distribution of absolute and percentage values of variables related to the work context during the COVID-19 pandemic*

Variables related to the work context during the COVID-19 pandemic		<i>n</i>	%
Average working hours per day	5-10 hours	5	8.2%
	>10 hours	56	91.8%
Need to leave home/live alone	No	44	72.1%
	Yes	17	27.9%
Knowledge about the disease	No	53	86.9%
	Yes	8	13.1%
Identified as a suspected or confirmed COVID-19 case	No	32	52.5%
	Yes	29	47.5%
No. of COVID-19 patients cared for	<10	1	1.6%
	10-100	18	29.5%
	>100	42	68.9%
Availability of sufficient PPE	No	18	29.5%
	Yes	43	70.5%
Experience of managing COVID-19 patient deaths	No	8	13.1%
	Yes	53	86.9%
Perception of fear of infection	No	3	4.9%
	Yes	58	95.1%
Being a source of infection for family/friends	No	0	0.0%
	Yes	61	100.0%
Social recognition	No	45	73.8%
	5-10 hours	16	26.2%

Note. *n* = Absolute frequency; % = Relative frequency.

Table 2 shows a comparison between burnout levels and variables related to the work context during the COVID-19 pandemic. Participants who left home or lived alone during this period showed lower client-related burnout levels, with differences approaching statistical significance ($\bar{x} = 34.9$; $\bar{x} = 25.2$, respectively; $p = 0.061$). However, no statistically significant differences were found for overall burnout ($p = 0.286$), personal burnout ($p = 0.585$), or work-related burnout ($p = 0.917$). Participants identified as suspected or confirmed COVID-19 cases reported higher overall burnout ($\bar{x} = 50.3$; $\bar{x} = 44.2$, respectively; $p = 0.073$) and personal burnout ($\bar{x} = 57.2$; $\bar{x} = 47.3$, respectively; $p = 0.025$). This pattern was not observed for work-related burnout ($p = 0.184$) or client-related burnout ($p = 0.360$). The number of COVID-19 patients cared for also influenced burnout levels. Participants who cared for more than 100 patients had statistically significantly higher mean scores on overall burnout ($\bar{x} = 51.1$; $\bar{x} = 38.4$, respectively; $p < 0.001$), personal burnout ($\bar{x} = 55.9$; $\bar{x} = 43.4$, respectively; $p = 0.009$), work-related burnout ($\bar{x} = 59.9$; $\bar{x} = 46.4$, respectively; $p < 0.001$), and client-related burnout ($\bar{x} = 35.9$; $\bar{x} = 24.1$, respectively; $p = 0.017$).

The experience of managing COVID-19 patient deaths

also significantly increased burnout levels: overall burnout ($\bar{x} = 49.1$; $\bar{x} = 34.0$, respectively; $p = 0.002$), work-related burnout ($\bar{x} = 53.7$; $\bar{x} = 40.6$, respectively; $p = 0.047$), personal burnout ($\bar{x} = 57.7$; $\bar{x} = 42.9$, respectively; $p = 0.001$), and client-related burnout ($\bar{x} = 34.5$; $\bar{x} = 17.2$, respectively; $p = 0.011$).

Participants who reported that sufficient PPE was always available showed lower burnout levels. These differences approached statistical significance for overall burnout ($\bar{x} = 45.0$; $\bar{x} = 52.2$, respectively; $p = 0.053$), work-related burnout ($\bar{x} = 49.4$; $\bar{x} = 58.1$, respectively; $p = 0.076$), and client-related burnout ($\bar{x} = 29.4$; $\bar{x} = 38.9$, respectively; $p = 0.063$).

Participants who reported fear of becoming infected with COVID-19 had higher burnout levels. The differences were statistically significant for work-related burnout ($\bar{x} = 56.5$; $\bar{x} = 40.5$, respectively; $p = 0.030$), though no significant differences were observed for the remaining dimensions. Overall burnout ($\bar{x} = 40.4$; $\bar{x} = 49.5$, respectively; $p = 0.016$), personal burnout ($\bar{x} = 43.8$; $\bar{x} = 54.9$, respectively; $p = 0.027$), and work-related burnout ($\bar{x} = 48.7$; $\bar{x} = 58.3$, respectively; $p = 0.008$) were significantly lower among participants who felt that their work was recognized by society.

Table 2*Distribution of associations between variables related to the work context during the COVID-19 pandemic and burnout levels*

	Burnout (score from 0 to 100)			
	Overall	Personal	Work-related	Client-related
Average working hours per day				
5-10 hours (<i>n</i> = 5)	42.4 (14.0)	51.7 (21.0)	51.4 (7.4)	22.5 (18.5)
>10 hours (<i>n</i> = 56)	47.6 (13.2)	52.0 (17.3)	56.1 (13.0)	33.1 (18.0)
<i>Student's t-test</i>	<i>p</i> = 0.406	<i>p</i> = 0.967	<i>p</i> = 0.430	<i>p</i> = 0.213
Need to leave home/live alone				
No (<i>n</i> = 44)	48.3 (14.1)	52.7 (17.7)	55.8 (13.3)	34.9 (18.0)
Yes (<i>n</i> = 17)	44.2 (10.6)	50.0 (17.2)	55.5 (10.9)	25.2 (16.9)
<i>Student's t-test</i>	<i>p</i> = 0.286	<i>p</i> = 0.585	<i>p</i> = 0.917	<i>p</i> = 0.061
Knowledge about the disease				
No (<i>n</i> = 53)	47.4 (13.2)	52.3 (17.2)	56.1 (12.7)	32.5 (17.5)
Yes (<i>n</i> = 8)	45.2 (14.2)	50.0 (19.9)	53.6 (12.4)	30.7 (23.4)
<i>Student's t-test</i>	<i>p</i> = 0.664	<i>p</i> = 0.733	<i>p</i> = 0.606	<i>p</i> = 0.796
Identified as a suspected or confirmed COVID-19 case				
No (<i>n</i> = 32)	44.2 (13.9)	47.3 (17.6)	53.7 (13.6)	30.2 (19.3)
Yes (<i>n</i> = 29)	50.3 (12.0)	57.2 (15.9)	58.0 (11.2)	34.5 (16.7)
<i>Student's t-test</i>	<i>p</i> = 0.073	<i>p</i> = 0.025	<i>p</i> = 0.184	<i>p</i> = 0.360
No. of COVID-19 patients cared for				
<100 (<i>n</i> = 19)	38.4 (12.8)	43.4 (18.7)	46.4 (13.3)	24.1 (15.7)
>100 (<i>n</i> = 42)	51.1 (11.6)	55.9 (15.5)	59.9 (9.9)	35.9 (18.1)
<i>Student's t-test</i>	<i>p</i> < 0.001	<i>p</i> = 0.009	<i>p</i> < 0.001	<i>p</i> = 0.017
Availability of sufficient PPE				
No (<i>n</i> = 18)	52.2 (14.0)	58.1 (19.3)	58.5 (13.5)	38.9 (15.8)
Yes (<i>n</i> = 43)	45.0 (12.5)	49.4 (16.2)	54.6 (12.2)	29.4 (18.5)
<i>Student's t-test</i>	<i>p</i> = 0.053	<i>p</i> = 0.076	<i>p</i> = 0.267	<i>p</i> = 0.063
Experience of managing COVID-19 patient deaths				
No (<i>n</i> = 8)	34.0 (15.3)	40.6 (22.6)	42.9 (15.7)	17.2 (15.7)
Yes (<i>n</i> = 53)	49.1 (11.9)	53.7 (16.1)	57.7 (11.0)	34.5 (17.5)
<i>Student's t-test</i>	<i>p</i> = 0.002	<i>p</i> = 0.047	<i>p</i> = 0.001	<i>p</i> = 0.011
Perception of fear of infection				
No (<i>n</i> = 3)	34.6 (16.9)	43.1 (10.5)	40.5 (14.4)	19.4 (30.1)
Yes (<i>n</i> = 58)	47.8 (12.9)	52.4 (17.6)	56.5 (12.1)	32.9 (17.5)
<i>Student's t-test</i>	<i>p</i> = 0.094	<i>p</i> = 0.367	<i>p</i> = 0.030	<i>p</i> = 0.213
Social recognition				
No (<i>n</i> = 45)	49.5 (12.2)	54.9 (16.5)	58.3 (11.4)	34.0 (16.3)
Yes (<i>n</i> = 16)	40.4 (14.2)	43.8 (17.9)	48.7 (13.6)	27.3 (22.4)
<i>Student's t-test</i>	<i>p</i> = 0.016	<i>p</i> = 0.027	<i>p</i> = 0.008	<i>p</i> = 0.209

Note. *n* = Absolute frequency; *p* = Probability of significance.

Discussion

The analysis of burnout levels in relation to work context variables during the COVID-19 pandemic showed that

nurses who left home or lived alone during the pandemic had lower client-related burnout, while no significant differences were observed in overall, personal, or work-related burnout. According to Ehrlich et al. (2020),



although moving out of their homes may be associated with increased anxiety, the lower burnout levels in this group can be explained by a reduced perception of the risk of infecting family members or friends.

Regarding the variable of being identified as a suspected or confirmed COVID-19 case, nurses showed higher levels of overall and personal burnout, which corroborates the findings of Borges et al. (2021).

Nurses who cared for more than 100 patients with COVID-19 had significantly higher levels of overall burnout and its three dimensions. Several studies indicate that the workload faced by frontline professionals during the pandemic increased the risk of physical fatigue, stress, anxiety, depression, and psychological distress, potentially leading to the development of burnout (Ahmadidarrehshima et al., 2022; Amorim et al., 2021; Barelo et al., 2020; Gomes, 2021; Luz et al., 2021).

Experiencing the death of patients with COVID-19 significantly increased overall burnout levels. According to Janeway (2020), inadequate management of patient death can lead to depression, which affects all areas of life. Pereira et al. (2020) note that nurses often perceive patient death as a disappointment and as a sense of inability to save lives, regardless of their efforts.

Another finding corroborated in this study was the increase in burnout associated with PPE shortages, consistent with Almeida et al. (2021), as participants who reported having sufficient PPE showed lower burnout levels. The differences approached statistical significance for overall burnout, work-related burnout, and client-related burnout. All participants reported feeling afraid of being a source of infection for family or friends. Nurses who perceived themselves as being afraid of becoming infected with the virus had higher burnout levels, corroborating the results of Luz et al. (2021) and Gomes (2021), who reported that professionals feared transmitting the disease.

Overall, personal, and work-related burnout levels were significantly lower among nurses who felt that their work was socially recognized. Fear of providing care in a context of high transmissibility, combined with factors such as low wages and excessive working hours, contributes to physical, mental, and emotional exhaustion (Amorim et al., 2021).

It is important to note that these results should be interpreted in light of the specific period during which data were collected and should not be considered representative of the entire pandemic experience. This study offers a delayed perspective on the COVID-19 pandemic, highlighting the persistent effects of burnout on ICU nurses at a stage already characterized by service reorganization. This context distinguishes it from earlier research, which focused mainly on the acute impact of the health crisis. This study has methodological limitations, namely the small sample size, which limits the generalizability of the findings.

Conclusion

This study found that, within the work-related dimension, the main risk factors were the number of patients cared

for, the experience of patient deaths, fear of infection, and lack of social recognition. In the personal dimension, the most influential factors were having been a suspected or confirmed COVID-19 case and the number of patients cared for. In the client-related dimension, the risks were associated with the number of patients cared for and their proximity to death. These findings deepen the understanding of burnout among healthcare professionals after global crises and support the development of strategies that promote team well-being and the quality of care.

For future research, the development of multicenter studies is recommended to enhance the generalizability of the findings, as well as retrospective studies that explore the progression of burnout over time, even after the pandemic period. It would also be important to use sampling techniques that yield data representative of the population of Portuguese nurses. In summary, the results reinforce the need to invest in the mental health of ICU nurses to ensure safer and more resilient care.

Thesis/Dissertation

This article derives from the dissertation entitled “Burnout em enfermeiros nos cuidados ao doente crítico em contexto pós pandemia COVID-19 – Estudo em Medicina Intensiva” presented at the School of Health of the Polytechnic Institute of Bragança in 2023.

Author contributions

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Writing – review and editing: Martins, M. S., Branco, M. A.

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