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OCCUPATIONAL STRESS AND COMPASSION FATIGUE: A CROSS-SECTIONAL ASSOCIATION STUDY AMONG NURSING PROFESSIONALS

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Abstract

This study evaluated the association between occupational stress and compassion fatigue among Brazilian nurses working in a hospital setting. This study is a census-based, cross-sectional, descriptive, and correlational investigation conducted among 83 nurses from a medium-sized university hospital in the southernmost part of Brazil. Validated instruments were used to assess occupational stress (Work Stress Scale) and professional quality of life (Professional Quality of Life Scale – ProQoL-BR). Logistic regression models were used to analyze the association between occupational stress and compassion fatigue, while adjusting for sociodemographic and professional variables. The prevalence of compassion fatigue was 65.9%, while 34.9% of participants exhibited occupational stress. A 10% increase in the occupational stress score was associated with a 33% increase in the likelihood of developing compassion fatigue. This association was influenced by variables such as age, sex, and sleep duration. This study associated occupational stress with compassion fatigue among hospital nurses, particularly in more vulnerable subgroups, such as female, older, and sleep-deprived professionals. These findings underscore the need for institutional policies that promote occupational health and prevent psychosocial problems.

Keywords: Compassion fatigue. Mental health. Nurses. Occupational health. Occupational stress.

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1. Introduction

Healthcare professionals working in hospitals face multiple challenges and risks in their work environments. This is exacerbated by task overload, high care demands, and the inherent competitiveness of the sector (Kwak et al. 2020; Lourenção et al. 2023). These challenges promote complex health outcomes where mental strain is often accompanied by physical symptoms, such as musculoskeletal disorders (Lourenção et al. 2025c). These daily stressors may also trigger significant biopsychosocial changes, including compassion fatigue and occupational stress, which negatively affect performance, occupational health, and the professional and personal quality of life of these workers.

Compassion fatigue is a state of biological, psychological, and social dysregulation due to prolonged exposure to traumatic situations, typically involving intense interaction with human suffering. This scenario generates stress, discomfort, and harm to workers' mental health (Borges et al. 2019; Lourenção et al. 2023). According to the Professional Quality of Life model, compassion fatigue arises from a combination of high levels of burnout and secondary traumatic stress, along with low levels of compassion satisfaction (Borges et al. 2019). Burnout stems from feelings of emotional exhaustion and cynicism, and reduced professional achievement. Secondary traumatic stress manifests through the indirect experience of trauma, leading to symptoms such as fear, insomnia, intrusive memories, and avoidance behaviors (Borges et al. 2019; Lourenção et al. 2025a).

Conversely, compassion satisfaction is a protective factor related to the pleasure and fulfillment perceived when caring for patients (Abou Hashish and Ghanem Atalla 2023; Lourenção et al. 2025a). Studies indicate that even with high levels of compassion satisfaction, nurses may exhibit signs of compassion fatigue. This phenomenon has been identified in Brazil, among nurses working in primary health care (Fabri et al. 2021), and in Portugal, among professionals in urgent and emergency care units (Borges et al. 2019).

Occupational stress is multifactorial and complex. It affects the health of workers, particularly nursing professionals. Its prevalence may vary from 24.5% to 44.2% (Wang et al. 2017; Faria et al. 2021). This condition is attributed to factors such as high workload, insufficient organizational resources, and the demanding emotional requirements inherent to healthcare (Faria et al. 2021; Wolotira 2023). Additionally, the hospital environment exacerbates these factors, placing nurses at a heightened risk for occupational diseases, absenteeism, and reduced psychosocial well-being (Sohrabi et al. 2022).

The relationship between occupational stress and compassion fatigue may establish a vicious cycle, in which prolonged exposure to occupational stress depletes professionals' emotional resources, increasing their vulnerability to compassion fatigue and harming their occupational health and the quality-of-care provision (Chen and Meier 2021; Xie et al. 2021; Getie et al. 2025). Occupational stress not only exacerbates the propensity for compassion fatigue but also contributes to adverse outcomes, such as depression, burnout, and turnover intention (Chen and Meier 2021; Júlio et al. 2021).

Although the literature recognizes the interrelationship between occupational stress and compassion fatigue, it still lacks in-depth investigations into this association, particularly in Brazilian hospital settings where nurses face unique challenges related to work overload, lack of professional recognition, and precarious working conditions (Lourenção et al. 2023; Souza et al. 2023). Advancing this knowledge is crucial for developing prevention and occupational health promotion strategies, as both conditions directly impact professional performance and healthcare quality (Sampaio et al. 2020; Getie et al. 2025).

Occupational stress predisposes the development of compassion fatigue, especially among nurses who care for patients in situations of emotional fragility and intense suffering. In this context, the higher the level of occupational stress, the higher the likelihood of developing compassion fatigue. That is due to the depletion of the psychological resources required to cope with stressors in the hospital environment (Ruíz-Fernández et al. 2020; Woo et al. 2020; Getie et al. 2025).

Hence, this study assumes that occupational stress is a significant risk factor for compassion fatigue, highlighting the need to investigate this association among nursing professionals working in Brazilian hospital settings. This research is justified by the need to convert theoretical knowledge about psychosocial risks into practical responses for public management. By identifying predictors of compassion fatigue, the study helps formulate occupational health policies that focus on individual well-being, maintaining quality

of care, and reducing costs generated by occupational illnesses within the Brazilian public health network (SUS).

It is noteworthy that complementary evidence from a recent study with the same population demonstrated that occupational stress and compassion fatigue are also negatively associated with work engagement among nurses, impacting dedication and vigor (Lourenção et al. 2025b). This reinforces the importance of addressing these psychosocial risks in the hospital environment.

This study aimed to evaluate the association between occupational stress and compassion fatigue among Brazilian nurses working in a hospital setting.

2. Material and Methods

Sample characteristics

A census-based, cross-sectional, descriptive, and correlational study was conducted with nurses from a medium-sized university hospital in the southernmost part of Brazil. The report followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (von Elm et al. 2007).

The study was conducted at Dr. Miguel Riet Correa Júnior University Hospital, which is affiliated with the Federal University of Rio Grande (FURG) and the Brazilian Hospital Services Company (EBSERH), located in Rio Grande, RS, Brazil. This reference center for several specialties has 221 beds distributed into units including intensive care, clinical medicine, surgery, and pediatrics. At the time of data collection, the nursing team comprised 146 professionals (EBSERH 2022).

The target population included all nurses who had worked at the hospital for at least six months. This criterion ensured familiarity with the work environment and processes. Professionals on sick leave or vacation during the data collection period were excluded, resulting in an estimated population of 141 nurses. The final sample was selected by convenience and included 83 participants (58.9% of the population) who voluntarily consented to participate in the study.

Data collection instruments

Data were collected using a self-administered structured questionnaire that covered sociodemographic and professional variables, including sex, age, marital status, employment relationship (Consolidation of Labor Laws or Public Servants' Statute), work sector, shift, type of activity (care or administrative/managerial), income, length of professional experience, hours of sleep, and physical activity. Professional variables included the nature of the employment relationship, distinguishing between the Single Legal Regime (Public Servants' Statute) and the Consolidation of Labor Laws regime (Brazilian Hospital Services Company contract), considering the structural differences in stability and performance-based wages inherent to each model.

Additionally, two instruments validated in Brazil were applied:

I. Work Stress Scale (WSS): Comprising 23 items related to common stressful situations in the workplace (Paschoal and Tamayo, 2004). Responses are expressed on a five-point Likert scale. The final score is calculated as the mean of responses and classified into “with stress” (≥ 2.5) or “without stress” (< 2.5). The scale was also analyzed by distribution in deciles, from the lowest to the highest levels of stress.

II. Professional Quality of Life Scale (ProQOL-BR): A translated and validated version for the Brazilian context, consisting of 30 items with responses on a six-point Likert scale, ranging from "never" (0) to "almost always" (5). ProQOL-BR assesses professional quality of life in three dimensions: Compassion Satisfaction (items 3, 6, 12, 16, 18, 20, 22, 24, 27, 30), Burnout (items 1, 4, 8, 10, 15, 17, 19, 21, 26, 29), and Secondary Traumatic Stress (items 2, 5, 7, 9, 11, 13, 14, 23, 25, 28) (Lago and Codo, 2013). Each dimension is scored by adding the scores of the 10 items. The values of items 1, 4, 15, 17, and 29 are reversed. Raw scores for the three subscales were transformed into z-scores and t-scores. This enabled comparisons between dimensions. Compassion fatigue was defined as the concomitance of high burnout and secondary traumatic stress scores, classified from the 75th percentile of the distribution (Stamm 2010).

Collection procedures

A trained research nurse collected the data during the pre-pandemic period, between September and December 2019. It is worth noting that this time frame should be considered when interpreting the results, as substantial changes in working conditions and levels of stress and fatigue occurred following the COVID-19 pandemic. Therefore, the findings reflect the occupational health status of nurses in the context prior to the health crisis.

During data collection, participants were approached in their work sectors, individually or in small groups, and were informed about the study's purpose and participation procedures. After signing the Free and Informed Consent Form (FICF), participants received a set of printed instruments and had up to 72 hours to return them in sealed envelopes deposited in a predesignated secure location.

The questionnaires were stored in a restricted-access room under the exclusive responsibility of the research team. They were later digitized, anonymized for analysis, and stored on an institutional password-protected computer to ensure data security and confidentiality.

Study variables

The explanatory variable was occupational stress measured by the WSS and classified as described. The outcome variable was compassion fatigue, assessed based on the combination of high scores in the burnout and secondary traumatic stress dimensions of the ProQOL-BR (Stamm, 2010).

Statistical analysis

Data were analyzed using Stata® software, version 16.0, employing univariate and multivariate logistic regression models. Compassion fatigue was the outcome, and occupational stress was the explanatory variable. Covariate selection for the multivariate model was guided by a Directed Acyclic Graph (DAG), aiming for an unbiased estimate of the effect of interest, according to the backdoor criterion.

Adjusted variables included age, sex, employment status (Consolidation of Labor Laws or Public Servants' Statute), length of professional experience, shift, and work sector (Intensive Care Unit vs. non-Intensive Care Unit). An interaction analysis was also conducted to explore potential effect modifiers between occupational stress and compassion fatigue. The Variance Inflation Factor (VIF = 1.94) confirmed the absence of collinearity. The significance level was 5% ($p < 0.05$).

3. Results

The study included 83 nurses, most of whom were female (75.9%), married, or in a stable union (57.8%). Their ages ranged from 25 to 61 years, with a mean age of 37.4 years (standard deviation: 8.1 years), and a concentration of professionals in the 26–35 age group (50.6%). Most participants worked under statutory employment contracts (97.6%) in sectors including the Intensive Care Unit, Emergency Care Service, Medical Clinic, and Surgical Center, among others. The "other sectors" category comprised professionals working in administrative areas, support services, and diagnostic units.

Regarding lifestyle habits, 62.7% reported engaging in physical activity, while most participants (68.7%) reported sleeping between 6 and 8 hours per day (Table 1).

Fifty-four nurses (65.9%) presented compassion fatigue, characterized by high concurrent scores for burnout and secondary traumatic stress. Twenty-nine professionals (34.9%) showed occupational stress, defined by scores equal to or greater than 2.5 on the WSS.

Figure 1 demonstrates that several demographic and work environment-related factors contribute to increased levels of occupational stress among nurses. These factors include sex, age, marital status, family income, length of professional experience, work sector, type of activity, work shift, and type of employment contract. These variables directly influence occupational stress, which, in turn, is significantly associated with compassion fatigue.

Moreover, variables such as sleep quality and physical activity play an important moderating role in this relationship. Both are correlated to levels of occupational stress and, simultaneously, the development of compassion fatigue.

Table 1. Sociodemographic and professional characteristics of nurses (n = 83). Rio Grande, RS, Brazil, 2019.

Variables	n	%
Sex		
Male	20	24.1
Female	63	75.9
Age group (years)*		
26 to 35 years (professional training)	42	50.6
36 to 50 years (professional maturity)	29	34.9
51 to 60 years (professional slowdown)	6	7.2
61 years or older (retirement)	1	1.2
No answer	5	6.0
Marital status		
Married/Stable union	48	57.8
Single	22	26.5
Separated	8	9.6
No answer	5	6.0
Type of employment		
Public Servants' Statute	81	97.6
Consolidation of Labor Laws	2	2.4
Work Sector		
Intensive Care Unit	21	25.3
Emergency Department	20	24.1
Medical Clinic	10	12.0
Surgical Center / Sterile Material Center	9	10.8
Surgical Clinic	5	6.0
Maternity / Obstetric Center	3	3.6
Other sectors	15	18.1
Family income (minimum wages)**		
From two to five	7	8.4
From six to 10	56	67.5
More than 10	20	24.1
Type of Activity		
Care	30	36.1
Administrative	12	14.5
Administrative and Care	41	49.4
Work Shift		
Morning	19	22.9
Afternoon	19	22.9
Evening	32	38.5
Full time	13	15.7
Physical Activity		
Yes	52	62.7
No	31	37.3
Daily Hours of Sleep		
Less than 6 hours	23	27.7
6 to 8 hours	57	68.7
More than 8 hours	3	3.6
Length of Professional Experience		
≤ 2 years	6	7.2
> 2 and ≤ 10 years	33	39.7
> 10 and ≤ 20 years	26	31.3
> 20 years	14	16.9
No answer	4	4.8

* Classification of age groups according to Machado et al. (2016). ** Minimum wage: R$ 998,00 / USD 236,29 (1 USD = R$4,2235).

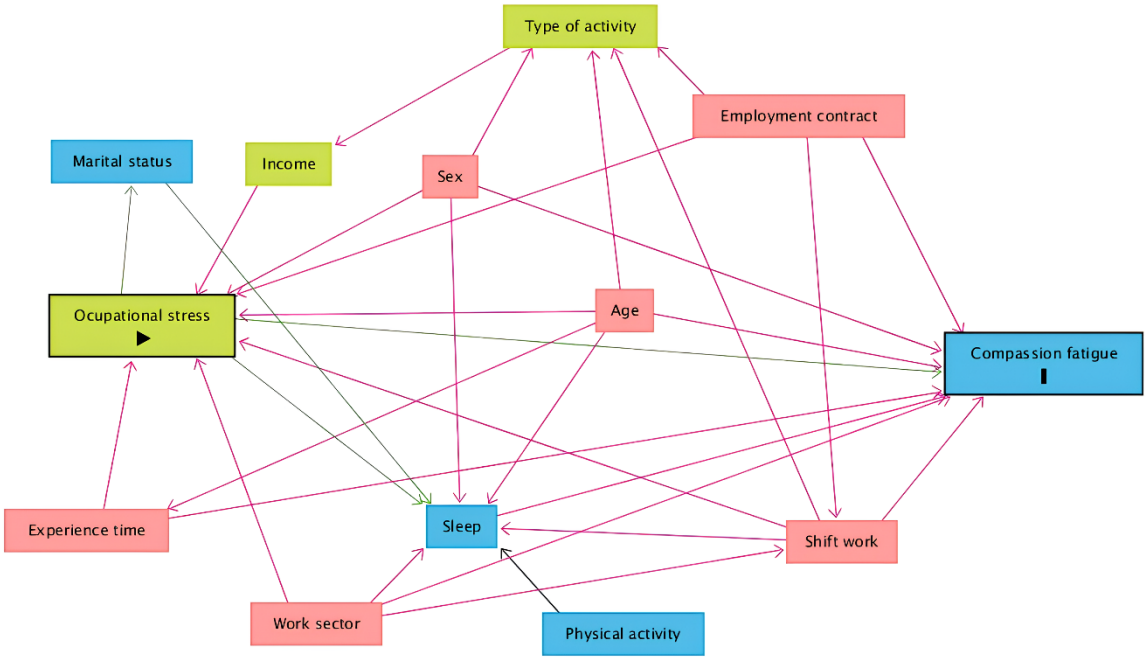

Figure 1. Causal diagram of variables related to occupational stress and compassion fatigue in hospital health professionals.

The analysis of the association between occupational stress and compassion fatigue revealed that a 10% increase in the occupational stress score was associated with a 33% higher likelihood of developing compassion fatigue (OR = 1.33; 95% CI: 1.05–1.68; p = 0.018). However, when occupational stress was categorized as a binary variable (present or absent), it was not significantly associated with compassion fatigue, in univariate (OR = 1.47; 95% CI: 0.55–3.95; p = 0.445) or multivariate (OR = 1.44; 95% CI: 0.42–4.99; p = 0.563) analyses (Table 2).

Table 2. Association between occupational stress and compassion fatigue among hospital nurses (n = 83). Rio Grande, RS, Brazil, 2019.

Explanatory Variable	Univariate Analysis		Multivariate Analysis	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Occupational stress (by decile)	1.22 (1.03–1.45)	0.027	1.33 (1.05–1.68)	0.018
Occupational stress (dichotomous)	1.47 (0.55–3.95)	0.445	1.44 (0.42–4.99)	0.563

Model adjusted for age, sex, employment status, professional experience, work shift, and work sector.

Table 3 shows how the interaction between occupational stress and several covariates influences the association with compassion fatigue. The findings suggest that this association is modified by demographic and behavioral variables, such as age, sex, income, employment status, shift, work sector, hours of sleep, and physical activity.

Age was a significant effect modifier, with a stronger association among professionals over 35 years old (OR = 1.45; 95% CI = 1.06–1.98; p = 0.018), while it was not significant among younger professionals (p = 0.097).

Sex also influenced the results, with a significant association only among women (OR = 1.51; 95% CI = 1.14–2.01; p = 0.004). Regarding income, professionals earning between 2 and 10 minimum wages showed a significant association (OR = 1.33; 95% CI = 1.04–1.70; p = 0.025).

Regarding employment status, the association was stronger among statutory workers (OR = 1.64; 95% CI = 1.17–2.31; p = 0.004). As for work shift, professionals working during the day (OR = 1.45; 95% CI = 1.08–1.95; p = 0.014) and those assigned to Intensive Care Units (OR = 1.62; 95% CI = 1.11–2.36; p = 0.012) also demonstrated significant associations.

Professionals who sleep less than 6 hours per night were more likely to develop compassion fatigue (OR = 1.88; 95% CI = 1.12–3.17; p = 0.017). Physical activity also showed a significant association between

those who practice it (OR = 1.29; 95% CI = 1.01–1.64; p = 0.041) and those who do not (OR = 1.45; 95% CI = 1.06–1.98; p = 0.019).

Table 3. Interaction between occupational stress and covariates in the association with compassion fatigue, among hospital nurses (n = 83).

Interaction	OR (95% CI)	p-value
Age		
< 35 years	1.25 (0.96-1.62)	0.097
≥ 35 years	1.45 (1.06-1.98)	**0.018**
Sex		
Male	1.03 (0.78-1.36)	0.845
Female	1.51 (1.14-2.01)	**0.004**
Family income (minimum wages)		
2–10	1.33 (1.04-1.70)	**0.025**
> 10	1.33 (1.00-1.79)	0.053
Type of employment		
Consolidation of Labor Laws	1.23 (0.97-1.56)	0.081
Public Servants' Statute	1.64 (1.17-2.31)	**0.004**
Length of professional experience		
< 10 years	1.45 (1.09-1.94)	**0.011**
≥ 10 years	1.24 (0.95-1.62)	0.113
Work shift		
Daytime	1.45 (1.08-1.95)	**0.014**
Night	1.20 (0.94-1.52)	0.140
Work sector		
Non-Intensive Care Units	1.26 (0.99-1.60)	0.059
Intensive Care Units	1.62 (1.11-2.36)	**0.012**
Daily hours of sleep		
≥ 6 hours	1.30 (1.02-1.66)	**0.038**
< 6 hours	1.88 (1.12-3.17)	**0.017**
Physical activity		
Yes	1.29 (1.01-1.64)	**0.041**
No	1.45 (1.06-1.98)	**0.019**

4. Discussion

This study showed that compassion fatigue is influenced by a complex interaction of individual and organizational factors. Occupational stress plays a central role in this dynamic. The prevalence of compassion fatigue (65.9%) and occupational stress (34.9%) among Brazilian nurses was significant. This prevalence is consistent with previous findings, which indicate the high vulnerability of these professionals to the psychosocial risks inherent in healthcare practice in hospital settings (Kwak et al. 2020; Lourenção et al. 2025a).

When compared to international studies, the levels identified in this research are higher than those reported in contexts such as Spain and Portugal, where the prevalence of compassion fatigue ranged from 40% to 55% (Borges et al. 2019; Garbin et al. 2022). This difference may be related to structural characteristics of the Brazilian healthcare system, such as precarious working conditions, insufficient professional development policies, and overload from multiple employment relationships (Ximenes Neto et al. 2022).

The high rate of compassion fatigue may partially reflect gaps in professional training. Health education in Brazil still chooses technical and procedural mastery over the development of social-emotional skills, including self-regulation and emotional intelligence (Lima and Tavares 2021). Without early education and recognition of personal stressors, future health professionals may enter the field unprepared to deal with such emotional burdens (Mathias and Wentzel 2017). The lack of methodologies that prepare nurses to manage ethical and emotional distress from graduation contributes to the vulnerability identified in this study (Powell et al. 2024).

Multivariate analysis showed that a 10% increase in occupational stress scores was associated with a 33% higher likelihood of developing compassion fatigue. This finding is clinically relevant, as it reinforces

that even modest increases in occupational stress may have substantial repercussions on the mental health and professional performance of nurses, increasing the risk of disengagement, absenteeism, and care errors (Garbin et al. 2022; Lutz et al. 2023).

The data suggest that chronic occupational stress and compassion fatigue work as predictors of turnover intention. Professionals experiencing high levels of exhaustion demonstrate a significant reduction in motivation and work performance, which may lead to the desire to abandon the unit or the profession (Wells-English et al. 2019; Rutledge et al. 2022). This phenomenon results in the loss of intellectual capital for the university hospital and increases instability within care teams.

These findings are consistent with previous research that exhibits the complex interplay between occupational stress and compassion fatigue. Recent data from a complementary study with the same nursing population identified that occupational stress not only increases the risk of compassion fatigue but also reduces key components of work engagement, particularly dedication and vigor (Lourenção et al. 2025b). Corroborating this perspective, recent evidence from the pandemic period indicates that nurses with higher levels of work engagement exhibited significantly lower indicators of compassion fatigue, highlighting engagement as a vital protective resource in high-pressure scenarios (Cunha et al. 2025). This highlights that occupational stress affects not only emotional well-being but also motivation and performance at work.

The relationship between occupational stress and compassion fatigue, confirmed in this study, is consistent with the theoretical framework that suggests a vicious cycle between exposure to work stressors and emotional exhaustion, leading to higher vulnerability to burnout and fatigue (Paschoal and Tamayo, 2004; Stamm 2010; Lago and Codo 2013). Additionally, interaction analyses revealed that this association is modulated by individual variables, such as sex, age, sleep quality, and physical activity, suggesting the need for personalized approaches to prevention and intervention.

Women and older professionals were more susceptible to compassion fatigue, in line with studies indicating higher exposure of these categories to traumatic situations and higher emotional burden in the hospital environment (Borges et al. 2019; Lourenção et al. 2025a). This vulnerability may also be related to sex inequality and the accumulation of family and work responsibilities, particularly in contexts shaped by neoliberal policies that exacerbate job insecurity (Ximenes Neto et al. 2022).

Sleep quality emerged as a significant moderating factor. Professionals who slept less than six hours per night had a higher risk of compassion fatigue, corroborating the literature that indicates sleep deprivation as one of the main negative determinants of mental health and healthcare quality (Wang et al. 2017). This finding reinforces the need for institutional policies that favor healthy practices, including the promotion of adequate sleep hygiene and the reduction of excessive working hours.

Similarly, regular physical activity emerged as a protective factor, as demonstrated by studies that associate physical activity with a reduced risk of burnout and compassion fatigue (Das and Adams 2021). However, long working hours and insufficient appropriate spaces in hospital environments may significantly limit adherence to these practices. This suggests the need for organizational strategies that encourage the physical and mental well-being of professionals, such as the creation of gyms or relaxation rooms (Kwak et al. 2020; Simão et al. 2024).

The high prevalence of Public Servants' Statute professionals (97.6%) suggests a sample with significant job stability. However, the data show that this legal stability does not prevent high levels of occupational stress. This indicates that structural overload and the intensity of hospital work are stressors that transcend the type of contract (Single Legal Regime or Consolidation of Labor Laws). Job security alone is insufficient to protect nurses from compassion fatigue in the absence of institutional emotional support programs (Zhang et al. 2018).

The practical implications of these findings are relevant for organizational management and the formulation of public policies. The implementation of continuous psychological support programs, the reorganization of working hours, and the promotion of breaks during shifts may mitigate the impact of occupational stress and reduce the incidence of compassion fatigue (Kelly 2020; Fox et al. 2022). The promotion of healthy organizational environments and the strengthening of policies that value nursing work are crucial to guarantee the sustainability of the health system, as staff turnover and sick leave represent high costs for institutions (Novaes Neto et al. 2020).

Additionally, structural interventions aimed at improving working conditions are important, especially in critical sectors such as intensive care units and emergency services, where emotional and physical overload tends to be higher (Fabri et al. 2021; Carvalho et al. 2023; Wolotira 2023). These interventions should address organizational aspects and the development of individual skills for coping with stress, promoting more resilient work environments that are better prepared to deal with future health emergencies.

One aspect that deserves consideration is the time interval between data collection (2019) and the present moment. The COVID-19 pandemic, which began shortly after the collection period, significantly transformed the occupational health scenario for nursing professionals, with a marked increase in levels of stress, burnout, and compassion fatigue (Pappa et al. 2020). Thus, although the presented results reflect the pre-pandemic reality, they indicate structural vulnerabilities that may have been exacerbated in the following years.

Recent findings reinforce that, even in the pre-pandemic context, the combined effects of occupational stress and compassion fatigue were associated with reduced work engagement among nurses. This suggests that the pandemic may have exacerbated an already critical scenario (Lourenção et al. 2025b).

The literature suggests promising intervention models to mitigate compassion fatigue. These models include Compassion Cultivation Training (CCT) and the Accelerated Recovery Program (ARP). ARP focuses on emotional regulation and strengthening resilience (D'Antoni et al. 2025; Rajeswari et al. 2020), and CCT is a training program that aims to cultivate compassion and empathy, taking a holistic approach to mental health (D'Antoni et al. 2025). The literature demonstrates that structured training in mindfulness and resilience has significantly contributed to professional satisfaction and to reducing burnout and secondary traumatic stress (D'Antoni et al. 2025). Similarly, ARP has presented positive results in reducing compassion fatigue symptoms and increasing job satisfaction among nurses in India, indicating that multifaceted educational programs are effective in this area (Rajeswari et al. 2020).

Additionally, institutional interventions that include clinical supervision and peer support groups have demonstrated higher sustainability (Pérez et al. 2022; Ong et al. 2024). These groups not only facilitate emotional support but also innovate in the addressed strategies and the formation of support networks among professionals. Institutions that implement support programs, such as support groups and education on compassion fatigue, show a significant reduction in levels of burnout and traumatic stress (Jais et al. 2021; Mamdani et al. 2023).

This study fills these gaps, which reinforces the link between professional well-being and the quality of care. As stated in the introduction, the social relevance of these findings lies in the fact that mitigating compassion fatigue among nurses has a direct impact on patient safety (Cho and Steege 2021). Therefore, the benefits of this research extend beyond the individuals, contributing to the sustainability of public health services and the effectiveness of care delivered to the population.

Although the present study provides important contributions by enhancing the understanding of the association between occupational stress and compassion fatigue in the Brazilian hospital context, some limitations should be considered. The cross-sectional nature of the design hinders the inference of causality, only allowing associations between the studied variables. Furthermore, this study did not consider personal stressors, such as chronic illness, bereavement, recent divorce, or other family crises (Dilmaghani et al. 2022; Li et al. 2022; Serrão et al. 2022). The literature demonstrates that such variables act as potent catalysts for compassion fatigue, reducing the professional's cognitive and emotional reserve to deal with patient suffering. The absence of these data limits a multifactorial understanding of the participants' emotional vulnerability.

The limited sample size and the study execution in a single hospital may limit the generalization of results. Such limitations are common in research in this area and should be regarded when interpreting the findings.

Conversely, the originality of this study stands out. It is one of the few empirical investigations to systematically explore this association in Brazilian nurses using regression models adjusted for multiple covariates. The use of validated instruments and a robust theoretical framework lends methodological rigor and scientific relevance to the research.

Public policies must be developed and strengthened to address the adverse working conditions faced by nurses. That is especially true in times of health crises, as evidenced by the COVID-19 pandemic, which exacerbated existing vulnerabilities in health systems and exposed professionals to unprecedented levels of stress (Fredericks et al. 2020). Future studies should prioritize longitudinal designs that capture the evolution of compassion fatigue over time and evaluate the effectiveness of organizational interventions in promoting occupational health and preventing psychosocial disorders.

In summary, the recommendations from this study go beyond nurses' benefits. They may also favor society as a whole, promoting a more efficient, safe, and humanized healthcare system.

5. Conclusions

This study demonstrated that occupational stress is a significant risk factor for the development of compassion fatigue among nurses working in hospital settings. The analysis indicated that higher levels of occupational stress are associated with a proportionally higher likelihood of compassion fatigue. This is more frequent in more vulnerable subgroups, such as female and older professionals, as well as those who reported fewer hours of sleep per day.

These findings reinforce the demand for structured interventions within the hospital environment to promote occupational health and prevent psychosocial disorders. Hospital managers should implement institutional policies that include continuous monitoring of occupational stress levels and compassion fatigue, the provision of psychological support programs, encouragement of regular physical activity, and adjustment of workloads to preserve well-being and the quality of care provision.

It is worth noting that the data were collected before the COVID-19 pandemic, a context that likely exacerbated stress factors and manifestations of compassion fatigue among nursing professionals worldwide. Although the findings reflect a pre-pandemic reality, they highlight pre-existing structural weaknesses that may have intensified, further emphasizing the urgency of effective actions in the field of occupational health.

Finally, future research should explore longitudinally the evolution of the relationship between occupational stress and compassion fatigue, particularly in the post-pandemic period. It should consider organizational interventions, contextual variables, and the effectiveness of occupational health promotion programs in hospital settings.

As part of the ethical commitment and social responsibility of this research, the findings have been shared with the hospital administration and professionals. The final publication will be distributed among the participants to subsidize institutional actions focused on preventing psychosocial risks.

Authors' Contributions: LOURENÇÃO, L.G.: conception and design; data acquisition, analysis, and interpretation; article drafting; final approval of the version for publication; PENHA, J.G.M.: conception and design; data acquisition; critical review of important intellectual content; final approval of the version for publication; GALVÃO,D.M.: critical review of important intellectual content; final approval of the version for publication; SILVA, F.G.: critical review of important intellectual content; final approval of the version for publication. XIMENES NETO, F.R.G.X.: critical review of important intellectual content; final approval of the version for publication; MENEZES-JUNIOR, L.A.A.: data analysis and interpretation; critical review of important intellectual content; final approval of the version for publication

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Ethics Approval: The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Ethics Committee of the Federal University of Rio Grande (Opinion No. 202/2018; CAAE: 3476218.2.0000.5324; Approval date: 15 September 2018).

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