

Contributions and Consequences of Organizational Factors in the Occupational Stress of Rescuers: Systematic Review

Sara Faria, Sílvia Monteiro Fonseca, António Marques, Cristina Queirós

¹ Center for Psychology, Faculty of Psychology and Education Sciences - University of Porto (FPCEUP), Portugal, Research Grant. 2022/15399/BD Maria de Sousa (FCT), Contact email: up201403461@edu.fpce.up.pt, ORCID: 0000-0002-1943-2255; ² FPCEUP, ORCID: 0000-0002-2720-6194; ³ School of Health, Polytechnic of Porto; ⁴ FPCEUP, ORCID: 0000-0002-8045-5317.

Abstract: Occupational stress affects various professions, including emergency professionals such as paramedics/pre-hospital emergency technicians, firefighters, nurses, and police officers. All these workers face demanding, unpredictable, and potentially traumatic events, being exposed to high stress levels. Understanding the organizational factors contributing to occupational stress and its consequences on health is crucial for developing effective interventions, using evidence-based strategies that mitigate stress and promote well-being. Through a systematic review, this study aims to identify the contributions and consequences of organizational factors in the occupational stress of rescue professionals, having identified 32 relevant studies using the PRISMA protocol. Results revealed the impact of culture and the lack of organizational support, as well leadership issues, poor communication, high workload, exposure to critical incidents/violence, and insufficient human/material resources. These factors often interacted and compounded one another, intensifying stress, and other psychological indicators, such as burnout. Most of the participants reported high levels of stress and/or psychological distress, underscoring the importance of fostering healthy working environments. Such environments are crucial for protecting the mental and physical health of these professionals, enabling them to perform their duties effectively. The findings will contribute to develop tailored programs addressing the needs and specificities of these professionals.

Keywords: occupational stress, rescuers, organizational factors, consequences on health, systematic review.

Contributos e Consequências dos Fatores Organizacionais no Stress Ocupacional dos Profissionais de Socorro: Revisão Sistemática

Resumo: O stress ocupacional afeta profissões variadas, incluindo os profissionais de socorro, como por exemplo técnicos de emergência pré-hospitalar, bombeiros, enfermeiros e polícias. Todos enfrentam eventos exigentes, imprevisíveis e potencialmente traumáticos, estando expostos a elevados níveis de stress. Compreender os fatores organizacionais que contribuem para o stress ocupacional e as suas consequências na saúde é crucial para desenvolver intervenções eficazes, recorrendo a estratégias baseadas em evidências que mitiguem o stress e promovam o bem-estar. Através de uma revisão sistemática pretendem-se identificar os contributos e consequências dos fatores organizacionais no stress ocupacional dos profissionais de socorro, tendo identificado 32 estudos com o protocolo PRISMA. Os resultados revelaram os contributos da cultura e falta de apoio organizacional, problemas na liderança, comunicação deficiente, elevada carga laboral, exposição a incidentes críticos/violência e falta de recursos humanos/materiais. Estes fatores frequentemente interagem e acumulam-se entre si, intensificando o stress e outros indicadores psicológicos como o *burnout*. A maioria dos participantes relatou elevados níveis de stress e/ou sofrimento psicológico, sendo crucial a existência de ambientes de trabalho saudáveis que protejam a saúde mental/física destes profissionais e lhes permita desempenhar as suas funções eficazmente. Os resultados encontrados permitirão desenvolver programas ajustados às necessidades e especificidades destes profissionais.

Palavras-chave: stress ocupacional, profissionais de socorro, fatores organizacionais, consequências para a saúde, revisão sistemática.

1. Background

The impact of psychological stress on the health of individuals is evident in various studies (e.g., Gradus, 2017; Kivimäki et al., 2022). Particularly, stress in organizations, also referred as occupational stress, has been a relevant study object for some decades, as evidenced by the study of Schuler in 1980. Although occupational stress is a pervasive issue affecting individuals in various professions, rescuers, including emergency responders, paramedics, firefighters, and police officers are particularly vulnerable to high levels of stress due to the nature of their work (e.g., Cubrich et al., 2022; Martínez & Blanch, 2024; Noureen et al., 2024; Soravia et al., 2021). The demanding, unpredictable and often traumatic nature of their work exposes them to high levels of stress, which can have detrimental effects on their health and well-being (Cordero, 2023; Naushad et al., 2019). Moreover, the pandemic COVID-19 increased their mental health problems at work (WHO, 2022), especially considering they have been at the frontline of the pandemic response, which heightened demands, and increased psychosocial risks/stressors in their daily tasks at work (e.g., Fonseca et al., 2022; Sousa et al., 2022). Furthermore, the urgency and unpredictability of their work have intensified, placing additional pressure on rescuers. Consequently, rescuers frequently encounter significant challenges that can contribute to occupational stress and have detrimental effects on their health and well-being as stress represents a significant risk factor for mental disorders (Teleanu et al., 2022).

According to the European Agency for Safety and Health at Work (EU-OSHA, n.d.), psychosocial risks in the workplace stem from deficiencies in design, organization, and work management. In any organization, regardless of its type, sector, or location, workers supervised by the organization are at risk of encountering psychosocial factors at work (Neto, 2015). Additionally, a problematic social work context can give rise to adverse psychological, physical, and social consequences, including stress, depression, and burnout. Examples of working conditions that lead to psychosocial risks are excessive workloads, conflicting demands with unclear role definitions, lack of involvement in decisions and lack of control over job performance, inadequately managed organizational changes, job insecurity, problems in communication, lack of support from managers and colleagues, harassment, and violence (EU-OSHA, 2022). At the individual level, stress at work, when chronic, can trigger serious problems for individual's physical and psychological health, potentially leading to burnout. At the organizational level, the adverse impacts of stress and psychosocial risks in the workplace can result in compromised organization performance, heightened rates of absenteeism (intentional absence of employees from their workplace, often resulting in missed working days), and presenteeism (employees attend work while unwell and are unable to function effectively), as well as an increased likelihood of accidents and injuries (EU-OSHA, 2022; Niedhammer et al., 2021).

Rescuers' well-being is not only crucial for the individuals themselves, but also for the effective delivery of emergency services and the overall safety of the community. Identifying and understanding the organizational factors that contribute to occupational stress among rescuers is crucial for developing targeted and effective interventions, as well evidence-based strategies to mitigate stress and promote well-being. This is particularly relevant as these rescuers were on the frontline during the combat against the COVID-19 pandemic and are now more susceptible to developing psychopathologies and psychological distress during and after this unprecedented crisis. Over recent years, there

has been a growing recognition of the significant impact that occupational stress can have on the physical and mental health of rescuers, as well as its implications for job performance and overall organizational effectiveness. However, the existing literature on this topic is fragmented, often lacks synthesis and, on a general note, mainly focuses on a particular group of rescuers. For example, the systematic review by Tejero and colleagues (2022), aimed to assess the personal and work-related factors influencing the stress levels of nurses during prehospital care; the systematic review and meta-analysis by Guilaran et al. (2018) focused on a broad range of disaster workers, but exclusively on understanding the extent of social support effectiveness on these groups. To the best of the authors' knowledge, this is the first systematic review conducted to explore the contributions and consequences of organizational factors in the occupational stress of rescuers, especially considering this group's extension to paramedics and other emergency personnel, such as nurses, firefighters, police forces and others. Therefore, a comprehensive synthesis of the existing literature is needed to consolidate the findings and identify potential gaps in the existing knowledge.

By synthesizing findings from diverse studies, and especially including all adverse psychological impacts in this review, the authors seek to provide valuable insights for both researchers and practitioners in the field of rescuers response management. Importantly, while this review represents a standalone effort to address an important gap in the literature, it also serves as a foundational component of an ongoing project aimed at developing an evidence-based intervention to mitigate occupational stress and promote the well-being of rescuers. Thus, this systematic review aims to identify the contributions and consequences of organizational factors in the occupational stress of rescue professionals, being the main aim of the current paper explore the answer to the research question: which organizational factors have been found to be associated with occupational stress in rescuers?

2. Methods

2.1. Study selection

In this study, the authors used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology. PRISMA is the gold standard of systematic reviews and meta-analysis as it provides a standardized framework for conducting systematic reviews, ensuring transparency, replicability, and methodological rigor throughout the review process. Its systematic approach to literature search, study selection, data extraction, and synthesis enhances the reliability and validity of the review findings. Moreover, we found that PRISMA is a methodology already used in systematic reviews about occupational stress (Agyemang et al., 2023; Mao, 2023; Montero-Tejero et al., 2024; Sriharan et al., 2020) and the psychological impact of disasters on rescuers (Mao et al., 2018). Thus, the adoption of PRISMA methodology aligns with the goal of conducting a rigorous and transparent systematic review to advance understanding of the organizational factors contributing to occupational stress among rescuers.

Considering the use of PRISMA protocol, we use the following inclusion criteria and only included studies which were: quantitative and qualitative research; published in peer-reviewed journals and indexed in scientific journals; published in English, Portuguese, Spanish or Catalanian, French or Italian; and reported on occupational factors determining any outcomes related to psychological wellbeing in any occupational groups pertaining

rescuers. For the review, a list of relevant terms was composed, and the full search equation strategy can be seen in Table 1.

Table 1. Research protocol and search equation strategy

Subject	Organizational factors that contribute to occupational stress and their consequences on rescuers' health
Time period	1 st January 1989 to 30 th June 2023
Databases	EBSCOhost (including PubMed, PsycINFO, Web of Science)
Search criteria	English, Portuguese, Spanish or Catalanian, French, Italian languages; title, abstract, keywords OR all; published in peer-reviewed journals; indexed in scientific journals
Subject areas	Social Sciences, Work Environment, Health, Psychology, Business, Management and Accounting, Work and Psychology
Search query and equation	= (("organizational factors" OR "work environment" OR "workplace factors") AND ("Occupational health" OR "organizational stressors" OR "Work-related health" OR "Workplace health" OR "occupational stress" OR "job stress") AND ("rescuer*" OR "police*" OR "paramedic*" OR "first responder*" OR "nurse*" OR "doctor*" OR "firefighter*") AND ("health outcomes" OR "health consequences" OR "health impacts" OR "health effects")). = (("organizational factors" OR "work environment" OR "workplace factors") AND ("Occupational health" OR "occupational stress" OR "job stress") AND ("rescuer*" OR "police*" OR "paramedic*" OR "first responder*" OR "nurse*" OR "doctor*" OR "firefighter*") AND ("health outcomes" OR "health consequences" OR "health impacts" OR "health effects")). = (("organizational factors") AND ("Occupational health" OR "occupational stress" OR "job stress") AND ("rescuer*") AND ("health outcomes" OR "health consequences" OR "health impacts" OR "health effects")).

2.2. Procedures of the review

In July 2023, a literature search using EBSCOhost® (including PubMed, PsycINFO, and Web of Science databases) was conducted (Figure 1). Duplicate citations were subsequently removed following the screening of titles for relevance. After this, all the abstracts of the remaining articles were screened and evaluated for their relevance to the review, and any that were deemed irrelevant were excluded.

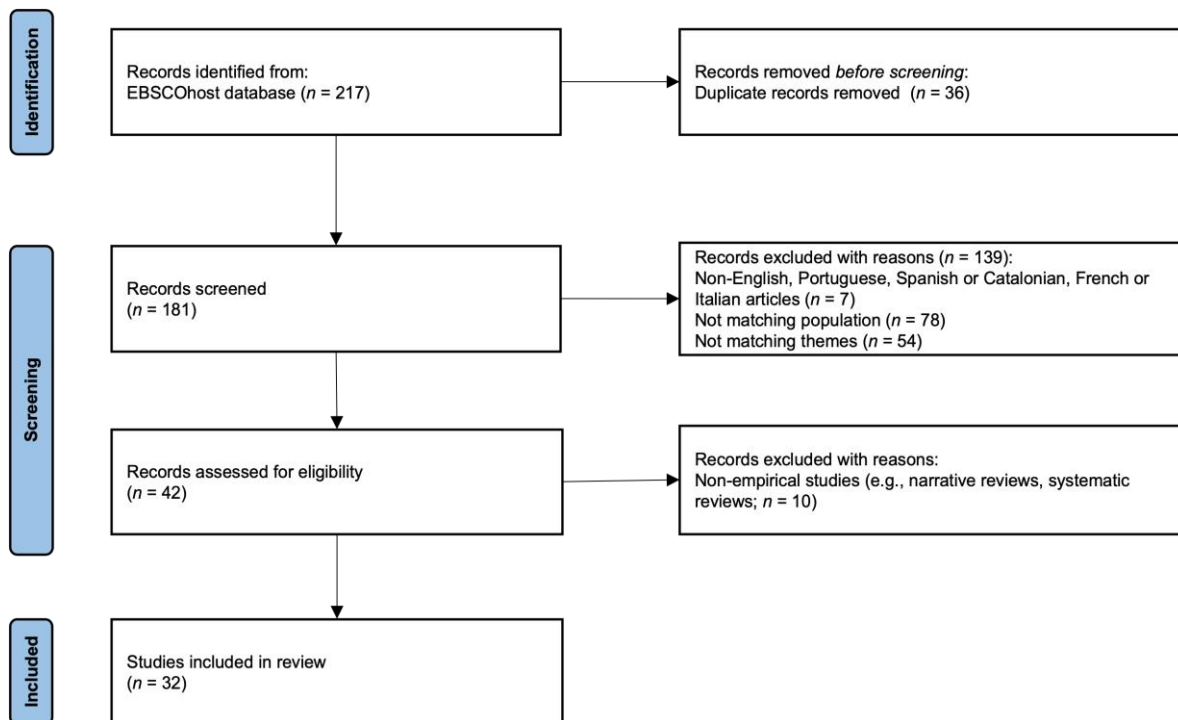


Figure 1. Prisma diagram used in the search

The full text of the remaining articles was then obtained and read in its entirety. If the articles did not align with the theme's relevancy following the inclusion criteria, namely reporting on occupational factors determining any outcomes related to psychological wellbeing in any occupational groups pertaining rescuers, they were excluded. The search was dynamic, as authors also sought studies that might have been overlooked but were relevant to the initial searches, considering the list of references of key articles.

2.3. Data extraction, quality appraisal and data synthesis

Details from relevant studies which were extracted included: authors last name and year of publication; sample size, design, and country of study; occupation, instruments, organizational factors; aims and main findings; and mental health outcomes/psychological impact.

Was assessed the quality of studies across four key domains: theoretical or conceptual framework, study design, data collection and methodology, analysis and interpretation of results (Table 2). To achieve this, we used a quality appraisal tool which was informed by the existing quality appraisal tools of Brooks et al. (2016) and QuADS by Harrison and colleagues (2021). Each study received an overall score, expressed as a percentage, derived from the number of positive responses ("yes") to the assessment questions.

Was employed thematic analysis to categorize predictive elements into a typology. For this qualitative analysis, authors adhered to the standard scientific guidelines for qualitative research (Patton, 1999). After coding all the relevant phrases, sentences, and paragraphs, a list of codes was created based on the research question. These codes were then refined into categories, forming broader themes that described relationships among the categories and composed key elements of the organizational factors contributing to occupational stress and their consequences on rescuers' health. Themes considered valid were those identified by a minimum of two studies.

Table 2. Quality appraisal score of the studies (Total score: 88.6%)

Author(s)	Theoretical or conceptual framework	Study design			Data collection and methodology			Analysis and interpretation of results				Score (%)*
		Statement of research aims	All subjects recruited from the same or similar populations and same time period	Definition of size and study population	Rationale for choice of data collection tools	The data collected addressed the research aims	Description of data collection procedure	Answer to the study question provided	Evidence that the research stakeholders was considered in research design	Findings related to previous research	Conclusions follow from the data reported	
Raper et al., 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
Kaushik et al., 2021	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	72.7
Cranage, & Foster, 2022	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
Antoniolli et al., 2021	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	72.7
Pelegri et al., 2018	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	90.9
Silva et al., 2015	Yes	Yes	No	Yes	No	Yes	No	Yes	No	No	Yes	54.5
Alomari et al., 2021	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
Singh, & Kar, 2015	Yes	Yes	Not reported	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	81.8
Rainbow et al., 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
Sabone et al., 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
Habersaat et al., 2015	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	81.8
Zhang et al., 2017	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	90.9
Hayward et al., 2016	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	90.9
von Treuer et al., 2014	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	81.8
Martinussen et al., 2007	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	81.8
Setti et al., 2016	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	81.8
Koeppel et al., 2022	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	81.8
Sliter et al., 2014	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	90.9
Hansen et al., 2012	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
McTiernan, & McDonald, 2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
Leineweber et al., 2014	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	90.9
Flynn et al., 2009	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	90.9
Kwak et al., 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	90.9
Nourry et al., 2014	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	90.9
LaRocco et al., 1989	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	90.9
Adriaenssens et al., 2011	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	90.9
Alameddine et al., 2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	90.9
Taylor, & Barling, 2004	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
Budge et al., 2003	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	90.9
Verhaeghe et al., 2006	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	90.9
Boudrias et al., 2020	Yes	Yes	Not reported	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	81.8
Tyagi, & Dhar, 2014	Yes	Yes	Not reported	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	81.8

Legend: * The scoring of each study was determined by calculating a percentage based on the number of affirmative responses ("yes") to the questions.

3. Results and Discussion

A total of 32 studies met the inclusion criteria and were included in the review, being the majority ($n = 25$) cross-sectional (see annex 1 for a detailed summary).

Regarding the sample size, it varied from 12 to 11015. The studies were conducted on Australia ($n = 5$), Brazil ($n = 3$), United States of America ($n = 3$), India ($n = 3$), Canada ($n = 1$), Lebanon ($n = 1$), New Zealand ($n = 1$), Belgium ($n = 1$), Italy ($n = 1$), France ($n = 1$), Korea ($n = 1$), Sweden ($n = 1$), Ireland ($n = 1$), Denmark ($n = 1$), Norway ($n = 1$), Switzerland ($n = 1$), and Botswana ($n = 1$), although 5 studies did not report the country (Figure 2). No studies were conducted in Portugal.

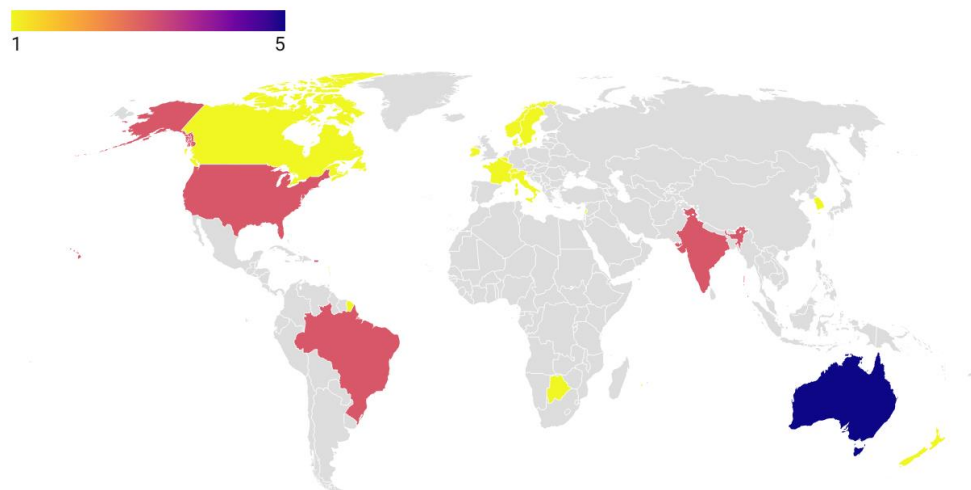


Figure 2. Frequency of studies according to country

Considering occupations of rescuers (Figure 3), nurses were referred in 23 studies (55%), followed by police officers (17% $n=7$), firefighters (9% $n=4$) and paramedics (7% $n=3$). Other occupations were also recorded when they were used in comparison with at least one of the aforementioned groups.

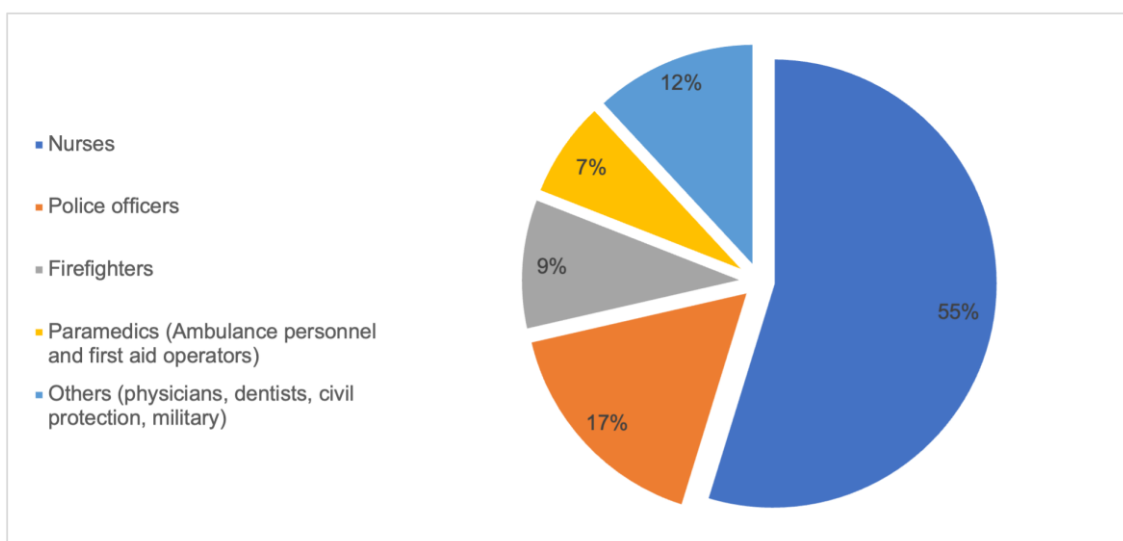


Figure 3. Percentage of rescuers main occupations (some studies consisted of more than one occupation)

The overall quality appraisal of each study was high (mean= 88.6% range between 54.5 to 100%; Table 2). Most studies received high scores for their design. However, common design errors included the omission of information regarding the selection and recruitment of participants from the same or similar populations within the same time period. Similarly, while most studies were highly rated for their data collection and methodology, a few studies lacked a clear rationale for selecting specific data collection tools and provided incomplete descriptions of the data collection procedures. Regarding the analysis and interpretation of results, the majority of studies achieved high scores. However, a significant number of studies did not report any evidence indicating that the perspectives and needs of the research stakeholders were considered during the research design or implementation phases. Regarding the quality appraisal of the article, the most significant flaw identified in articles, in general, pertained to the field related to presenting evidence that research stakeholders were considered in research design or conduct. While some articles in this review did not address this aspect, it is important to note that there is a growing recognition of the importance of stakeholder engagement in research. Efforts are being made to promote inclusivity in the research process, but authors and researchers often face challenges such as time constraints related to funding, publication processes, resource challenges, and others. Citizen science is a field that addresses these concerns, gaining more visibility in literature and science fields in recent years (Wiggins & Wilbanks, 2019). This aspect can also contribute to understanding the results of this study, given that the mean publication year of the included studies is 2012.

For the literature review, five relevant themes emerged related with organizational factors for rescuers' work: workload and job demands; exposure to critical incidents and violence; organizational culture and support; job roles; and resources (Table 3). Each theme was discussed with examples from the literature, and a summary of the key findings from each study was included within the aforementioned themes, and, when applicable, the mental health outcomes and psychological impact was discussed.

Table 3. Distribution of themes according to the studies

Author(s)	Organizational culture and support	Workload and job demands	Exposure to critical incidents and violence	Job roles	Resources
Raper et al., 2020	•	•			•
Kaushik et al., 2021	•	•	•	•	•
Cranage, & Foster, 2022	•		•		•
Antoniolli et al., 2021		•			
Pelegri et al., 2018	•	•		•	•
Silva et al., 2015			•		
Alomari et al., 2021	•	•	•		
Singh, & Kar, 2015	•	•	•	•	
Rainbow et al., 2020	•				
Sabone et al., 2020	•			•	•
Habersaat et al., 2015				•	
Zhang et al., 2017	•	•			
Hayward et al., 2016	•	•			
von Treuer et al., 2014	•	•			
Martinussen et al., 2007	•	•			•
Setti et al., 2016	•				
Koeppel et al., 2022			•		
Sliter et al., 2014			•		
Hansen et al., 2012	•				
McTiernan, & McDonald, 2015	•	•			•
Leineweber et al., 2014	•				
Flynn et al., 2009	•	•			
Kwak et al., 2020			•		
Nourry et al., 2014	•			•	
LaRocco et al., 1989	•				
Adriaenssens et al., 2011	•	•		•	•
Alameddine et al., 2015			•		
Taylor, & Barling, 2004	•	•	•		•
Budge et al., 2003	•				
Verhaeghe et al., 2006	•				
Boudrias et al., 2020		•			
Tyagi, & Dhar, 2014	•	•			

Organizational culture and support

The findings from the included studies consistently highlighted the significant impact of organizational culture and support on rescuers' psychological health, with this theme being the most frequently referenced. A positive and supportive organizational culture was associated with better psychological well-being among rescuers (Budge et al., 2003; Hansen et al., 2012; LaRocco et al., 1989; McTiernan, & McDonald, 2015; Raper et al., 2020; von Treuer et al., 2014). Organizations that fostered open communication, cohesion, affective commitment or a sense of companionship and involvement among the collaborators were linked to lower levels of psychological distress, stress and burnout (Kaushik et al., 2021; Martinussen et al., 2007; Rainbow et al., 2020; Setti et al., 2016; von Treuer et al., 2014). Decision authority, skill discretion, adequate work procedures, perceived reward, and social support from supervisors proved to be strong determinants of job satisfaction, work engagement, and lower turnover intention in emergency nurses (Adriaenssens et al., 2011). This appears to be particularly true for night shift workers (von Treuer et al., 2014). Rescuers working in such environments reported higher levels of job satisfaction and a greater sense of purpose in their roles (Hansen et al., 2012; von Treuer et al., 2014). It was also found that strategic alignment reduces psychological strain on police officers (Raper et al., 2020). However, on nurses, the occurrence of practical restructuring or recurrent changes appears to be associated with negative psychological

outcomes as depressive symptoms and decrease job satisfaction and eustress (Budge et al., 2003; Nourry et al., 2014; Verhaeghe et al., 2006). Conversely, negative organizational cultures as well as organizational structure, characterized by poor communication, limited leadership support, team conflicts, overall lack of support, and inadequate recognition of rescuers' efforts, were associated with elevated levels of stress, anxiety, and burnout (Flynn et al., 2009; Kaushik et al., 2021; Martinussen et al., 2007; Singh, & Kar, 2015; Taylor, & Barling, 2004; Tyagi, & Dhar, 2014) and often lead to intention to quit their jobs (Flynn et al., 2009; Hayward et al., 2016; Martinussen et al., 2007) and sickness presenteeism (Rainbow et al., 2020). Also, the presence of comprehensive support systems within organizations emerged as an important factor influencing psychological health outcomes among rescuers.

Moreover, the findings demonstrated that perceived social support from coworkers and supervisors acted as a buffer against psychological distress. This contributes to the discussion regarding whether social support can contribute to lower stress levels, as the latter was presented in a study by Ganster and colleagues (1986). In this study, rescuers who felt supported and understood by their colleagues and supervisors reported lower levels of emotional exhaustion and greater psychological resilience when they face challenging situations (Adriaenssens et al., 2011; Martinussen et al., 2007; Setti et al., 2016; Tyagi, & Dhar, 2014; von Treuer et al., 2014). This highlights the positive role that social support plays for rescuers. It is noteworthy that the role of social support is also presented in the literature in relation to lower negative organizational outcomes like turnover and as a buffer to work stress, as demonstrated in the study by Kim and Stoner (2008) with social workers.

Work-family conflict was also highlighted in some of the studies as a stressor factor (Leineweber et al., 2014), and it was pointed as an important predictor of burnout (Martinussen et al., 2007). Moreover, work interference with family is affected by working conditions, that can be associated with decision authority (Zhang et al., 2017).

Workload and job demands

The findings from the included studies consistently revealed a substantial relationship between workload and the related job demands and the psychological health outcomes of rescuers. High workload and high job demands were associated with an increased risk of adverse psychological consequences (Adriaenssens et al., 2011; Alomari et al., 2021; Martinussen et al., 2007; McTiernan, & McDonald, 2015; Singh, & Kar, 2015). Excessive workload, characterized by high task demands and long working hours, emerged as a key contributor to psychological distress among rescuers. Those exposed to heavy workloads reported higher levels of emotional exhaustion, anxiety, stress, and overall burnout (McTiernan, & McDonald, 2015; Singh, & Kar, 2015; Taylor, & Barling, 2004; Tyagi, & Dhar, 2014; von Treuer et al., 2014). For nurses, heavy workloads are often associated with prejudicing quality care of the patient, as nurses left undone nursing tasks and have interruptions during their work (Alomari et al., 2021; Flynn et al., 2009). Shift work, common among rescuers, introduced additional complexities to workload and job demands. Irregular and or night work schedules often lead to sleep disturbances and fatigue which compromised psychological well-being (Antoniolli et al., 2021; Gifkins et al., 2020; von Treuer et al., 2014). These findings have been supported by other studies that reported workload as a major source of stress in nursing (Adeb-Saeedi, 2002; Jäppinen et al., 2022; Tyler, & Cushway, 1992). Nevertheless, the study by Antoniolli and colleagues

(2021) in nurses showed that better coping strategies contribute to a lower occurrence of the negative effects of shift work on health, including cognitive functions, sleep, eating and gastric habits, and stress. This is not new, as the study of Tyler and Cushway already in 1992 showed that negative mental health outcomes were mainly predicted by nurses' perceptions of excessive workload and their adoption of avoidance coping strategies. Workload, associated with other organizational factors and job demands, can also lead to turnover or intention to quit the job (Boudrias et al., 2020; Flynn et al., 2009; Hayward et al., 2016). These results underscore the importance for organizations to meticulously oversee and address workload and job demands, particularly in the context of the distinctive challenges encountered by rescuers.

Exposure to critical incidents and violence

On their duty, rescuers frequently encountered traumatic and distressing events as part of their roles. The studies showed an association between exposure to critical incidents and/or violence and rescuers' psychological health outcomes. For nurses, findings indicated that situations that arise from dealing with patients and their families are characterized as one of the most stressful situations on their job, specifically the situations where the nurses must deal with violent or abusive patients/families (Alomari et al., 2021). For example, the study by Edward and colleagues (2014), have showed that violence and abuse by patients or families were a major factor for stress in nurses. For nurses, this violence in the workplace often led to burnout, depressive symptoms, as well as anxiety and post-traumatic stress (Alameddine et al., 2015; Kwak et al., 2020; Sliter et al., 2014; Taylor, & Barling, 2004). For firefighters, the study of Koepfel and colleagues (2022) showed that women who experienced harassment or discrimination reported 40% more poor health, were 300% more likely to experience depressive symptoms, had higher levels of anxiety, and were 150% more likely to meet the threshold for post-traumatic stress. The exposure to critical incidents, such as accidents, suicides, death, natural disasters, bullying, moral harassment and violent situations, was closely linked to the development of stress among rescuers contributing to impaired well-being (Alameddine et al., 2015; Cranage, & Foster, 2022; Kwak et al., 2020; Sliter et al., 2014; Silva et al., 2015; Taylor, & Barling, 2004).

Overall, the findings underscored the substantial impact of exposure to critical incidents and violence on the psychological health outcomes of rescuers, which was also the most reported psychosocial risk factor in the workplace according to the European Survey of Enterprise on New and Emerging Risks (ESENER) from EU-OSHA (2022). The heightened risk of post-traumatic stress symptoms, depression, anxiety, and burnout highlights the importance of providing comprehensive support systems and interventions to mitigate the adverse psychological consequences of exposure. In fact, rescuers' psychological well-being is intricately linked to their exposure to traumatic events and violence. Thus, it is needed organizational efforts to address these challenges and promote effective coping strategies among rescuers. As other studies have shown, and especially for nurses, violence prevention interventions are particularly important for nurses due to the relatively common occurrence of violence in their workplace (e.g., Aljohani et al., 2021; Lanctôt, & Guay, 2014).

Job roles

Among the rescuer population, specifically nurses, police officers, firefighters, and paramedics, it is important to consider variations within their job roles. These differences contribute to varying perceptions regarding organizational factors and their corresponding outcomes.

For nurses, some differences were found. The study by Kaushik and colleagues (2021) revealed variations between nurses working in different department sectors. Stress among intensive care nurses was attributed to inadequate salary, while stress among non-intensive care nurses was linked to conflicts with patients, non-availability of drugs, or lack of equipment. Private sector nurses, characterized by higher anxiety levels, lower job satisfaction, and increased job stress, experienced conflicts with doctors or patients. In private hospital settings, work affected relationships with family or friends. Finally, for nurses in the public sector, stress primarily stemmed from the fear of acquiring infectious diseases. Additionally, the study by Nourry and colleagues (2014) found that nurse managers working in emergency and intensive care units or operating theatres exhibited more depressive symptoms compared to those working in hospitalization units. Adriaenssens and others (2011) discovered that emergency nurses reported more time pressure and physical demands, lower decision authority, less adequate work procedures and reward than a general hospital nursing population. However, they reported more opportunities for skill discretion and better social support from colleagues. These differences in job stress among nurses working in different department sectors were also found by other studies, namely the study of Aljohani and colleagues (2021), which discovered that occupational stress was generally higher among emergency department nurses than in non-emergency department nurses. It is important to notice that entities such as EU-OSHA (2022) and EUROFOUD (2020) also reported that in health and social care sectors, the majority of the workforce are women. The study by Najimi et al. (2012) found that the most important job stress aspects in female nurses were the range of roles (48.4%), role duality (40.9%), and job environment (39.6%). Although the present study did not explore differences according to gender in rescue jobs, this aspect may be important in understanding potential nuances between genders and the reasons behind them. Such insights could contribute to a better understanding of the importance of different organizational factors based on gender.

For police officers, the study from Singh and Kar (2015), presented that although occupational stress was perceived among all police personnel, the major sources of stress for the inspectors were work overload, organizational structure, inter-personal, private and personal stressors; for officers it was managing people and ambiguity of roles and also overload, organizational structure and role conflict; for constables, who had lesser overall stress, it was environmental stress, traveling away from the organization and work overload. Also, the study from Habersaat and colleagues (2015), found that emergency officers reported fewer physical symptoms, while community officers reported more posttraumatic stress symptoms and criminal officers perceived more stress. This suggests that within specific rescuer groups, interventions may be needed to be tailored according to the predominant stressors found in particular subgroups with different job roles.

For paramedics and firefighters, this difference was not explored in the presented studies, which warns that more studies on the psychological impact of these professionals are needed.

Resources

Adequate resources, both tangible and intangible, played an important role in shaping the mental well-being of these professionals. For nurses, having adequate work procedures and perceived reward predicted job satisfaction, work engagement and turnover intention (Adriaenssens et al., 2011). Conversely, the lack of resources, especially staffing shortage and inadequate resources and services, contributed to the psychological distress of rescuers (McTiernan, & McDonald, 2015; Taylor, & Barling, 2004) and was considered by nurses as a main impediment to high-quality work (Sabone et al., 2020). The appropriate staffing can reduce the burden on individual rescuers, allowing them to manage their tasks more effectively and mitigating feelings of being overwhelmed, being also closely related with workload (EU-OSHA, 2014; Yu et al., 2019). For police officers, the study by Pelegrini and colleagues (2018) indicated that they had a worse perception related to remuneration and benefits. Having an adequate physical environment was also important for rescuers (Pelegrini et al., 2018; Taylor & Barling, 2004). Studies indicated that access to psychological support services, peer support programs, and debriefing sessions, especially following critical incidents, played a crucial role in mitigating the impact of traumatic events on rescuers' mental well-being (Alomari et al., 2021).

4. Conclusion

Organizational factors play a pivotal role in shaping the work environment and can significantly impact stress levels experienced by rescuers. In this study, the main organizational factors evidenced in the literature as triggers for occupational stress among rescue professionals were culture and lack of organizational support, leadership problems, poor communication, high workload and job demands, exposure to critical incidents/violence, job roles, and lack of human and/or material resources.

The studies showed that rescuers are already experiencing high levels of stress and psychological distress, and the consequences of occupational stress on rescuers' health were multifaceted. Prolonged exposure to high stress levels was associated with burnout and rescuers also faced an increased risk of developing mental health disorders (Zhang et al., 2017), although some coping strategies appeared to minimize some of them (McTiernan, & McDonald, 2015). Effectively, and because of the nature of their work, rescuers experience an increased risk of developing mental health disorders, including post-traumatic stress disorder (PTSD), depression, and anxiety (e.g., Martínez, & Blanch, 2024; Soravia et al., 2021), and their work faced even more challenges that predisposed them to psychological distress after the COVID-19 pandemic (Awan et al., 2022; Sheraton et al., 2020; Stodolska et al., 2023).

The results underscore the importance of creating supportive work environments that address workload demands, provide job control, foster positive interpersonal relationships, offer resources and support, and promote work-life balance (e.g., Martinussen et al., 2007). The identified factors shed light on potential targets for intervention and policy development aimed at reducing stress and promoting the well-being of rescuers. Effective strategies may involve implementing workload management measures, improving organizational leadership and communication, providing adequate resources and support, and implementing comprehensive debriefing and psychological support programs. Violence-based interventions are particularly important for nurses due to the relatively common occurrence of violence in their workplace (e.g., Cranage, & Foster, 2022).

Intervention strategies targeting these organizational factors can potentially reduce stress levels and promote the overall well-being of rescuers.

Some limitations of the reviewed studies should be acknowledged, like most of the included studies being cross-sectional in nature, limiting the ability to establish causal relationships, and longitudinal research designs are needed to better understand these complex relations and bidirectional relationships. Also, there was considerable heterogeneity in the measurement tools used across the studies, making it challenging to compare findings across different studies. Third, the studies predominantly focused on specific types of rescuers, such as nurses and police officers, which may limit the generalizability of the findings to other types of rescuers or occupations.

Thus, future research should employ longitudinal designs to further elucidate the complex relationships between organizational factors, occupational stress, and health outcomes among rescuers, considering the recent psychological impact of the COVID-19 pandemic. Future research should strive for standardized measurement approaches to enhance comparability and generalizability. Also, the implementation of resilience programs and resilience-building strategies for mental health nurses at the individual, work unit, and organizational levels is needed. This research can also help in understanding the heterogeneity of organizational stressors according to different occupations but also their common points, which can aid in tailoring interventions accordingly although, as the research points out, more research is needed on other rescuers, such as firefighters and paramedics.

5. References (* references obtained from the systematic review of the literature)

- Agyemang, G., Bema, Y., Eturu, D., Bawontuo, V., & Kuupiel, D. (2023). Occupational stress and burnout experience among healthcare workers compounded by the COVID-19 pandemic in Africa: a scoping review protocol. *Systematic Reviews*, 12(1), 1-5. <https://doi.org/10.1186/s13643-023-02200-w>
- Adeb-Saeedi, J. (2002). Stress amongst emergency nurses. *Australian Emergency Nursing Journal*, 5(2), 19–24. [https://doi.org/10.1016/s1328-2743\(02\)80015-3](https://doi.org/10.1016/s1328-2743(02)80015-3)
- *Adriaenssens, J., Gucht, V., van der Doef, M., & Maes, S. (2011). Exploring the burden of emergency care: Predictors of stress-health outcomes in emergency nurses. *Journal of Advanced Nursing*, 67(6), 1317–1328. <https://doi.org/10.1111/j.1365-2648.2010.05599.x>
- *Alameddine, M., Mourad, Y., & Dimassi, H. (2015). A national study on nurses' exposure to occupational violence in Lebanon: Prevalence, consequences and associated factors. *PLoS ONE*, 10(9), Article e0137105. <https://doi.org/10.1371/journal.pone.0137105>
- Aljohani, B., Burkholder, J., Tran, K., Chen, C., Beisenova, K., & Pourmand, A. (2021). Workplace violence in the emergency department: a systematic review and meta-analysis. *Public Health*, 196, 186–197. <https://doi.org/10.1016/j.puhe.2021.02.009>
- *Alomari, A., Collison, J., Hunt, L., & Wilson, N. (2021). Stressors for emergency department nurses: Insights from a cross-sectional survey. *Journal of Clinical Nursing*, 30(7–8), 975–985. <https://doi.org/10.1111/jocn.15641>
- *Antoniolli, L., Cócaro de Souza, S. B., Teixeira Macedo, A. B., Dal Pai, D., Müller de Magalhães, A. M., & Bosi de Souza Magnago, T. S. (2021). efeitos do trabalho em turnos e coping em profissionais de enfermagem hospitalar. *Revista Cuidarte*, 12(2), 1–12. <https://doi.org/10.15649/cuidarte.1169>
- Awan, S., Diwan, M., Aamir, A., Allahuddin, Z., Irfan, M., Carano, A., Vellante, F., Ventriglio, A., Fornaro, M., Valchera, A., Pettoruso, M., Martinotti, G., Di Giannantonio, M., Ullah, I., & De

- Berardis, D. (2022). Suicide in Healthcare Workers: Determinants, Challenges, and the Impact of COVID-19. *Frontiers in Psychiatry*, 12, Article 792925. <https://doi.org/10.3389/fpsy.2021.792925>
- *Boudrias, V., Trépanier, S. G., Foucreault, A., Peterson, C., & Fernet, C. (2020). Investigating the role of psychological need satisfaction as a moderator in the relationship between job demands and turnover intention among nurses. *Employee Relations*, 42(1), 213–231. <https://doi.org/10.1108/ER-10-2018-0277>
- Brooks, S., Dunn, R., Amlôt, R., Greenberg, N., & Rubin, G. (2016). Social and occupational factors associated with psychological distress and disorder among disaster responders: a systematic review. *BMC Psychology*, 4(1), 1-13. <https://doi.org/10.1186/s40359-016-0120-9>
- *Budge, C., Carryer, J., & Wood, S. (2003). Health correlates of autonomy, control and professional relationships in the nursing work environment. *Journal of Advanced Nursing*, 42(3), 260–268. <https://doi.org/10.1046/j.1365-2648.2003.02615.x>
- Cordero, A.D. (2023). Rescuing the Rescuers: the essential role of recognition for the mental health of emergency rescuers. *Annals of Work Exposures and Health*, 67(9), 1125–1126. <https://doi.org/10.1093/annweh/wxad061>
- *Cranage, K., & Foster, K. (2022). Mental health nurses' experience of challenging workplace situations: A qualitative descriptive study. *International Journal of Mental Health Nursing*, 31(3), 665–676. <https://doi.org/10.1111/inm.12986>
- Cubrich, M., Sodhi, K., Petruzzelli, A., & Doverspike, D. (2022). Who rescues the rescuers? Multilevel challenges facing first responder organizations. In Svyantek, D. (Ed.), *Crisis and Chaos and Organizations: The Coronavirus and Lessons for Organizational Theory* (pp. 65-96). Information Age Publishing.
- Edward, K., Ousey, K., Warelow, P., & Lui, S. (2014). Nursing and aggression in the workplace: a systematic review. *British Journal of Nursing*, 23(12), 653–659. <https://doi.org/10.12968/bjon.2014.23.12.653>
- EU-OSHA - European Agency for Safety and Health at Work (2014). *Calculating the cost of work-related stress and psychosocial risks: European Risk Observatory – Literature Review*. Publications Office of the European Union. <https://op.europa.eu/en/publication-detail/-/publication/c8328fa1-519b-4f29-aa7b-fd80cffc18cb>
- EU-OSHA (2022). *Human health and social work activities– evidence from the European Survey of Enterprise on New and Emerging Risks (ESENER)*. Publications Office of the European Union. <https://osha.europa.eu/en/publications/human-health-and-social-work-activities-evidence-european-survey-enterprises-new-and-emerging-risks-esener>
- EU-OSHA (n.d.). *Psychosocial risks and mental health*. <https://osha.europa.eu/en/themes/psychosocial-risks-and-mental-health>
- *Flynn, L., Thomas-Hawkins, C., & Clarke, S. (2009). Organizational traits, care processes, and burnout among chronic hemodialysis nurses. *Western Journal of Nursing Research*, 31(5), 569–582. <https://doi.org/10.1177/0193945909331430>
- Fonseca, S.M., Cunha, S., Campos, R., Faria, S., Silva, M., Ramos, M.J., Azevedo, G., Barbosa, A. R., & Queirós, C. (2022). Medical rescuers' occupational health during COVID-19: Contribution of coping and emotion regulation on burnout, trauma and post-traumatic growth. *Análise Psicológica*, 40(1), 1–13. <https://doi.org/10.14417/ap.1868>
- Ganster, D., Fusilier, M., & Mayes, B. (1986). Role of social support in the experience of stress at work. *Journal of Applied Psychology*, 71(1), 102–110. <https://doi.org/10.1037/0021-9010.71.1.102>
- Gradus, J. (2017). Prevalence and prognosis of stress disorders: a review of the epidemiologic literature. *Clinical Epidemiology*, 9, 251–260. <https://doi.org/10.2147/CLEP.S106250>
- Guilarn, J., de Terte, I., Kaniasty, K., & Stephens, C. (2018). Psychological outcomes in disaster responders: a systematic review and meta-analysis on the effect of social support. *International Journal of Disaster Risk Science*, 9(3), 344–358. <https://doi.org/10.1007/s13753-018-0184-7>

- *Habersaat, S., Geiger, A., Abdellaoui, S., & Wolf, J. (2015). Health in police officers: Role of risk factor clusters and police divisions. *Social Science & Medicine*, 143, 213–222. <https://doi.org/10.1016/j.socscimed.2015.08.043>
- *Hansen, C., Rasmussen, K., Kyed, M., Nielsen, K.J., & Andersen, J.H. (2012). Physical and psychosocial work environment factors and their association with health outcomes in Danish ambulance personnel - A cross-sectional study. *BMC Public Health*, 12(1), 1-13. <https://doi.org/10.1186/1471-2458-12-534>
- Harrison, R., Jones, B., Gardner, P., & Lawton, R. (2021). Quality assessment with diverse studies (QuADS): an appraisal tool for methodological and reporting quality in systematic reviews of mixed- or multi-method studies. *BMC Health Services Research*, 21(1), 1-20. <https://doi.org/10.1186/s12913-021-06122-y>
- *Hayward, D., Bungay, V., Wolff, A.C., & MacDonald, V. (2016). A qualitative study of experienced nurses' voluntary turnover: Learning from their perspectives. *Journal of Clinical Nursing*, 25(9–10), 1336–1345. <https://doi.org/10.1111/jocn.13210>
- Jäppinen, K., Roos, M., Slater, P., & Suominen, T. (2022). Connection between nurse managers' stress from workload and overall job stress, job satisfaction and practice environment in central hospitals: a cross-sectional study. *Nordic Journal of Nursing Research*, 42(2), 109-116. <https://doi.org/10.1177/20571585211018607>
- *Kaushik, A., Ravikiran, S., Suprasanna, K., Nayak, M., Baliga, K., & Devadasa, S. (2021). Depression, anxiety, stress and workplace stressors among nurses in tertiary health care settings. *Indian Journal of Occupational & Environmental Medicine*, 25(1), 27–32. https://doi.org/10.4103/ijoem.IJOEM_123_20
- Kim, H., & Stoner, M. (2008). Burnout and turnover intention among social workers: Effects of role stress, job autonomy and social support. *Administration in Social Work*, 32(3), 5-25. <https://doi.org/10.1080/03643100801922357>
- Kivimäki, M., Bartolomucci, A., & Kawachi, I. (2022). The multiple roles of life stress in metabolic disorders. *Nature Reviews Endocrinology*, 19(1), 10–27. <https://doi.org/10.1038/s41574-022-00746-8>
- *Koeppel, M., Hollerbach, B., Thaden, T., Khurram, S., Kelley, H., Jitnarin, N., Kaipust, C., Poston, W., Haddock, C., & Jahnke, S. (2022). Assault in the atmosphere: Workplace violence in the fire service. *International Fire Service Journal of Leadership & Management*, 16, 17-25.
- *Kwak, Y., Han, Y., Song, J., & Kim, J. (2020). Impact of emotional labour and workplace violence on professional quality of life among clinical nurses. *International Journal of Nursing Practice*, 26(1), Article e12792. <https://doi.org/10.1111/ijn.12792>
- Lancôt, N., & Guay, S. (2014). The aftermath of workplace violence among healthcare workers: A systematic literature review of the consequences. *Aggression and Violent Behavior*, 19(5), 492–501. <https://doi.org/10.1016/j.avb.2014.07.010>
- *LaRocco, J.M., Tetrick, L.E., & Meder, D. (1989). Differences in perceptions of work environment conditions, job attitudes, and health beliefs among military physicians, dentists, and nurses. *Military Psychology*, 1(3), 135–151. https://doi.org/10.1207/s15327876mp0103_2
- *Leineweber, C., Chungkham, H., Westerlund, H., Tishelman, C., & Lindqvist, R. (2014). Hospital organizational factors influence work-family conflict in registered nurses: Multilevel modeling of a nation-wide cross-sectional survey in Sweden. *International Journal of Nursing Studies*, 51(5), 744–751. <https://doi.org/10.1016/j.ijnurstu.2013.09.010>
- Mao, Y., Raju, G., & Zabidi, M. (2023). Association between occupational stress and sleep quality: a systematic review. *Nature & Science of Sleep*, 15, 931–947. <https://doi.org/10.2147/nss.s431442>
- Mao, X., Fung, O., Hu, X., & Loke, A. (2018). Psychological impacts of disaster on rescue workers: A review of the literature. *International Journal of Disaster Risk Reduction*, 27, 602–617. <https://doi.org/10.1016/j.ijdr.2017.10.020>
- Martínez, A., & Blanch, A. (2024). Are rescue workers still at risk? A meta-regression analysis of the worldwide prevalence of post-traumatic stress disorder and risk factors. *Stress and Health*, 1–13. <https://doi.org/10.1002/smi.3372>

- *Martinussen, M., Richardsen, A., & Burke, R. (2007). Job demands, job resources, and burnout among police officers. *Journal of Criminal Justice*, 35(3), 239–249. <https://doi.org/10.1016/j.jcrimjus.2007.03.001>
- *McTiernan, K., & McDonald, N. (2015). Occupational stressors, burnout and coping strategies between hospital and community psychiatric nurses in a Dublin region. *Journal of Psychiatric & Mental Health Nursing*, 22(3), 208–218. <https://doi.org/10.1111/jpm.12170>
- Montero-Tejero, D., Jiménez-Picón, N., Gómez-Salgado, J., Vidal-Tejero, E., & Fagundo-Rivera, J. (2024). Factors influencing occupational stress perceived by emergency nurses during prehospital care: a systematic review. *Psychology Research & Behavior Management*, 17, 501–528. <https://doi.org/10.2147/prbm.s455224>
- Najimi, A., Goudarzi, A., & Sharifirad, G. (2012). Causes of job stress in nurses: A cross-sectional study. *Iranian journal of nursing and midwifery research*, 17(4), 301–305.
- Naushad, V.A., Bierens, J.J., Nishan, K.P., Firjeeth, C.P., Mohammad, O.H., Maliyakkal, A.M., ChaliHadan, S., & Schreiber, M.D. (2019). A systematic review of the impact of disaster on the mental health of medical responders. *Prehospital and Disaster Medicine*, 34(6), 632–643. <https://doi.org/10.1017/s1049023x19004874>
- Neto, H. V. (2015). Estratégias organizacionais de gestão e intervenção sobre riscos psicossociais do trabalho. *International Journal on Working Conditions*, 9, 1-21.
- Niedhammer, I., Bertrais, S., & Witt, K. (2021). Psychosocial work exposures and health outcomes: A meta-review of 72 literature reviews with meta-analysis. *Scandinavian Journal of Work, Environment & Health*, 47, 489-508. <https://doi.org/10.5271/sjweh.3968>
- Noureen, N., Gul, S., Maqsood, A., Hakim, H., & Yaswi, A. (2024). Navigating the shadows of others' traumas: an in-depth examination of secondary traumatic stress and psychological distress among rescue professionals. *Behavioral Sciences*, 14(1), Advance online publication. <https://doi.org/10.3390/bs14010021>
- *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), 252–269. <https://doi.org/10.2478/s13382-014-0264-x>
- Patton M. Q. (1999). Enhancing the quality and credibility of qualitative analysis. *Health Services Research*, 34(5), 1189–1208.
- *Pelegriani, A., Cardoso, T., Claumann, G., de Pinto, A., & Felden, E.P. (2018). Percepção das condições de trabalho e estresse ocupacional em policiais civis e militares de unidades de operações especiais. *Brazilian Journal of Occupational Therapy*, 26(2), 423–430. <https://doi.org/10.4322/2526-8910.ctoAO1160>
- *Rainbow, J., Drake, D., & Steege, L. (2020). Nurse health, work environment, presenteeism and patient safety. *Western Journal of Nursing Research*, 42(5), 332–339. <https://doi.org/10.1177/0193945919863409>
- *Raper, M., Brough, P., & Biggs, A. (2020). Evidence for the impact of organisational resources versus job characteristics in assessments of occupational stress over time. *Applied Psychology: An International Review*, 69(3), 715–740. <https://doi.org/10.1111/apps.12201>
- *Sabone, M., Mazonde, P., Cainelli, F., Maitshoko, M., Joseph, R., Shayo, J., Morris, B., Muecke, M., Wall, B., Hoke, L., Peng, L., Mooney-Doyle, K., & Ulrich, C. (2020). Everyday ethical challenges of nurse-physician collaboration. *Nursing Ethics*, 27(1), 206–220. <https://doi.org/10.1177/0969733019840753>
- *Setti, I., Lourel, M., & Argentero, P. (2016). The role of affective commitment and perceived social support in protecting emergency workers against burnout and vicarious traumatization. *Traumatology*, 22(4), 261–270. <https://doi.org/10.1037/trm0000072>
- Sheraton, M., Deo, N., Dutt, T., Surani, S., Hall-Flavin, D., & Kashyap, R. (2020). Psychological effects of the COVID 19 pandemic on healthcare workers globally: a systematic review. *Psychiatry Research*, 292, 132-136. <https://doi.org/10.1016/j.psychres.2020.113360>

- *Silva, A., Costa, S., Batista, P., Zaccara, A., Costa, I.C., & Duarte, M. (2015). Assédio moral: estudo com enfermeiros da estratégia saúde da família. *Revista de Pesquisa: Cuidado e Fundamental*, 7(1), 1820–1831. <https://doi.org/10.9789/2175-5361.2015.v7i1.1820-1831>
- *Singh, S., & Kar, S. K. (2015). Sources of occupational stress in the police personnel of North India: An exploratory study. *Indian Journal of Occupational & Environmental Medicine*, 19(1), 56–60. <https://doi.org/10.4103/0019-5278.157012>
- *Sliter, M.T., Sinclair, R.R., Yuan, Z., & Mohr, C.D. (2014). Don't fear the reaper: Trait death anxiety, mortality salience, and occupational health. *Journal of Applied Psychology*, 99(4), 759–769. <https://doi.org/10.1037/a0035729>
- Soravia, L. M., Schwab, S., Walther, S., & Müller, T. (2021). Rescuers at risk: Posttraumatic stress symptoms among police officers, fire fighters, ambulance personnel, and emergency and psychiatric nurses. *Frontiers in Psychiatry*, 11, 1-10. <https://doi.org/10.3389/fpsy.2020.602064>
- Sousa, L., Moreira, C., Barbosa, E., Paúl, C., & Queirós, C. (2022). Burnout, ansiedade e depressão em enfermeiros: estudo comparativo antes e durante a pandemia COVID-19. *International Journal on Working Conditions*, 23, 1-21. <https://doi.org/10.25762/edsq-3b64>
- Sriharan, A., Ratnapalan, S., Tricco, A., Lupea, D., Ayala, A. P., Pang, H., & Lee, D. (2020). Occupational stress, burnout, and depression in women in healthcare during COVID-19 pandemic: Rapid scoping review. *Frontiers in Global Women's Health*, 1, Article e596690. <https://doi.org/10.3389/fgwh.2020.596690>
- Stodolska, A., Wójcik, G., Barańska, I., Kijowska, V., & Szczerbińska, K. (2023). Prevalence of burnout among healthcare professionals during the COVID-19 pandemic and associated factors - a scoping review. *International Journal of Occupational Medicine and Environmental Health*, 36(1), 21–58. <https://doi.org/10.13075/ijom.1896.02007>
- *Taylor, B., & Barling, J. (2004). Identifying sources and effects of career fatigue and burnout for mental health nurses: A qualitative approach. *International Journal of Mental Health Nursing*, 13(2), 117–125. <https://doi.org/10.1111/j.1445-8330.2004.imntaylorb.doc.x>
- Tejero, D. J., Picón, N., Salgado, J., Vidal-Tejero, E., & Rivera, J. (2022). Factors influencing occupational stress perceived by emergency nurses during prehospital care: a systematic review. *Psychology Research and Behavior Management*, 17, 501–528. <https://doi.org/10.2147/prbm.s455224>
- Teleanu, D.M., Niculescu, A.G., Lungu, I., Radu, C.I., Vladâcenco, O., Roza, E., Costăchescu, B., Grumezescu, A.M., & Teleanu, R. (2022). An overview of oxidative stress, neuroinflammation, and neurodegenerative diseases. *International Journal of Molecular Sciences*, 23(11), Article e5938. <https://doi.org/10.3390/ijms23115938>
- *Tyagi, A., & Dhar, R.L. (2014). Factors affecting health of the police officials: Mediating role of job stress. *Policing*, 37(3), 649–664. <https://doi.org/10.1108/PIJPSM-12-2013-0128>
- Tyler, P., & Cushway, D. (1992). Stress, coping and mental well-being in hospital nurses. *Stress Medicine*, 8(2), 91–98. <https://doi.org/10.1002/smi.2460080206>
- *Verhaeghe, R., Vlerick, P., Gemmel, P., Maele, G., & Backer, G. (2006). Impact of recurrent changes in the work environment on nurses' psychological well-being and sickness absence. *Journal of Advanced Nursing*, 56(6), 646–656. <https://doi.org/10.1111/j.1365-2648.2006.04058.x>
- *von Treuer, K., Fuller-Tyszkiewicz, M., & Little, G. (2014). The impact of shift work and organizational work climate on health outcomes in nurses. *Journal of Occupational Health Psychology*, 19(4), 453–461. <https://doi.org/10.1037/a0037680>
- WHO (2022, march 2nd). *COVID-19 pandemic triggers 25% increase in prevalence of anxiety and depression worldwide*. <https://www.who.int/news/item/02-03-2022-covid-19-pandemic-triggers-25-increase-in-prevalence-of-anxiety-and-depression-worldwide>
- Wiggins, A., & Wilbanks, J. (2019). The rise of citizen science in health and biomedical research. *The American Journal of Bioethics*, 19(8), 3–14. <https://doi.org/10.1080/15265161.2019.1619859>

Yu, F., Raphael, D., Mackay, L., Smith, M., & King, A. (2019). Personal and work-related factors associated with nurse resilience: a systematic review. *International Journal of Nursing Studies*, 93, 129-140. <https://doi.org/10.1016/j.ijnurstu.2019.02.014>

*Zhang, Y., Duffy, J.F., & Castillero, E.R. (2017). Do sleep disturbances mediate the association between work-family conflict and depressive symptoms among nurses? A cross-sectional study. *Journal of Psychiatric & Mental Health Nursing*, 24(8), 620–628. <https://doi.org/10.1111/jpm.12409>

Sara Faria, Sílvia Monteiro Fonseca, António Marques, Cristina Queirós

6. Annex

Annex 1. Detailed summary of the studies

Author(s)	Sample size/ Design/Country	Occupation	Instruments	Organizational factors	Mental health outcomes/Psychological impact
Raper et al., 2020	n = 1601 Quantitative study with a prospective design Australia	Police officers	GHQ ⁱ , UWES ⁱⁱ	Job demands, job control, supervisor and colleague support, strategic alignment, work engagement	Strategic alignment reduces psychological strain and job demands did not have an impact on psychological strain
Kaushik et al., 2021	n = 431 Quantitative study with a cross-sectional design India	Nurses	DASS ⁱⁱⁱ	Job satisfaction, team conflicts, recognition of work, salary, work overload, sleep, personal relationships, patient deaths and sufferings, characteristics of workplace, equipment and/or availability of drugs, knowledge of operation of special equipment or procedures	- 50.8% of nurses had stress; 74% had anxiety; 70.8% had depression. 79.1% had at least one of them. - Stressed, anxious or depressed nurses were more concerned about lack of job satisfaction and conflicts with supervisors
Cranage, & Foster, 2022	n = 374 Qualitative descriptive study Australia	Mental health nurses (MHN)	NA	Violence/aggression from consumers, bullying from colleagues, staff levels, skills, exposure to suicide and murder, threats from consumers, moral distress, colleagues' quality of practice, support from colleagues and/or the organization	NR
Antoniolli et al., 2021	n = 124 Quantitative study with a cross-sectional design Brazil	Nurses	Cognitive performance assessment, PSQI ^{iv} , IEE ^v ; WHOQOL ^{vi}	Work shifts	Better coping strategies lead to lower negative effects of shift work on health (cognitive functions, sleep, eating gastric habits, stress)
Pelegri et al., 2018	n = 84 Quantitative study with a cross sectional design Brazil	Police officers (civilian and military)	Profile of Work Environment and Working Conditions, Job Stress Scale	Working conditions (physical, social environment, professional development, achievement, work social relevance), occupational stress (demands, control, social support), job roles	NR
Silva et al., 2015	n = 30 Quantitative study with a cross-sectional design Brazil	Nurses	Developed by the authors	Moral harassment in the workplace	Stress (92.3%), irritability (84.6%), anxiety (76.9%), fatigue (38.4%); low self- esteem (30.7%) and insomnia (23%)
Alomari et al., 2021	n = 190 Cross-sectional survey using a correlational design. Australia	Nurses	ENSS ^{vii}	Exposure to death/dying, conflicts, emotional preparation, problems with peers and supervisors, workload, uncertainty of treatment, patients and families, discrimination	Situations related from dealing with patients and families was the most stressful situation, especially dealing with violent/abusive patients or families
Singh, & Kar, 2015	n = 300 (100 constables, 100 inspectors and 100 police officers) Mixed methods study India	Police officers (constables, inspectors and police officers)	OSQ ^{viii}	Job roles, workload, organizational structure, conflicts	Stress levels were high in all sample; Inspectors had the highest level of stress, followed by officers and constables

Author(s)	Sample size/ Design/Country	Occupation	Instruments	Organizational factors	Mental health outcomes/Psychological impact
Rainbow et al., 2020	n = 332 nurses Quantitative study with a cross-sectional design. USA	Nurses	AHRQ ^{ix} , PQLS ^x , Healthcare Team Vitality Instrument, Flourishing Scale, Chalder Fatigue Scale, SPS ^{xi-6}	Patient safety culture	Sickness presenteeism was related to burnout; job-stress presenteeism was related to team vitality, psychological well-being, burnout and to patient safety outcome measures
Sabone et al., 2020	n = 39 (20 physicians and 19 nurses) Qualitative descriptive study Botswana	Physicians and nurses	NA	Work environment, lack of resources, work ethic and perceived management, attitudes and beliefs of patients, collaboration between roles and their benefits and impediments and opportunities, discrepant views of work roles, inter-professional education	NR
Habersaat et al., 2015	n = 84 Quantitative study with a cross sectional design Switzerland	Police officers	SSS ^{xii} , SRRS ^{xiii} , JCQ ^{xiv} , WCCL ^{xv} , UCLA Loneliness Scale, PSS ^{xvi} , CHIPS ^{xvii} , MIS ^{xviii} , BDI-SF ^{xix}	Job characteristics and work structure	In the high-risk cluster, emergency officers reported fewer physical symptoms; community officers reported more posttraumatic stress symptoms; criminal officers perceived more stress
Zhang et al., 2017	n = 397 Quantitative study with a cross-sectional design USA	Nurses	CES-D ^{xx} , SD-SF ^{xxi} , JCQ ^{xxii}	Work-family conflict	100 nurses reported depressive symptoms
Hayward et al., 2016	n = 12 Qualitative, interpretive descriptive approach	Nurses	NA	Decision-making processes, intention to leave, workload, working relationships, leadership	High stress had impact on the health and emotional well-being of nurses
von Treuer et al., 2014	n = 142 Quantitative study with a cross sectional design Australia	Nurses	WES-R ^{xxiii} , GHQ ⁱ	Organizational climate and shift work	- Overall participants exhibited high levels of distress - Night and rotating shift: Higher levels of acute distress, depression, anxiety and insomnia, social dysfunction, and somatic complaints
Martinussen et al., 2007	n = 223 Quantitative study with a cross-sectional design Norway	Police officers	MBI ^{xxiv} , PSC ^{xxv} , OCQ ^{xxvi}	Job satisfaction, job demands (overtime work, work conflicts and work-family conflict), job resources, leadership, organizational commitment, organizational support	Overall level of burnout was not high among police compared to other occupational groups sampled from Norway

Author(s)	Sample size/ Design/Country	Occupation	Instruments	Organizational factors	Mental health outcomes/Psychological impact
Setti et al., 2016	n = 783 Quantitative study with cross-sectional design Italy	Rescuers (70.3% ambulance operators, military (7.0%), first aid operators (5.2%), firefighters (4.6%), policemen (4.2%), civil protection operators (3.6%), and other types of rescuers (5.2%).	STSS ^{xxvii} , MBI ^{xxiv} , Support Appraisal for Work Stressors inventory, Family Support Inventory for Workers, Organizational Commitment Questionnaire	Job support from colleagues and superiors, organizational support (affective commitment, and family support)	Affective commitment was a protective resource against negative psychological effects
Koepfel et al., 2022	n = 31 Qualitative study	Firefighters and fire service leaders	NA	Workplace violence	NR
Sliter et al., 2014	n = 438 Quantitative study with a cross-sectional design	Nurses and firefighters	ENSS ^{vii} , Shirom-Melamed Burnout Measure, UWES ⁱⁱ , RDAS ^{xxviii}	Mortality salience cues (dealing with injured and dying patients), engagement, death anxiety, job demands	Nurses: Burnout M = 2.57/5, Engagement M = 3.41/5 Mortality cues directly related to burnout (in nurses) and absenteeism (in firefighters)
Hansen et al., 2012	n = 1691 Quantitative study with a cross sectional design Denmark	Ambulance personnel and fire fighters	SF-36, Basic Nordic Sleep Questionnaire, SF-12, DMQ ^{xxix} , COPSOQ ^{xxx}	Physical and psychosocial work environment, musculoskeletal pain	Ambulance personnel have half the prevalence of poor self-rated health compared to the core work force (5% vs. 10%). Levels of mental health were the same across the two samples
McTiernan, & McDonald, 2015	n = 69 Quantitative study with a cross sectional design Ireland	Psychiatric nurses	MHPSS ^{xxxi} , MBI ^{xxiv} , PNMCS ^{xxxii}	Workload, client-related difficulties, organizational structures/processes, relationships and conflicts with other professionals, lack of resources, professional self-doubt, home-work conflict, social support at work and positive attitude towards one's role at work	Both groups reported average levels of emotional exhaustion, low levels of depersonalization and average levels of personal accomplishment
Leineweber et al., 2014	n = 11015 Quantitative study with a cross sectional design Sweden	Nurses	NWI ^{xxxiii}	Work-family conflict, organizational structure, practice environment	14% of nurses experienced a high/very high degree of work-family conflict and a low/very low degree of work-family enhancement
Flynn et al., 2009	n = 422 Quantitative study with cross-sectional, correlational design USA	Nurses	MBI ^{xxiv} , Workload Perception Scale, NWI ^{xxxiii} -R	Workload, practice environment, intent-to-leave the job	Burnout: 31% (n = 132) had scores of 27 or higher on the emotional exhaustion dimension, indicating high burnout levels
Kwak et al., 2020	n = 399 Quantitative study with a cross-sectional design Korea	Nurses	OSHR ^{xxxiv} , KOSHA ^{xxxv} , ELS ^{xxxvi} , ProQOL ^{xxxvii}	Emotional labor, workplace violence	-Level of burnout was higher than compassion satisfaction and secondary traumatic stress -Workplace violence led to burnout, decreased professional quality of life and trauma
Nourry et al., 2014	n = 296 Descriptive correlational /cross sectional design France	Nurse managers	CES-D ^{xvii} ; Scale of Siegrist effort-reward imbalance model, STAI ^{xxxviii}	Effort-reward imbalance model, colleagues and supervisor support, organizational structure	31% had depressive symptoms

Author(s)	Sample size/ Design/Country	Occupation	Instruments	Organizational factors	Mental health outcomes/Psychological impact
LaRocco et al., 1989	n = 180 physicians, 225 nurses, and 50 dentists Quantitative study with a cross sectional design	Physicians, nurses, dentists.	Developed by the authors	Job characteristics, job strain, job attitudes, social support	Dentists had more health worries, anxiety, and somatic complaints, followed by nurses and then physicians
Adriaenssens et al., 2011	n = 254 Quantitative study with a cross-sectional design Belgium	Nurses	LQWQ-N ^{xxxix} , BSI ^{xl} , CIS ^{xli} , UWES ^{li}	Job and organizational characteristics	Work demands predict psychosomatic complaints and fatigue; job control, social support, adequate work procedures and perceived reward predict job satisfaction, engagement and turnover intention
Alameddine et al., 2015	n = 915 Quantitative study with cross-sectional design Lebanon	Nurses	MBI ^{xxiv}	Exposure to occupational violence, intention to quit	- 54.1% had high levels of emotional exhaustion and 28.8% had high levels of depersonalization - Nurses who were exposed to verbal abuse had high levels of emotional exhaustion, depersonalization and intention to quit job
Taylor, & Barling, 2004	n = 20 Qualitative study Australia	Nurses	NA	Employment insecurity and casualization of the work-force; management and the system; nature of the work, resources and services, problems with doctors, aggressive and criminal consumers, undervaluing consumers and nurses, physical and emotional constraints of the work setting, nurse–nurse relationships and horizontal violence	The effects of stress were shown in dealing with and reacting to workplace stressors and burnout was an effect of the stressors
Budge et al., 2003	n = 225 Quantitative study with a cross sectional design New Zealand	Nurses	NWI ^{xxxiii} -R, MOS ^{xlii} , SF-36	Perceptions of autonomy, control and relations with physicians and administration	NR
Verhaeghe et al., 2006	n = 2094 Quantitative study using a cross-sectional design	Nurses	SPPN ^{xliii}	Organizational structure, appraisal of recurrent changes in the work environment	Nurses who had been confronted with changes scored higher for distress
Boudrias et al., 2020	n = 1179 Quantitative study with a cross-sectional design Canada	Nurses	Role ambiguity and role conflict, W-BNS ^{xliv} , Turnover intention O'Driscoll and Beehr's	Role ambiguity and role conflict, autonomy and control	NR
Tyagi, & Dhar, 2014	n = 444 Quantitative study with a cross sectional design India	Police officers	Job stress Lait and Wallace scale, Work overload Roberts et al. scale, GHQ ⁱ	Perceived organizational support and organizational politics and work overload	Work overload was the highest contributor in causing stress and stress had a strong impact on the health of the police officers

Note: list of instruments

ⁱGHQ: General Health Questionnaire; ⁱⁱUWES: Utrecht Work Engagement Scale; ⁱⁱⁱDASS: Depression, Anxiety and Stress Scale; ^{iv}PSQI: Pittsburgh Sleep Quality Index; ^vIEE: Inventário de Estresse em Enfermeiros; ^{vi}WHOQL: World Health Organization Quality of Life Assessment; ^{vii}ENSS: Expanded Nursing Stress Scale; ^{viii}OSQ: Occupational Stress Questionnaire; ^{ix}AHRQ: Agency for Healthcare Research and Quality; ^xPQLS: Professional Quality of Life Scale; ^{xi}SPS: Stanford Presenteeism Scale; ^{xii}SSS: Subjective Social Status; ^{xiii}SRRS: Social Readjustment Rating Scale; ^{xiv}JCQ: Job Content Questionnaire; ^{xv}WCCL: Ways of Coping Checklist; ^{xvi}PSS: Perceived Stress Scale at work; ^{xvii}CHIPS: Cohene Hoberman Inventory of Physical Symptoms; ^{xviii}MIS: Mississippi Scale; ^{xix}BDI-SF: Beck Depression Inventory Short Form; ^{xx}CES-D: Center for Epidemiologic Studies Depression Scale; ^{xxi}SD-SF: Sleep Disturbance Short Form; ^{xxii}JCQ: Job Content Questionnaire; ^{xxiii}WES-R: Work Environment Scale-Real; ^{xxiv}MBI: Maslach Burnout Inventory; ^{xxv}PSC: Psychosomatic complaints; ^{xxvi}OCQ: Organizational Commitment Questionnaire; ^{xxvii}STSS: Secondary Traumatic Stress Scale; ^{xxviii}RDAS: Revised DA Scale; ^{xxix}DMQ: Dutch Musculoskeletal Questionnaire; ^{xxx}COPSOQ: Copenhagen Psychosocial Questionnaire; ^{xxxi}MHPSS: Mental Health Professional Stress Scale; ^{xxxii}PNMCS: PsychNurse Methods of Coping Scale; ^{xxxiii}NWI: Nursing Work Index; ^{xxxiv}OSHR: Occupational Safety and Health Research; ^{xxxv}KOSHA: Korea Occupational Safety & Health Agency; ^{xxxvi}ELS: Emotional Labor Scale; ^{xxxvii}ProQOL: Professional Quality of Life; ^{xxxviii}STAI: State-Trait Anxiety Inventory; ^{xxxix}LQWQ-N: Leiden Quality of Work Questionnaire for Nurses; ^{xl}BSI: Brief Symptom Inventory; ^{xli}CIS: Checklist Individual Strength; ^{xlii}MOS: Medical Outcomes Study; ^{xliii}SPPN: Stress Professionnel Positif et Negatif; ^{xliiv}W-BNS: Work-Related Basic Need Satisfaction Scale.