

Burnout in Health Professionals Working in Surgical and Intensive Care Units: A Systematic Review of Related Factors and Consequences

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ABSTRACT

Background: Burnout is found at elevated levels in healthcare professionals who work in critical units. At the same time, high levels of burnout are associated with strong negative effects on a personal and professional level.

Aim: The aim of this study was to examine the factors associated with burnout and its associated consequences in workers in surgical departments and intensive care units.

Materials and Methods: A systematic review of the literature was applied. The search and inclusion of articles in the systematic review was performed using the PRISMA Statement. A total of 31 different studies were included in the search.

Results: Firstly, most of the relevant studies concerned nurses, not physicians or other health professionals. Second, all the studies were cross-

sectional. Third, a common finding of the effects of sociodemographic factors cannot be drawn as there were conflicting findings between the studies. Fourth, it appears that evidence that demonstrates a broader burden of mental health is associated with burnout (e.g. anxiety). Fifth, parameters that are related to resilience, for example hardness as a personality trait, were associated with lower burnout scores. Finally, all studies concerned workers in intensive care units and not in surgical departments.

Conclusions: Therefore, this study may lead to some findings for health care workers in intensive care units, but not for those working in surgical departments.

Keywords: burnout; healthcare; intensive care units; mental health

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INTRODUCTION

Without a doubt, burnout is a factor that poses key threats to employees and companies [1]. Burnout is a syndrome with particularly pronounced and negative consequences for the employees and their organizations [1,2]. It is a phenomenon that occurred simultaneously with the transition to the tertiary economy and is considered as a result of the labor dynamics of the latest decades [3].

This syndrome has three separate dimensions. The first dimension concerns the emotional exhaustion of workers, who need to make ever greater efforts to cope with the emotional load of their work due to their low energy. The second parameter concerns the feeling of personal accomplishment. As employees are affected by burnout, they stop to consider that their work contributes to their personal accomplishment. The third parameter relates to depersonalization, that is, to treat cynically the other people interacting in the work environment [4].

Burnout was studied primarily in health professionals, as through relevant research during the 1970s clinical manifestations were found that were not explained by any previously known mental illness, thus leading to the consideration of an independent syndrome [3,5]. Subsequently, the systematic research carried out led to the finding that this phenomenon is wider and does not concern exclusively health professionals [6].

In any case, it can be assumed that health professionals constitute a professional group with significantly increased rates of burnout. Drummod (2015) considers that the very nature of the profession of health professionals promotes burnout. For example, as he supports, physicians are required to perform the same every day in their work environment, although their energy may vary significantly from day to day [7].

A key research question is how the working unit of health professionals differentiates levels of burnout. According to a relevant meta-analysis, working in intensive care units leads to quite increased frequencies of burnout. A relevant meta-analysis found that up to 47% of health professionals working in intensive care units have clinically significant levels of burnout [8]. Similarly, high rates have been recorded in health professionals working in surgical departments [9]. These are therefore two groups of health professionals with fairly high rates of burnout.

Apart from the aforementioned meta-analysis, several independent studies lead to a high prevalence of burnout. A relevant case is that of Turkey. Some studies in that country lead to low burnout levels. For example, a relevant study in 711 physicians in Northeast Anatolia in Turkey indicated that there were low levels emotional exhaustion, depersonalization and low personal accomplishment

[10]. Yet, other studies lead to a higher prevalence of burnout. For example, a study in 362 urologists found high emotional exhaustion and depersonalization [11].

Burnout has also been studied during the COVID-19 pandemic in Turkey. A relevant study examined 1.015 health professionals, administering the Maslach Burnout Inventory (MBI). As indicated by the study, 56.7% had moderate/high emotional exhaustion, 35.8% had moderate/high depersonalization and 58.0% had low personal accomplishment [12]. As found by another study during the pandemic in Turkey, burnout scores were higher in health professionals working in the frontline compared to the others [13]. Lack of COVID-19 training and supply shortage (e.g. masks) were significantly related to burnout [14].

In any case, burnout during the pandemic lead to severe negative consequences for health professionals' mental health in Turkey. A relevant study examined a sample of 377 midwives and nurses. This research evaluated mental health aspects and burnout in the studied sample. As indicated by the study, high emotional exhaustion lead to higher depression scores [15].

Based on the above, this study focuses on burnout specifically on two groups of health professionals, specifically in those working in surgical departments and those working in intensive care units, as well as the consequences of burnout in those two categories.

MATERIALS AND METHODS

Study design

This research constitutes a systematic review of the literature. From a methodological point of view, systematic reviews are indicated for answering well-formulated research questions [16]. As this study focused on the factors associated with burnout and the consequences of this syndrome on health professionals working in intensive care units and surgical units, this methodological approach was considered to be in line with the overall aim of the research.

Registration

This systematic review was registered in the PROSPERO database (registration no. CRD42022299664). There were no violations of the origin protocol during any stages of the research.

Literature search

All three authors participated in the literature search process. A search for English-language papers from 01.01.2011 until 15.06.2021 was carried out in MEDLINE, Scopus, and the Web of Science databases. The combinations utilized were burnout AND ("health professional*" OR nurses OR nurse OR physician*) AND ("intensive

care unit*" OR "surgical unit"). In addition, a snowball technique was employed in order to include any potential studies not revealed through this process. Issues of related journals, reference lists of included studies, and other relevant papers in the field were rummaged through in an attempt to locate possible records. The flow of information from record identification to inclusion followed the principles of the PRISMA statement [17].

Study selection

The inclusion criteria of the specific study were the following:

- studies published in peer-reviewed journals
- Published in English
- Including a sample of health professionals working in intensive care or surgical units
- Assessing burnout through self-reported instruments
- Assessing factors related to burnout and/or consequences of burnout

The only exclusion criteria of the study had to do with studies in which other members of hospital staff (non-health professionals) were also included and analyzed.

Identified abstracts were stored using Zotero reference management software. All authors participated in the study selection process.

Data extraction

The extracted data of the study were the following:

- study
- country
- sample characteristics
- study design
- instruments used
- main results.

All authors took part at the data extraction process.

RESULTS

The literature search carried out led to a total of 983 records, while 4 more studies were identified through snowball searching. After removing the duplicates, 684 original titles remained. A total of 559 studies were excluded by title and 125 were full-text accessed to search for eligibility. After excluding studies for the reasons presented in the flowchart, a total of 31 papers were included in the qualitative synthesis.

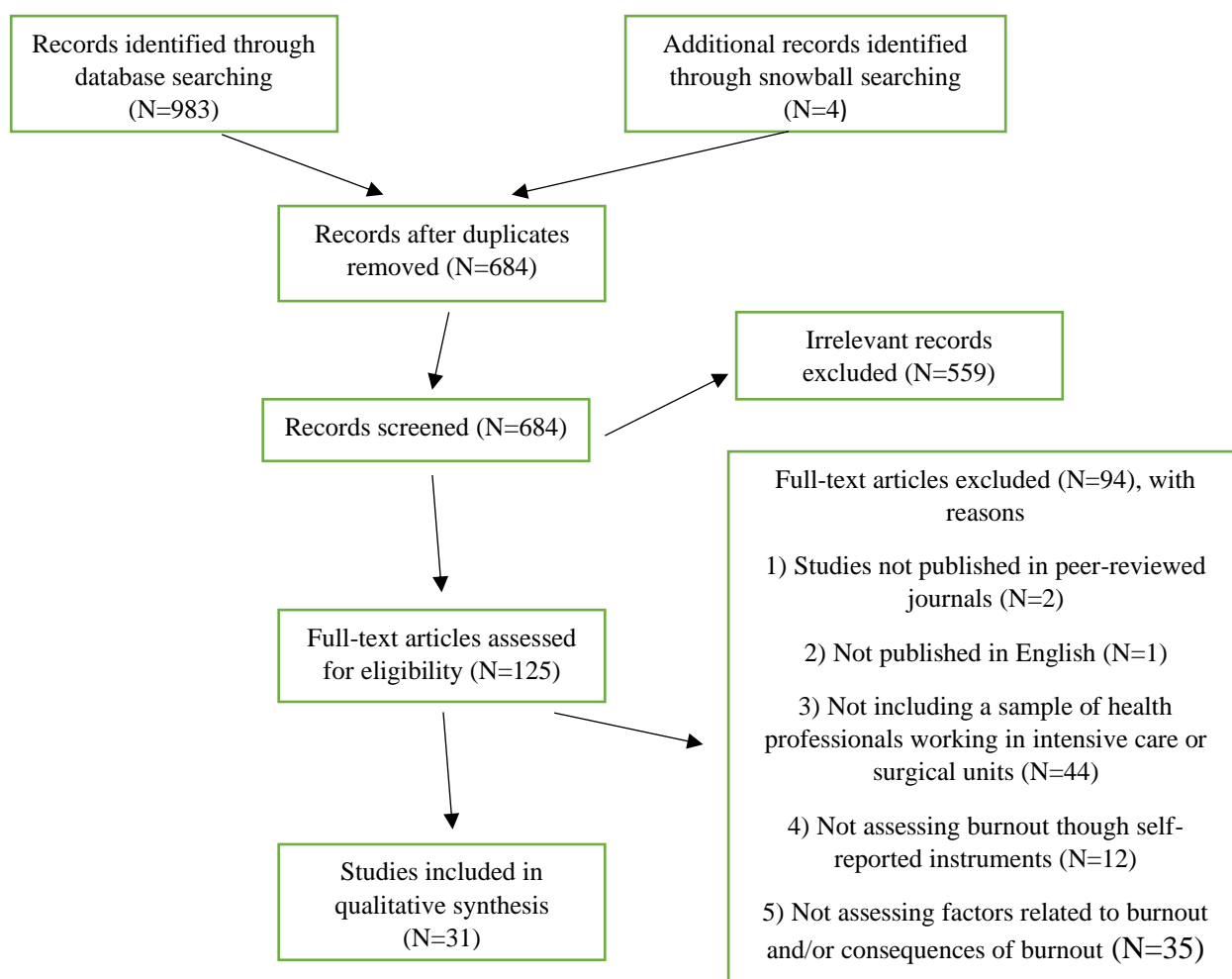


Figure 1. Information flowchart

According to the relevant table, a number of key findings can be drawn. Firstly, most of the relevant studies concerned nurses, not physicians or other health professionals. Second, all the studies were cross-sectional. Third, a common finding of the effects of sociodemographic factors cannot be drawn as there were conflicting findings between the studies. For example, in the study by Lederer et al. (2008) in Austria, an absence of a significant association between age and burnout was found [18], whereas in the study by Aragao et al. (2021), a

positive association between burnout and age was found [19].

Fourth, it appears that evidence that demonstrates a broader burden of mental health is associated with burnout. For example, the study by Voultsos et al. (2020) found that stress as a personality trait was associated with burnout [20]. Fifth, parameters that are related to resilience, for example hardiness as a personality trait were associated with lower burnout scores [21].

Table 1. The extracted data

Study	Country	Sample characteristic	Study design	Instruments used	Main results
Saeidi et al., 2020 [22]	Iran	30 neonatal ICU nurses	Cross-sectional	MBI & Job Descriptive Index	No significant association between job satisfaction and burnout
Rivaz et al., 2020 [23]	Iran	212 ICU nurses	Cross-sectional	MBI & Hospital Ethical Climate Survey	Significant inverse associations between ethical climate and burnout ($p=0.001$). Work shifts had a positive correlation with burnout ($p=0.038$)
Fernandes et al., 2018 [24]	Brazil	160 ICU nurses working in 4 ICU	Cross sectional	MBI, smoking and drinking frequency	A positive and significant correlation was found between MBI and smoking in one ICU
Vasconcelos et al., 2018 [25]	Brazil	91 ICU nurses	Cross-sectional	MBI & BDI	A significant association was found between burnout and depressive symptoms
Nantana et al., 2017 [26]	Greece	714 ICU nurses	Cross-sectional	MBI, Eysenck Personality Questionnaire & Spiritual/Religious Attitudes Questionnaire	Neuroticism was a positive and extraversion a negative predictor of exhaustion
Sok et al., 2020 [27]	Korea	115 ICU nurses	Cross-sectional	Copenhagen Burnout Inventory, Center for Epidemiological Studies Depression Scale, Job Satisfaction & Nursing Job Stress Scale	Burnout had a significant, positive relationship with depression and nursing job stress. No significant association was found between burnout and job satisfaction
Merlani et al., 2011 [28]	Switzerland	3052 ICU nurses & physicians	Cross-sectional	MBI	Higher risk of burnout for nurses, males, those having no children and those aged over 40 years old
Hu et al., 2021 [29]	China	1.122 physicians and 1.289 nurses	Cross-sectional	MBI	Low frequency of exercise, comorbidities, working in a high quality hospital, having more years of experience, more night shifts and fewer paid vacation days were associated with higher burnout
Texeira et al., 2013[30]	Portugal	82 physicians and 218 nurses	Cross-sectional	MBI	No differences were noted between physicians and

		working in ICU			nurses MBI scores. Females had higher scores of burnout. Burnout was associated with conflicts and ethical decision making regarding withdrawing treatments. Temporary work contracts were also associated with higher burnout. Working for another service at the same health care institution was a protective factor
Aytekin & Kuruoglu, 2013 [31]	Turkey	80 neonatal ICU nurses	Cross-sectional	MBI and World Health Organization Quality of Life	A negative association was found between quality of life and burnout
Aragao et al., 2021 [19]	Brazil	65 intensive care nurses	Cross-sectional	MBI	Burnout was associated with age, tobacco consumption, alcohol use, weekly night shift hours, employment relationship, having an intensive care specialist title, number of patients on duty, monthly income and considering active or high-strain job
Voultos et al., 2020 [20]	Greece	80 ICU physicians	Cross-sectional	MBI & STAI	Trait anxiety was positively associated to burnout
Vincent et al., 2019 [32]	UK	996 intensive care unit workers	Cross-sectional	MBI	Males had higher scores of emotional exhaustion and lower scores of depersonalization compared to females. Physicians had lower scores of emotional exhaustion and higher scores of depersonalization compared to other health professionals
Karanikola et al., 2012 [33]	Cyprus	152 health professionals	Cross-sectional	MBI & Stamp's Index of Work Satisfaction	Emotional exhaustion was a strong predictor of job satisfaction
Colville et al., 2017 [34]	UK	377 ICU health professionals	Cross-sectional	MBI, Brief Resilience Scale, Trauma Screening Questionnaire & HADS	There was a negative association between resilience and burnout
Regan et al., 2009 [35]	England	87 ICU nurses	Cross-sectional	The Nursing Stress Scale The Defense Style Questionnaire 40, MBI & General Health Questionnaire 28	Immature defenses were related to emotional exhaustion
Bisetti et al., 2021 [36]	Italy	105 ICU nurses and healthcare assistants	Cross-sectional	MBI	Younger nurses had higher depersonalization. Nurses were 4.5 times more likely to have burnout than healthcare assistants.

Lederer et al., 2008 [37]	Austria	33 physicians & 150 nurses working in ICUs	Cross-sectional	MBI	Age, gender, level of training, years of employment and family status had no significant association with MBI
Wright et al., 1993 [21]	USA	31 ICU nurses	Cross-sectional	Hardiness Test, Nursing Stress Scale & Tedium Scale	Hardiness and burnout had a significant inverse relationship. Stress and burnout had a positive relationship
Embriaco et al., 2007 [38]	France	189 ICU nurses	Cross-sectional	MBI	Workload and poor relationships with colleagues were related to higher levels of burnout
Özden et al., 2013 [39]	Turkey	138 ICU nurses	Cross-sectional	MBI & Minnesota Satisfaction Questionnaire	It was determined that nurses who agreed to the proposition that the application of futility demoralizes health-care professionals had low levels of job satisfaction but high levels of depersonalization. In addition, it was determined that nurses had moderate levels of job satisfaction, emotional exhaustion, and personal achievements but high levels of sensitivity.
Barros et al., 2008 [40]	Brazil	297 ICU physicians	Cross-sectional	MBI	Young physicians, those with higher workload and those without specialization on intensive care had higher burnout
Myhren et al., 2013 [41]	Norway	431 ICU nurses	Cross-sectional	Cooper's Job Stress Questionnaire, Job Satisfaction Scale, MBI & Basic Character Inventory	Burnout had a positive correlation with stress and vulnerability, as well as a negative correlation with satisfaction
Johnson-Coyle et al., 2016 [42]	Canada	169 ICU health professional	Cross-Sectional	Moral Distress Scale-Revised, MBI, and a validated job satisfaction questionnaire	Moral distress and burnout were positively correlated. Burnout had a negative correlation with job satisfaction
Wang et al., 2021 [43]	China	1813 intensivists	Cross-sectional	Demographic variables, Lifestyle information and the MBI	Higher number of children and income satisfaction were protective against severe burnout
Yildiz, 2021 [44]	Turkey	164 ICU nurses	Cross-sectional	BDI, Secondary Traumatic Stress Scale & MBI	Anxiety, depression, and secondary traumatic stress explained 61% of emotional exhaustion, 38% of depersonalization, and 13% of personal accomplishment
Shoorideh et al., 2015 [45]	Iran	159 ICU nurses	Cross-sectional	Copenhagen Burnout Inventory, Moral Distress Scale & Hinshaw and At-	There was a positive statistical correlation between intensive care unit nurses' age, moral distress, their work experience and

				wood Turnover Scale	the fraction of nurses' number to number of intensive care unit beds with burnout
Saravabavan et al., 2019 [46]	India	204 ICU nurses	Cross-sectional	Perceived Stress Scale & MBI	A significant positive correlation was noted between burnout & job satisfaction
Kim et al., 2018 [47]	South Korea	318 ICU nurses	Cross-sectional	Burnout & Spiritual Well-Being	A higher level of burnout was positively associated with younger age, lower educational level, single marital status, having no religion, less work experience and previous end-of-life care experience. Higher spiritual well-being was associated with lower burnout
Soroush et al., 2016 [48]	Iran	86 ICU nurses	Cross-sectional	MBI & Patricia Clinical Competency Scale	Burnout and clinical competency had a significant negative relationship
Lin et al., 2016 [49]	China	144 female paediatric ICU nurses	Cross-sectional	Nurse Stress Checklist, Occupational Burnout Inventory & Taiwan Depression Questionnaire	Work stress and depression had a positive correlation with burnout
Abbreviations: BDI, Beck Depression Inventory; HADS, Hospital Anxiety and Depression Scale; MBI, Maslach Burnout Inventory; STAI, State-Trait Anxiety Inventory					

Quality assessment

The quality of the studies included in the systematic review was assessed on the basis of the Newcastle-Ottawa Scale (NOS), proposed by Cochrane Non-Randomized Studies Methods Working Group [50].

The NOS scale is used to assess the quality of heterogeneous methodological surveys.

This tool specifically examines the selection of participants, comparability and outcome recording.

The score ranges from 0 to 8. A first finding concerns the low methodological reliability of the surveys. Indeed, it appears that the score for the studies included in the systematic review was only 2 out of 10.

The second finding that may emerge has to do with the common rating of the studies.

Specifically, the inclusion and exclusion criteria for this particular survey were determined so that studies that have not examined burnout via a self-reported questionnaire and that were using a control group were excluded.

However, this particular assessment tool was used taking into account the possibility that some of the included studies could be not cross-sectional, but prospective, leading the change of quality appraisal for criteria related to follow-up.

This did not happen, as all the relevant studies were cross-sectional.

This results in a common assessment of the methodological reliability for each independent study.

Table 2. Studies' quality appraisal

	Representativeness of the exposed cohort	Selection of the external control	Assessment of exposure	Outcome of interest not present at the start of the study	Comparability	Assessment of outcomes	Sufficient time of followup	Adequacy of followup	Total score
Saeidi et al., 2020	NO	NO	YES	NO	NO	YES	NO	NO	2
Rivaz et al., 2020	NO	NO	YES	NO	NO	YES	NO	NO	2
Fernandes et al., 2018	NO	NO	YES	NO	NO	YES	NO	NO	2
Vasconcelos et al., 2018	NO	NO	YES	NO	NO	YES	NO	NO	2
Nantana et al., 2017	NO	NO	YES	NO	NO	YES	NO	NO	2
Sok et al., 2020	NO	NO	YES	NO	NO	YES	NO	NO	2
Merlani et al., 2011	NO	NO	YES	NO	NO	YES	NO	NO	2
Hu et al., 2021	NO	NO	YES	NO	NO	YES	NO	NO	2
Texeira et al., 2013	NO	NO	YES	NO	NO	YES	NO	NO	2
Aytekin & Kuruoglu, 2014	NO	NO	YES	NO	NO	YES	NO	NO	2
Aragao et al., 2021	NO	NO	YES	NO	NO	YES	NO	NO	2
Voultsov et al., 2020	NO	NO	YES	NO	NO	YES	NO	NO	2
Vincent et al., 2019	NO	NO	YES	NO	NO	YES	NO	NO	2
Karanikola et al., 2012	NO	NO	YES	NO	NO	YES	NO	NO	2
Colville et al., 2017	NO	NO	YES	NO	NO	YES	NO	NO	2
Regan et al., 2009	NO	NO	YES	NO	NO	YES	NO	NO	2
Bisetti et al., 2021	NO	NO	YES	NO	NO	YES	NO	NO	2
Lederer et al., 2008	NO	NO	YES	NO	NO	YES	NO	NO	2
Wright et al., 1993	NO	NO	YES	NO	NO	YES	NO	NO	2
Embriaco et al., 2007	NO	NO	YES	NO	NO	YES	NO	NO	2
Özden et al., 2013	NO	NO	YES	NO	NO	YES	NO	NO	2
Barros et al., 2008	NO	NO	YES	NO	NO	YES	NO	NO	2
Myhren et al., 2013	NO	NO	YES	NO	NO	YES	NO	NO	2
Johnson-Coyle et al., 2016	NO	NO	YES	NO	NO	YES	NO	NO	2

Wang et al., 2021	NO	NO	YES	NO	NO	YES	NO	NO	2
Yildiz, 2021	NO	NO	YES	NO	NO	YES	NO	NO	2
Shoorideh et al., 2015	NO	NO	YES	NO	NO	YES	NO	NO	2
Saravabavan et al., 2019	NO	NO	YES	NO	NO	YES	NO	NO	2
Kim et al., 2018	NO	NO	YES	NO	NO	YES	NO	NO	2
Sorosh et al., 2016	NO	NO	YES	NO	NO	YES	NO	NO	2
Lin et al., 2016	NO	NO	YES	NO	NO	YES	NO	NO	2

DISCUSSION

The negative effects of burnout on health professionals have been studied for decades, as they were the original group in which the related phenomenon was found [3]. Based on the above, this research attempted to study burnout specifically in workers in surgical departments and intensive care units.

Despite the intention of the relevant study, all of the studies included in the systematic review involved workers in intensive care units and not a single study involved workers in surgical departments. This finding is quite paradoxical and leads to highlight a significant gap in the literature. While it is therefore established based on prior literature that healthcare professionals working in surgical departments have increased levels of burnout [9] no relevant studies appear to have been conducted to investigate the factors associated with it or its consequences. Clearly, there are studies in the literature in which relevant healthcare professionals have been examined alongside those working in other units or departments. However, in this systematic review, studies which examined surgical trauma workers jointly with others were excluded from further stages of the review. Consequently, while findings can be made for workers in intensive care units, no findings can be made for workers in surgical departments.

Certainly, in the case of workers in the surgical departments, there is a significant heterogeneity of findings with regard to the socio-demographic characteristics of the participants. This variation could be attributed to cultural and organisational factors of health systems, which certainly have a significant impact on the mental health of health professionals [3]. Therefore, the differences identified in terms of burnout based on the socio-demographic characteristics of the participants could be considered a function of these factors.

A second problematic finding that emerges from this systematic review has to do with the limited ability to draw conclusions about cause and effect relationships among the variables examined. The systematic review attempted to study both the causal factors and the consequences of burnout for health professionals working in the departments studied. However, from a methodological point of view, synchronic studies are not suitable for an in-depth and confident understanding of cause and effect relationships between variables. For example, in Voultsos et al (2020) study in Greece, it was found that stress showed a positive and statistically significant association with burnout [14]. However, it is quite difficult to consider an independent and dependent variable between these two, thus hindering the research's ability to reach conclusions regarding the causal relationship between these variables. Therefore, while this systematic review attempted to draw conclusions about cause and effect relationships between the variables under consideration, in practice this was not possible.

In any case, a conclusion can be drawn about causal and factor-related factors on the part of those related to the wider resilience of health professionals working in intensive care units, as these factors would be unlikely to be influenced by burnout scores, rather the reverse seems to be true. For example, the study by Wright et al [21] found that hardness as a personality trait was associated with lower levels of burnout. Therefore, it can be argued that factors associated with a broader resilience to mental health problems have protective effects on burnout among health professionals working in intensive care units.

Starting from the above, two relevant suggestions for clinical practice can be derived. Firstly, programmes focusing on addressing burnout among health professionals working in intensive care units should have a broader character and focus on other factors at the same time, as burnout tends to occur together with other health problems, such as depression. Stress management and health

promotion programs have the ability to improve burnout levels and the overall well-being in health professionals [51]. Therefore, their application is highly recommended. Secondly, there is a need to develop broader programmes to promote mental resilience in intensive care units, since the relevant personality traits and elements have a protective effect against the development of burnout. Person-centered therapy has the ability to improve the resilience mechanisms, leading to structural changes in the level of personality [52]. The application of person-centered therapy to health professionals working in intensive care units could be beneficial, leading to increased resilience towards burnout.

In any case, this study faces two specific limitations, which have to be highlighted. First, as mentioned above, all studies focused on the staff of intensive care units, although the systematic review had a double scope, also aiming to investigate workers in surgical departments. Second, the methodological quality of the majority of the studies was fairly low. Third, the cause and effect associations of the studied variables are quite foggy, since cross-sectional studies can not easily establish cause-effect relationships [53].

Based on the aim, the findings and the limitations of the study, some suggestions for future research can be made through this systematic review. Firstly, it is necessary to address the apparent literature gap concerning workers in intensive care units. Second, it is imperative to conduct prospective studies to examine the cause-and-effect relationships between the individual variables studied by the studies included in this review. Third, it is necessary to investigate the role of cultural factors and factors at the level of health systems organization, which may be responsible for the variations in the effects of demographic variables on burnout in the individual studies.

CONCLUSIONS

This study attempted to investigate the factors associated with burnout and its consequences in health professionals working in intensive care units and surgical departments.

As it was found, the relevant phenomenon has been studied only in workers in intensive care units and not in workers in surgical departments.

In addition, the cross-sectional research design of the studies included in the systematic review hinders the drawing of conclusions about the cause and effect relationships between the studied variables.

In conclusion, while numerous studies have been conducted so far, their similar methodology and targeting prevents the drawing of a broader understanding about the phenomenon under study.

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Conflicts of interest

There are no conflicts of interest to declare.

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