

Burnout in the intensive care unit professionals

A systematic review

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Abstract

Background: Burnout has been described as a prolonged response to chronic emotional and interpersonal stress on the job that is often the result of a period of expending excessive effort at work while having too little recovery time. Healthcare workers who work in a stressful medical environment, especially in an intensive care unit (ICU), may be particularly susceptible to burnout. In healthcare workers, burnout may affect their well-being and the quality of professional care they provide and can, therefore, be detrimental to patient safety. The objectives of this study were: to determine the prevalence of burnout in the ICU setting; and to identify factors associated with burnout in ICU professionals.

Methods: The original articles for observational studies were retrieved from PubMed, MEDLINE, and Web of Science in June 2016 using the following MeSH terms: “burnout” and “intensive care unit”. Articles that were published in English between January 1996 and June 2016 were eligible for inclusion. Two reviewers evaluated the abstracts identified using our search criteria prior to full text review. To be included in the final analysis, studies were required to have employed an observational study design and examined the associations between any risk factors and burnout in the ICU setting.

Results: Overall, 203 full text articles were identified in the electronic databases after the exclusion of duplicate articles. After the initial review, 25 studies fulfilled the inclusion criteria. The prevalence of burnout in ICU professionals in the included studies ranged from 6% to 47%. The following factors were reported to be associated with burnout: age, sex, marital status, personality traits, work experience in an ICU, work environment, workload and shift work, ethical issues, and end-of-life decision-making.

Conclusions: The impact of the identified factors on burnout remains poorly understood. Nevertheless, this review presents important information, suggesting that ICU professionals may suffer from a high level of burnout, potentially threatening patient care. Future work should address the effective management of the factors negatively affecting ICU professionals.

Abbreviations: CI = confidence interval, DP = depersonalization, EE = emotional exhaustion, ICCs = intraclass correlation coefficients, ICU = intensive care unit, MBI = Maslach burnout inventory, MeSH = medical subject headings, OR = odds ratio, PA = personal accomplishment, WHO = World Health Organization.

Keywords: burnout, depersonalization, emotional exhaustion, intensive care, personal accomplishment

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1. Introduction

Burnout has been described as a prolonged response to chronic emotional and interpersonal stress on the job^[1] that is often the result of a period of expending excessive effort at work while having too little recovery time.^[2] Burnout was first described in 1974 by Freudenberger, thereby inspiring the investigation of the characteristics and prevalence of this phenomenon.^[3] Maslach and Jackson defined burnout as having three different aspects: emotional exhaustion, depersonalization, and lack of personal and professional completion.^[4]

Burnout has been recognized as an occupational hazard in various people-oriented professions, including healthcare.^[5] To construct a resilient health system, it is important that burnout in healthcare workers be addressed.^[6] Burnout in healthcare workers may affect healthcare worker well-being and the quality of professional care they provide^[7] and can, therefore, be detrimental to patient safety.^[8] The prevalence of burnout in healthcare workers is among the highest out of the occupations that have been surveyed^[9] (occupational physicians 11%, psychiatrist 9%, general practitioners 8%, community nurses 8%, and midwives 7%). Workload and time pressure have been cited as the major causes of high levels of burnout, with both qualitative and quantitative workload contributing to burnout, especially in the emotional exhaustion dimension.^[10] Patient-

related stressors, experience, personality, and work-related attitudes have also been identified factors associated with burnout.^[11] Burnout may also affect both the physical and psychological health of the healthcare worker.

The composition of intensive care units is unique in the spectrum of healthcare services provided. Medical care is provided in intensive care units by a critical care team, composed of intensivists, critical care nurses, respiratory therapists, pharmacists, dietitians, and other medical professionals. Patients with any life-threatening illnesses may be admitted to the intensive care unit. The mortality rate in critical care patients have been reported to range from 10% to 29%.^[12] For medical professionals working in the intensive care unit (ICU), discrepancies in job demands, responsibility overload, end-of-life issues, and interpersonal conflict all constitute potential stressors.^[13] Healthcare workers are particularly susceptible to burnout,^[9] which has been observed to occur at an especially high rate in this population, with at least 20% of ICU professionals scoring high on burnout indicators.^[13]

As a recent World Health Organization (WHO) reports emphasized, research, and evaluation are important in developing health policies and creating comprehensive health systems,^[6,14,15] and the health of medical personnel should be not excluded from this principle, especially in the era of universal health coverage.^[15] While a recent systematic review reported the prevalence of burnout in the ICU and several effective strategies to prevent burnout among ICU professionals,^[16] the true magnitude of burnout remains open for discussion. Additionally, an important literature gap still exists in terms of the risk factors for the development of burnout in ICU professionals. Therefore, the purposes of our review are to determine the prevalence of burnout and to identify risk factors associated with burnout in ICU professionals.

2. Methods

2.1. Literature search

The PubMed, MEDLINE, and Web of Science electronic databases were systematically searched in June 2016. The terminology used in this review was utilized to identify Medical Subject Headings (MeSH) and free-text terms, and “burnout” and “intensive care unit” were used as search terms to identify potentially relevant studies. The original articles for observational studies (cross-sectional, cohort, and case-control studies) were eligible for inclusion if they were published in the English language between 1996 and June 2016. Qualitative studies, reviews, clinical treatment trials, case reports and series, cadaveric studies, biomechanical studies, and laboratory studies were excluded. The references of all relevant articles were also screened for additional publications.

2.2. Study selection

Each publication was initially assessed for relevance using data presented in the abstract. When the abstract failed to provide sufficient information, a reprint of the full text was obtained. Two reviewers (CHC, PCT) independently evaluated the abstracts identified using our search criteria and selected eligible articles for full text review. Full text articles were screened for eligibility according to predefined criteria. To be included in the final analysis, studies were required to have employed an observational study design to examine the associations between any risk factors and burnout in the ICU setting. Studies were excluded if

they recruited non-ICU professionals and burnout was not included as an outcome variable.

2.3. Quality assessment

Two reviewers independently assessed the quality of each study using a modification of the checklist designed by Downs and Black^[17] and Crombie.^[18] Checklists were modified according to the type of study reviewed.^[19] Two reviewers performed independent, in-depth reviews of each eligible study. The results of these reviews were compared using the kappa statistic to measure the level of agreement between the two reviewers. Values of kappa between 0.40 and 0.59 were considered to reflect fair agreement, while values between 0.60 and 0.74 were considered to reflect “good” agreement, and values of 0.75 or more were considered to reflect “excellent” agreement.^[20] The interrater reliability of the two reviewers’ checklist scores was evaluated using type 2, 1 intraclass correlation coefficients (ICCs). When the scores for any article differed between the two reviewers, a consensus score was assigned after comprehensive discussion.

Each checklist item were scored as “yes,” “no” or “unable to determine” where unclear or insufficient information was provided on a specific criterion. Positively scored criteria were added in order to obtain a total quality score for each paper. The maximum obtainable scores for each paper were 20 points for cohort studies and 19 points for other studies. The results were expressed as percentages of the total attainable score.

2.4. Data extraction and synthesis

For each paper, the following information was extracted: year of publication, country of study, setting, assessment tool for burnout measurement, sample size, participation rate, burnout prevalence, and risk factors. Data were extracted independently by 2 reviewers. This systematic review used a narrative synthesis format to determine the prevalence of burnout and to identify risk factors associated with burnout in ICU professionals.

Ethical approval was not requested for this study as it did not involve human participants.

3. Results

A total of 203 full texts were identified from the PubMed, MEDLINE, and Web of Science electronic databases, and after screening for duplicate articles and performing the initial review, 25 studies fulfilled our inclusion criteria. We excluded texts in which not all participants were ICU healthcare workers or professionals, where the outcome was “no burnout”, and that were not an observational study. The review process is described in Fig. 1.

The quality of the studies by checklist item is presented in Table 1. There was a high level of agreement in the assessments of the included articles performed by the two reviewers (Kappa 0.82), and the intraclass correlation coefficient for the interrater reliability of the total checklist scores for individual raters was 0.996 (95% confidence interval [CI] 0.989–0.998). The characteristics of the selected articles are presented in Table 2, including the year of study, country, setting, burnout measurement, sample size (participation rate), prevalence of burnout, and risk factors (risk or protective factors).

Regarding the year of publication, 60% of the articles were published after 2011.^[21–35] Only one article was published before 2000.^[36] Regarding the journal field, of the included studies, 12 were published in the critical medicine

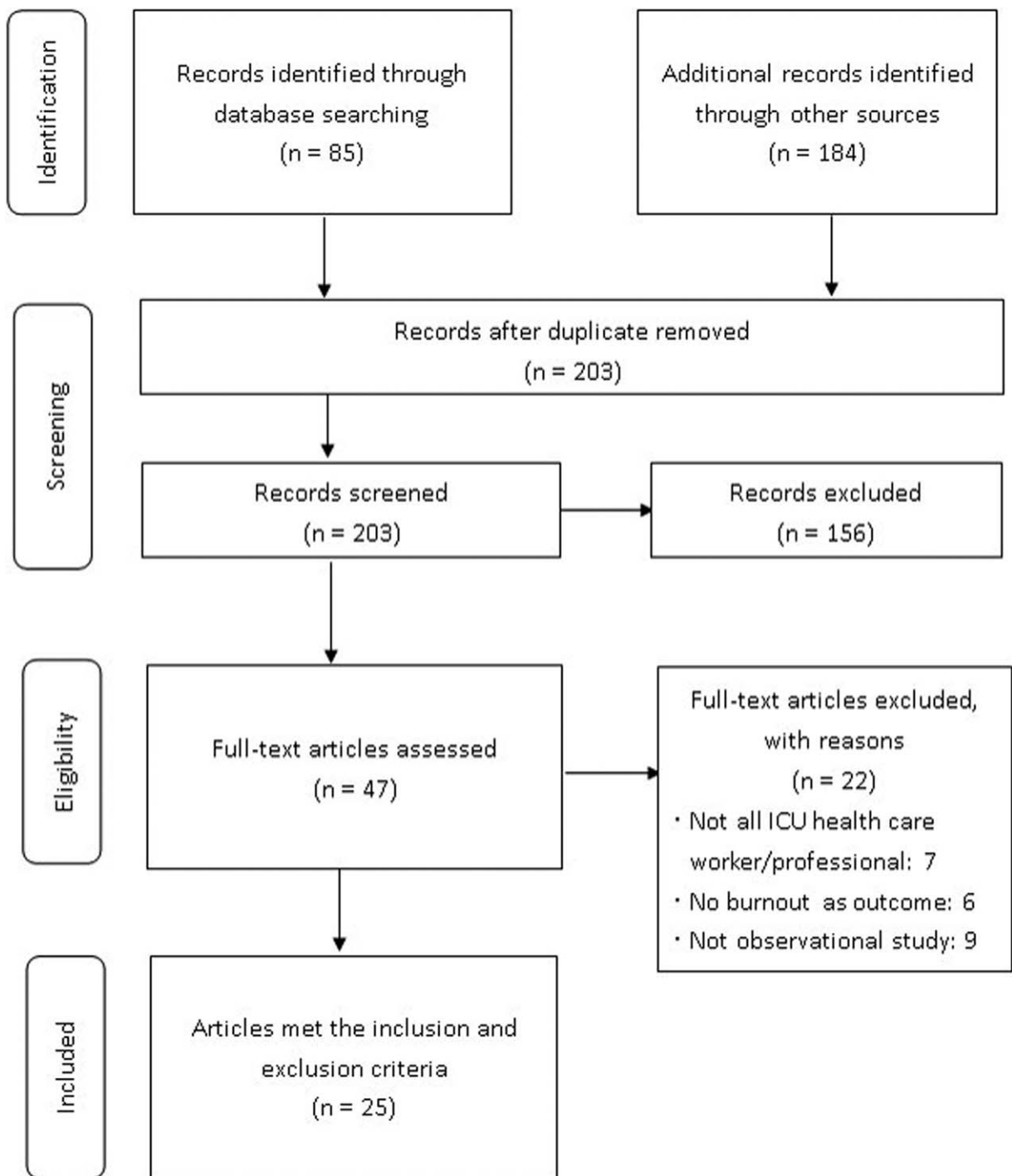


Figure 1. Flow diagram of the literature search process.

field,^[26,27,29,30,33,36-42] 7 in were published the nursing field,^[21,25,27,28,31,43,44] 2 were published in the field of ethics,^[31,34] and 1 was published in the anthropology field.^[45] The geographical distribution analysis showed that of the included studies, 12 were conducted in the European Union (Netherlands, Croatia, France, Switzerland, Italy, Austria, Germany, Greece, Portugal, Norway),^[25,27,29,30,33,37,38,40-43,45] 4 were conducted in the USA,^[26,28,36,39] 4 were conducted in South America (Brazil, Argentina, Peru),^[22,24,32,34] 2 were conducted in Turkey,^[21,27] 1 was conducted in South Africa,^[23]

1 was conducted in Australia,^[44] and 1 was conducted in China.^[35]

A variety of instruments were utilized for data collection. The most commonly used instrument in quantitative studies was the Maslach burnout inventory (MBI). One study combined the MBI with the nursing work index-revised.^[32] Additionally, the professional quality of life scale^[23] and work-related behavior and experience patterns^[25] were used in the selected articles.

Among the studies, there were 10 articles that assessed all personnel working in the ICU,^[22,26,29,30,33,37,38,40,41,45] while 13

Table 1

Quality of papers (n = 25).

Quality criteria	Chen [44]	Bakker [43]	Verdon [42]	Mertani [29]	Raggio [41]	Teixeira [33]	Guntupalli [13]	Guntupalli [26]	Aytekiri [21]	Turek [45]	Barbosa [22]	Poncet [40]	Karanikola [27]	Meltzer [39]	Ayala [34]	Lederer [38]	Embriaco [37]	Ozden [31]	Zhang [35]	Myhren [30]	Elkonin [23]	Galvan [24]	Panunto [32]	Mealer [28]	Goetz [25]
Is the hypothesis/aim/objective of study clearly described?	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Are the main outcomes to be measured clearly described in the introduction or Methods section?	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Is the design of the study described?	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Is the setting of the study described?	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Is the source of the subjects studied stated?	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Is the distribution of the study population by age and sex described?	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
Is the sample size stated?	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Is the participation/follow up rate stated?	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Are non-participants/subjects lost to follow up described?	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	1
Are the main findings of the study clearly described?	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Are the statistical methods described?	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Have actual probability values been reported (e.g., 0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001?	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1
Are any conclusions stated?	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Were the subjects asked to participate in the study representative of the entire population from which they were recruited?	0	1	0	1	1	0	1	1	1	0	0	1	1	0	1	1	1	1	1	1	0	1	1	1	1

(continued)

Table 1
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Quality criteria	Chen [44]	Bakker [43]	Verdon [42]	Merlani [29]	Raggio [41]	Teixeira [33]	Guntupalli [13]	Guntupalli [26]	Aytekin [21]	Turek ⁽⁴⁵⁾	Barbosa [22]	Poncet [40]	Karamikola [27]	Meltzer [39]	Ayala [34]	Lederer [38]	Embricao [37]	Ozden [31]	Zhang [35]	Myhren [30]	Elkonin [23]	Galvan [24]	Panunto [32]	Meater [28]	Goetz [25]
Were those subjects who were prepared to participate representative of the entire population from which they were recruited? Was the participation/follow up rate >80%?	0	1	0	1	1	1	0	0	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	0
Were the main outcome measures used accurate (valid and reliable)? Was there adequate adjustment for confounding in the analyses from which the main findings were drawn?	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Was the sample size justified? Analysis adjusts for length of follow up? (cohort only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	13	15	15	16	18	14	15	14	16	13	15	17	16	16	16	15	14	14	17	16	14	16	15	15	15

1 classified as "yes," 0 classified as "no," NA classified as "unable to determine."

Table 2**Characteristic of included studies.**

Study (y)	Country	Study design	Setting	Burnout measurement	Sample size (participation rate)	Prevalence of burnout	Risk factors
Guntupalli et al ^[13]	USA	Cross-sectional study	Section of internal medicine of the society of critical care medicine	Maslach burnout inventory	248 (24.8%)	EE: 29% DP: 20.4% PA: 59%	Anticipating leaving critical care practice before retirement ($P=0.003$), time to winding down critical care practice ($P=0.02$), most happy when off service for critical care ($P=0.003$), less happy while on critical care service ($P=0.003$)
Chen et al ^[44]	Australia	Cross-sectional study	Two hospitals and critical care course at 1 university	Maslach burnout inventory	68 (56%)	NA	Emotional exhaustion: younger age, depersonalization: younger age, single, years worked in ICU personal accomplishment: clinical nurse consultant ($P<0.05$ for all of above)
Meltzer et al ^[39]	USA	Cross-sectional study	An adult intensive care unit (ICU), coronary care unit, or neurological ICU at the 2 participating hospitals (350–470 beds) in Southern California	Maslach burnout inventory	60	NA	Moral distress ($P=0.01$), nurses who worked in only a single type of critical care unit ($P=0.05$), considered religion to have no importance in their lives ($P=0.05$)
Bakker et al ^[43]	The Netherlands	Cross-sectional study	Eighty ICUs in 12 different European countries	Maslach burnout inventory	1849 (74%)	NA	Emotional exhaustion: perceived burnout complaints among colleagues, (high) job demands and (limited) decision latitude depersonalization: decision latitude, perceived burnout complaints among colleagues personal accomplishment: decision latitude, perceived burnout complaints among colleagues ($P<0.01$)
Cubriilo-Turek et al ^[45]	Croatia	Cross-sectional study	Medical and surgical intensive care units general hospital »Sveti Duh«, Zagreb	Maslach burnout inventory	71	NA	MICU ($P<0.05$)
Poncet et al ^[40]	France	Cross-sectional study	Two hundred and eighty six ICUs that were affiliated with the French Society for Critical Care	Maslach burnout inventory	2392 (95.8%)	32.80%	Younger age ($P=0.02$), able to schedule days off according to personal wishes ($P<0.0001$), participates in an ICU research group ($P=0.02$), relationship with head nurses ($P<0.0001$), and relationship with

(continued)

Table 2
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Study (y)	Country	Study design	Setting	Burnout measurement	Sample size (participation rate)	Prevalence of burnout	Risk factors
Verdon et al ^[42]	Switzerland	Cross-sectional study	Twenty-bed surgical ICU	Maslach burnout inventory	97 (91%)	28%	physicians ($P < 0.0001$) are protective factors. Conflicts with patients ($P < 0.0001$), respondent caring for a dying patient ($P < 0.0001$), and number of decisions to forego life-sustaining therapies in the last week ($P = 0.09$) are risk factors
Raggio et al ^[41]	Italy	Cross-sectional study	Two ICU of the Azienda Ospedaliera- Univeritaria of Pisa: the medical-surgical ICU and the surgical post-transplants ICU	Maslach burnout inventory	50	EE: 32% DP: 52% PA: 20%	Lack of co-operation ($P = 0.002$), the organization of the service ($P = 0.01$) and rapid patient turnover ($P = 0.008$)
Embriaco et al ^[37]	France	Cross-sectional study	All French public hospitals ICU	Maslach burnout inventory	978 (82.3%)	47%	Professional role ($P < 0.01$) and sex ($P < 0.006$)
Lederer et al ^[38]	Austria	Cross-sectional study	Five ICUs affiliated with the Departments of Anaesthesiology, Surgery, Neurology and Internal Medicine and Cardiac Care of Innsbruck Medical University Hospital	Maslach burnout inventory	183 (59.0%)	6% (34.4% at risk)	Women ($P = 0.02$), organizational factors: workload (the number of night shifts per month [$P = 0.02$], a long period of time from the last nonworking week [$P = 0.02$], night shift the day before the survey [$P = 0.03$]) and impaired relationships (such as conflict with another colleague intensivist [$P = 0.001$], and/or with a nurse [$P = 0.001$])
Merlani et al ^[29]	Switzerland	Cross-sectional study	All certified ICUs in Switzerland	Maslach burnout inventory	3052 (71%)	28%	No statistically significant difference in prevalence of fully developed burnout or burnout risk was detected in sub-groups according to age ($P = 0.105$), sex ($P = 0.788$), level of training ($P = 0.520$), years of employment ($P = 0.632$) and family status ($P = 0.876$)
							German-, French-, Italian-speaking part of Switzerland, proportion of women in the nurse team, mortality rate, nurse-assistant—(nurse, physician), men, no child, age ≤ 40 y ($P < 0.05$ for the above)

(continued)

Table 2
(continued).

Study (y)	Country	Study design	Setting	Burnout measurement	Sample size (participation rate)	Prevalence of burnout	Risk factors
Elkonin et al ^[23]	South African	Cross-sectional study	Three intensive care units at a South Africa hospital	Professional quality of life scale	30 (40.0%)	89.9% in burnout subclass	Compassion satisfaction ($P < 0.05$)
Goetz et al ^[25]	Germany	Cross-sectional study	Two ICUs and one IMC	Work-related behavior and experience patterns	86 (54.4%)	17.7%	NA
Barbosa et al ^[22]	Brazil	Cross-sectional study	Public and private intensive care units in Maceió, Alagoas	Maslach burnout inventory	67	17.90%	NA
Karanikola et al ^[27]	Greece	Cross-sectional study	ICUs of adult general hospitals in the public or private sector in the Athens metropolitan area of Greece	Maslach burnout inventory	152 (60%)	EE: 25.5% DP: 45.5% PA: 41.8%	Degree in master of science in nursing ($P = 0.003$), working in private hospitals ($P = 0.046$), and staff nurses ($P = 0.024$) are risk factors. Length of experience in nursing ($P < 0.011$) was protective factor
Galván et al ^[24]	Argentina	Cross-sectional study	Public or private PICUs of Argentina	Maslach burnout inventory	162 (60%)	EE: 25%; DP: 19%; PA: 6%	Single ($P = 0.01$), with children ($P = 0.03$), less working years in ICU ($P = 0.02$), over 36 on-call duty hours weekly ($P = 0.03$), public sector ($P = 0.003$)
Mealer et al ^[28]	USA	Cross-sectional study	ICU across the United States	Maslach burnout inventory	1239 (35%)	EE: 61%; DP: 44%; PA: 51%	Younger age ($P = 0.03$), diagnosis of posttraumatic stress disorder ($P < 0.001$), burnout syndrome ($P < 0.001$), symptoms of anxiety ($P < 0.001$), symptoms of depression ($P < 0.001$)
Teixeira et al ^[33]	Portugal	Cross-sectional study	State hospitals in the north of Portugal	Maslach burnout inventory	267 (60%)	32%	Women ($P = 0.003$), in same setting in the same institution ($P = 0.026$), conflict ($P = 0.014$), withdraw treatments ethical decision ($P = 0.004$)
Aytekin et al ^[21]	Turkey	Cross-sectional study	The NICU of 2 state hospitals located in the north of Turkey	Maslach burnout inventory	80 (94%)	NA	Aged 36 years and older ($P < 0.05$), working at Level I ($P = 0.042$), unsatisfied with their job ($P < 0.001$), at least 15 years' experience ($P = 0.006$), had been working at the unit for over 5 y ($P = 0.003$)
Ayala et al ^[34]	Peru	Cross-sectional study	The acute and critical care departments of Hospital Central de la Fuerza Aérea del Perú, a large, national reference, tertiary (highest	Maslach burnout inventory	93 (84.5%)	NA	Emotional exhaustion: have children ($P < 0.05$), less years in current department ($P < 0.05$) depersonalization: younger age ($P < 0.05$), recovery department ($P < 0.01$) (protective factor) personal

(continued)

Table 2
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Study (y)	Country	Study design	Setting	Burnout measurement	Sample size (participation rate)	Prevalence of burnout	Risk factors
Özden et al ^[31]	Turkey	Cross-sectional study	complexity) military hospital in Lima, Peru ICU of 3 teaching hospitals in a city located in Central Anatolia in Turkey	Maslach burnout inventory	138 (67.0%)	NA	accomplishment: have children ($P < 0.05$) Undergraduate education, worked <4 years, working in shifts ($P < 0.05$ for the above)
Myhren et al ^[30]	Norway	Cross-sectional study	Three ICUs at Oslo University Hospital, Ullevål	Maslach burnout inventory	145 (74.0%)	NA	Women ($P < 0.001$), job satisfaction ($P < 0.05$), job stress ($P < 0.05$), personality neuroticism ($P < 0.05$)
Panunto et al ^[32]	Brazil	Cross-sectional study	Adult ICUs of 17 public, private and philanthropic hospitals in the interior of São Paulo, Brazil	Maslach burnout inventory and nursing work index—revised	129 (89.6%)	NA	Limited autonomy, poor control over their practice, and with poor relationships with physicians, experience a greater level of emotional exhaustion (P value unavailable)
Guntupalli et al ^[26]	USA	Cross-sectional study	The ICUs of the Harris County Hospital District Houston	Maslach burnout inventory	213	EE: 54% DP: 40% PA: 40.6%	Nursing staff ($P = 0.03$) and more depersonalization ($P < 0.01$) are risk factors. Night shift ($P = 0.04$) and accomplishment ($P = 0.01$) are protective factors
Zhang et al ^[35]	China	Cross-sectional study	Seventeen ICUs from 10 tertiary-level hospitals in Liaoning, China	Maslach burnout inventory	426 (87.7%)	16% in all three dimensions, and 26.1–43.2% in each single subscale	Work environment, job satisfaction, social support, and coping strategies ($P < 0.05$ for all)

DP = depersonalization; EE = emotional exhaustion; ICU = Intensive Care Unit; IMC = intermediate care; NA = not available; NICU = neonatal intensive care unit; PA = personal accomplishment; PICU = pediatric intensive care unit; USA = United States of America.

studies assessed nurses only,^[21,23,25,27–29,32,34,35,39,42–44] and 2 studies assessed physicians only.^[24,36] Except for 1 study that did not report sex data,^[21] the selected studies had a preponderance of women personnel, with only 2 studies having a man majority.^[37,41] One of these studies was targeted exclusively at internal medicine intensivists,^[36] and the other was a French nationwide study^[40] that comprehensively assessed interns, residents, fellows, and attending physicians.

Among the 5 largest research studies included in our review, the sample size ranged from 978 to 3052.^[29,37] Among the other included studies, the largest sample size was 426,^[35] and the smallest sample size was 30.^[23] Overall, the response rate ranged from 24.8% to 96%.^[36,40]

3.1. Prevalence of burnout among ICU personnel

The prevalence of burnout among ICU personnel in the selected studies varied from 6% to 47%. Some studies presented the prevalence of the 3 domains of MBI separately.^[24,26–28,35,36,41] In the emotional exhaustion domain, the prevalence of burnout ranged from 25.0% to 61.0%, while the prevalence of burnout in the depersonalization domain 19.0% to 45.5%, and the

prevalence of burnout in the personal accomplishment domain ranged from 6.0% to 59.0%.

Of note, 4 of the 5 largest research studies reported prevalence data.^[28,29,37,40] The prevalence rates of burnout were 32.8% and 47% in 2 different nationwide French studies^[37,40] and 28% in Switzerland.^[29] In the study conducted in the United States, the prevalence rate of burnout was 61% in the emotional exhaustion (EE), 44% in the depersonalization (DP), and 51% in the personal accomplishment (PA) domain.^[28]

3.2. Risk factors for burnout among ICU personnel

The burnout risk factors identified in the review articles were mainly related to age, sex, working experience in an ICU, working experience in nursing, working environment, organizational factors, interpersonal relationships with colleagues, personality traits and beliefs, workload and shift work, marital status, and educational degree.

3.2.1. Age. In our review, 6 studies indicated that young age was a risk factor for burnout.^[21,28,29,33,40,44] Chen and McMurray and Ayala and Carnero reported, more specifically, that young age was a risk factor for burnout in the domains of

depersonalization and emotional exhaustion.^[34,44] More specifically, Merlani et al^[29] reported that being younger than 40 years old was a risk factor for burnout. Furthermore, Aytekin et al^[21] identified a lower prevalence of burnout in the personal accomplishment domain among those aged 36 years and older ($P < 0.05$). Additionally, Mealer et al^[28] noted that an increase in age was significantly associated with high resilience among ICU nurses ($P = 0.03$) in a study that was conducted using the Connor–Davidson Resilience Scale.

3.2.2. Sex. Sex was reported as a risk factor for burnout among ICU personnel in 4 cross-sectional studies.^[29,33,37,41] Raggio and Malacarne^[41] reported that in men, particularly men doctors, a high degree of DP was observed, while in women physicians, the tendency towards EE was much higher. In the 1-day nationwide survey conducted in France by Embriaco et al,^[37] the univariate analysis showed a higher prevalence of burnout in women intensivists. However, a large Swiss multicenter study showed having a higher proportion of women nurses on the working team was associated with a decreased risk of burnout.^[29] The author also indicated that men sex was a caregiver-related factor associated with high risk of burnout.

3.2.3. Marital status and child bearing. Four studies included in our review showed consistent results regarding familial status, suggesting that being single and childless might be associated with a higher risk of burnout.^[24,29,34,44] Chen and McMurray^[44] indicated that among nurses, being married was associated with lower levels of burnout in the depersonalization domain. Similarly, an investigation of ICU professionals in Portugal indicated that a higher level of burnout was associated being single and without children.^[33]

3.2.4. Work experience in nursing and the ICU. Less working experience was found to be associated with different aspects of burnout in several cross-sectional studies. In an Argentinian study, Galván et al^[24] reported that having worked fewer years in an ICU was a statistically significant risk factor for burnout among ICU personnel. Additionally, Aytekin et al^[21] found that having worked fewer years in the nursing field was a significant risk factor for burnout in the PA domain. A Greek study showed that experience (years) in nursing was inversely correlated with burnout in the DP domain ($r = 0.214$, $P < 0.011$), but not with burnout in the EE and PA domains ($P > 0.6$).^[27] Özden et al^[31] reported that nurses that had worked for less than 4 years had higher mean scores in the EE and DP domains; however, this result was not statistically significant.

3.2.5. Organizational factors. Regarding organization factors, in the study conducted by Poncet et al,^[40] 2 organizational factors were associated with burnout level: 1 was participation in an ICU research group (OR 0.74; CI, 0.56–0.97; $P < 0.03$) and the other was the ability to choose days off according to personal wishes (odds ratio [OR], 0.69; CI, 0.52–0.91; $P < 0.009$).

3.2.6. Night shifts and working hours. Two studies noted that working night shifts and number of working hours were factors associated with burnout. Galván et al^[24] found that being on-call for more than 36 hours a week increased the risk of burnout risk. A nationwide French study indicated that an increased frequency of night shifts per month and the time duration since the last non-working week were both associated with increased burnout risk, as was having a night shift the day before conducting the survey.^[40]

3.2.7. Ethical issues and end-of-life decision-making. Embriaco et al^[37] and Poncet et al^[40] reported an increased prevalence of burnout among physicians and nurses who had often been dealing with death or who had participated in decisions of foregoing life-sustaining therapy. Teixeira et al^[33] also found that ethical decision-making regarding end of life issues (including the decision to withhold or withdraw treatment) was positively associated with the observed level of burnout.

3.2.8. Personality and traits. In a study conducted in Norway, Myhren et al^[30] used the basic character inventory methodology, which is composed of 3 dimensions of, neuroticism, extroversion, and control/compulsiveness, to evaluate burnout. The results showed that higher burnout scores were associated with having a “vulnerable” personality. Similar findings were reported by Mealer et al,^[28] who indicated that psychological resilience was independently associated with a lower prevalence of posttraumatic stress disorder and burnout syndrome among intensive care unit nurses.

4. Discussion

4.1. Prevalence: comparison of burnout prevalence between ICU and non-ICU healthcare workers

Environment influences health,^[46] and the intensive care unit, being a totally different environment from general wards, has been found to be associated with higher prevalence of burnout due to its associated increased work intensity, much higher degree of difficulty with regards to patient disease status, and imposition of higher emotional stress on both family members and patients. Although the prevalence of burnout in the ICU healthcare workers assessed in included studies varied widely (from 6% to 47%), the 4 large-scale research studies reported burnout prevalence rates ranging from 28%~61%, suggesting that ICU healthcare workers were slightly more prone to burnout than average health care workers.

A study comparing pediatricians, cancer physicians, and general practitioners showed that approximately 1/3 of the physicians had burnout, and general practitioners had the highest burnout prevalence, with 36% of general practitioners having high EE scores, 36% of general practitioners having high in DP scores, 15% of general practitioners having low in PA scores.^[47] Similarly, a study conducted in Madrid revealed that 69.2% of primary care physicians had moderate to high levels of burnout,^[48] which was much higher than that of the average physician. Thus, it appears that, along with emergency nurses and oncologists, ICU health workers exhibit a high prevalence of burnout.

4.2. Risk factors for ICU burnout

4.2.1. Individual variables/sociodemographic characteristics

4.2.1.1. Age. Pooled analyses performed in several previous studies have shown that caregiving professional age was inversely associated with burnout, which is consistent with the results found in the present study.^[34,49] It is believed that younger individuals may be more sensitive to job burnout.^[50] It is possible that caregivers with less seniority are still learning to cope with high workload demands when faced with stressors and less able to schedule days off or asked to work more night shifts, which may have led to the burnout observed in younger caregivers.^[29,44,51]

4.2.1.2. Length of work experience. Previous studies have revealed different findings regarding the association between burnout level and years of working experience. Some results have indicated that experienced nurses become more skilled and committed to their work, therefore staying more calm and controlled when facing unpredictable situations and feeling more successful in their profession, resulting in the identification of a decreased level of burnout in more experienced professionals.^[30,52–55]

4.2.1.3. Personality trait. Studies have revealed that personality characteristics may be predictive of burnout^[56–58] because personality traits may be associated with problem solving and coping strategies and relate to how well an individual reacts to stressful situations in his or her workplace. Some studies have indicated that job holders with neuroticism were more likely to push themselves hard in their work, resulting in an increased level of burnout.^[59,60] Neuroticism has been viewed as a “negative affectivity,”^[61] as it may be correlated with increased psychological distress associated with worrying about poor career achievement and, thus, may cause mental health problems.^[57,60,62] In line with the aforementioned literature, this review found that neuroticism was strongly associated with burnout.

4.2.2. Occupational factors. Excessive workload and overtime are commonly reported by professionals who work in healthcare systems,^[63] especially nurses.^[64–66] The backbreaking workload shouldered by nurses is associated with the unpredictable nature of their jobs, and nurses often work understaffed and rotating shifts.^[67] Work overload contributes to burnout by depleting the capacity of the people available to meet the demands of the job,^[5] which was described by several of the included studies^[24,31,37]

4.3. Consequences of burnout

A higher level of burnout among healthcare professionals has been reported to be associated with negative outcomes, such as psychological and other types of discomfort,^[42] higher staff turnover, lower job satisfaction, and heart disease.^[7] Additionally, having a sedentary occupation, such as working in an ICU, has been shown to be associated with the development of metabolic syndrome, putting workers at increased risk for diabetes, cardiovascular events, and coronary heart disease mortalities.^[68–70] As a result, not only may burnout decrease the physical and psychological conditions of healthcare professionals, but it also may harm the health care institutions at which they are employed.

4.4. Limitations

Although our review used a comprehensive search strategy, limitations should be noted. First, even though the most important objective of a systematic review is to locate all original reports on the topic of interest, only articles published in the English language were included in this study. This may have introduced bias, but a lack of resources precluded the translation of texts from other languages into the English language. Second, another limitation may be publication bias. Studies that have statistically significant results are more likely to be published than are studies that do not have significant findings. Nevertheless, due to a lack of resources, only references obtained based on an electronic search and review of references included in the

available articles were used in this review. Third, one of the requirements of a systematic review is for independent data extraction to be performed by 2 reviewers. In this systematic review, a comparison of the data extracted by 2 assessors was performed and found to be satisfactory.

5. Conclusion

In summary, the prevalence rates of burnout among ICU professionals ranged from 6% to 47%. Several risk factors, such as age, sex, marital status, personality traits, work experience in an ICU, work environment, workload and shift work, ethical issues, and end-of-life decision making were found to affect the prevalence of burnout among ICU professionals. However, impact of these risk factors on burnout remains poorly understood. Nevertheless, this review discussed important findings suggesting that ICU professionals suffer from a high level of burnout, which may, in turn, threaten patient care. We believe that burnout in the ICU settings should be considered an important issue in clinical research. Future work should address effective management of the identified risk factors that negatively affect ICU professionals.

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