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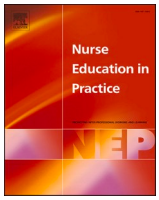

Prevalence and levels of burnout in nursing students: A systematic review with meta-analysis

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ABSTRACT

Aim: The aim of this study was to analyze burnout levels and prevalence in nursing students and to estimate prevalence levels with meta-analyses.
Background: Nurses are one of the healthcare professionals most affect by burnout, but nursing students, during their studies, can also suffer burnout.
Design: a systematic review with meta-analysis was performed.
Methods: The search equation used in Pubmed, CINAHL and Scopus databases was "burnout AND nursing students". Quantitative primary studies including information about burnout, emotional exhaustion, depersonalization, or personal accomplishment in nursing students were included. Four meta-analysis were performed.
Results: the sample was of n = 34 studies, with n = 15 studies being included in the meta-analysis with n = 2744 nursing students. Burnout prevalence was 19% (95% CI 11–28%). Regarding burnout dimensions, the most affected was high emotional exhaustion with a prevalence of 41%(95% CI 23–61%; n = 2222) followed by 27% low personal accomplishment(95% CI 9–49%; n = 2096), 25% high depersonalization (95% CI 15–36%; n = 2096).
Conclusions: Prevalence of burnout and its dimensions vary from 19% to 41%, being emotional exhaustion the main problem in nursing students. This problem may affect their future as nursing professionals, and it would be of important to prevent and to treat burnout at university levels.

1. Introduction

Burnout syndrome occurs as a response to chronic stress in the work environment and it is included in the World Health Organisation's International Classification of Diseases (World Health Organization, 2019). A widely-accepted definition is that proposed by Maslach and Jackson (Maslach and Jackson, 1986), who characterised the syndrome in terms of three dimensions: emotional exhaustion (loss of energy, fatigue, depletion or wearing out) depersonalisation (cynicism with clients and colleagues, irritability, negative or inappropriate attitudes) and decreased personal accomplishment (inefficacy, low morale or reduced productivity or capability) (Leiter and Maslach, 2016). Thus, a person that suffers burnout is affected by its three dimensions but people affected by one or two dimensions are at risk and they are considered latent burnout profiles (Leiter and Maslach, 2016).

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2. Background

Many groups are susceptible to burnout syndrome, and health professionals such as nurses and doctors are among the most affected. Research interest has also been focused on the impact of burnout on university students, whose environment is highly conducive to stress (Caballero Domínguez et al., 2010) and where problems may be persistent, causing prolonged discomfort and sometimes resulting in burnout syndrome(Fares et al., 2016). University degree courses are highly demanding. This, together with the personal circumstances of each student, can further aggravate the problem (Breso and Salanova, 2009).

Academic stress is related to personal life events, academic stressors or internship-specific stressors(Fares et al., 2016). This stress can lead to academic burnout, which has been related to the intention to leave the university(Álvarez-Pérez et al., 2021). This intention may be due to their lacking or failure to develop appropriate strategies to meet academic requirements, and resorting to escape or avoidance behaviour instead (Rosales Ricardo and Rosales Paneque, 2013). This can create negative self-perceptions, generating feelings of insufficiency, devaluation and loss of interest (Schaufeli et al., 2002). The joint impact of these manifestations has been termed academic burnout syndrome. The Maslach Burnout Inventory-Student Survey (MBI-SS) (Schaufeli et al., 2002) has been proposed to identify and assess this syndrome, defining it by the three classical dimensions of emotional exhaustion, depersonalization and personal accomplishment.

Regarding their vulnerability to burnout, university students and working people can be compared in certain key aspects. For example, in both cases, they have objectives to achieved. For the students, their arrival and permanence at the university often depend on obtaining a scholarship, and so their efforts, are also driven by economic incentives (Karyotaki et al., 2020). Furthermore, research has shown that many types of persons and occupations are exposed to the risk of burnout, not only the persons paid to provide services (Manzano-García and Ayala-Calvo, 2013; Maslach et al., 2001; Ruiz and Chirivella, 2007). In addition, student-student and student-teacher relationships can be compared to workers' relationships with their superiors in terms of the task and demands imposed or assumed (Hughes and Chen, 2011).

In general, the consequences of academic burnout syndrome are like those suffered by professionals in other fields. In this respect, (Bresó et al., 2011; Salanova et al., 2005) highlighted the following consequences for students: (a) behavioural symptoms, such as alcohol and drug abuse, voluntary absences from classes, poor diet and inability to relax; (b) psychosomatic symptoms, such as cardiovascular problems, gastrointestinal disturbances, lack of sleep and chronic fatigue; and (c) emotional symptoms, including impatience, the desire to give up university studies, demotivation, depression and lack of self-esteem.

Among professional groups, nurses are one of those most strongly affected by burnout. The negative consequences of burnout for university students, as described above, can be even more severe for nursing students, who are required to perform internships in hospitals and to provide in-person care for patients. If the nursing student is suffering from burnout this will have a negative impact on the quality of care provided and on patient safety (Barboza and Beresin, 2007).

As indicated, the negative consequences of burnout affect the person but also patient care and patient safety during clinical placements (Barboza and Beresin, 2007). These consequences for patients and for the health institution has been identified also in nurses (Garcia et al., 2019). To avoid all this, it is important to know the prevalence of burnout in nursing students. Although some research about the risk factors or the evolution of the syndrome in nursing students has been conducted (Gómez-Urquiza et al., 2023; Velando-Soriano et al., 2023), many questions need to be addressed concerning the prevalence and levels of burnout among nursing students. This will allow to know the problem and take the necessary actions to solve it. The present study, therefore, had the following objectives: a) to determine the prevalence of burnout syndrome among nursing students; b) to determine the mean levels of burnout and its dimensions; and c) to perform a meta-analytical estimation of burnout prevalence and burnout dimensions prevalence.

3. Methods

3.1. Design

A systematic review and meta-analysis has been performed and reported following the PRISMA guideline (Preferred Reporting Items for Systematic Reviews and Meta-analyses) (Page et al., 2021).

3.2. Data sources and search strategy

The following sources were consulted: CINAHL, LILACS, ProQuest Platform, PsycINFO, PubMed, SciELO and Scopus. The search was conducted in October 2022, using the MeSH terms "burnout AND nursing students" as a search strategy. This simple search equation with two general and broad terms were used to get as many results as possible.

3.3. Study selection

Two authors reviewed independently the title and abstract of each article found after eliminating duplicate studies using a citation manager. If any disagreement arose, a third author was consulted. Subsequently, the full-text was read for final selection following the inclusion criteria, and subjected to critical reading.

3.4. Inclusion and exclusion criteria

The inclusion criteria were the following: (1) primary (data extraction from persons) and quantitative studies; (2) based on a sample of nursing students; (3) include the measurement of burnout; (4) express burnout levels as mean and/or prevalence values; (5) unrestricted by year of publication; (6) written in English, Spanish or Portuguese.

Articles that were based on mixed samples (nursing students with other degrees students) lacking specific and individual data for nursing students were excluded.

3.5. Risk assessment of bias and quality

As proposed by Sanderson et al., the quality of these studies was evaluated using the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) (Sanderson et al., 2007) guidelines, considering the following domains: objectives, study design, setting, participants, variables, data sources/measurement, bias, study sizes, quantitative variables, and statistical method. In each case, quality was classified as low, medium or high, according to the presence of three or more, one, or no types of bias, respectively (supplementary table 1).

The criteria of the Oxford Centre for Evidence-Based Medicine Levels of Evidence Working Group (OCEBM) were used to determine the level of evidence and grade of recommendation for each study.

3.6. Data extraction

Two members of the research team extracted data from each study, using a data coding form. The results of this process were then checked and verified by a third author. The following variables were obtained for each article: (1) bibliographic information (authors, year of publication, country); (2) study design; (3) sample data (total size, response rate, mean age of participants and percentage of women); (4) instrument used to measure burnout; (5) levels of burnout (mean and standard deviation for each dimension); (6) prevalence of burnout and for each dimension); (7) level of evidence and grade of recommendation.

The reliability of the researchers' data coding was assessed as follows: intraclass correlation coefficient = 0·98 (minimum = 0·96;

maximum = 1); Cohen's kappa coefficient, for categorical variables, = 0·97 (minimum = 0·95; maximum = 1).

3.7. Data synthesis

Using the meta-analysis package of StatsDirect program (StatsDirect Ltd, Cambridge, UK), four random effects meta-analyses were performed to calculate the following proportion effect sizes: a) prevalence of burnout, b) prevalence of high emotional exhaustion, c) prevalence of high depersonalization and d) prevalence of low personal accomplishment. Each effect size was calculated using the total sample of each study and the sample affected by a) burnout, b) high emotional exhaustion, c) high depersonalization and d) low personal accomplishment):

In addition, a heterogeneity analysis was performed using the I^2 value and to decide between random (I^2 >50%) or fixed (I^2 <50%) effect meta-analysis. Publication bias was assessed by Egger's linear regression test. Finally, a sensitivity analysis was performed excluding one study each time and no significant alteration of the effect size was found.

4. Results

4.1. Search results

The initial search obtained 964 studies. After eliminating duplicates and reading the titles and abstracts, 125 studies remained. After continuing with the full text reading, n = 34 articles were finally selected for the review; of these, 15 had useful data for the meta-analysis. The complete study selection process is shown in Fig. 1.

4.2. Characteristics of the study sample

The n = 34 included studies represented a total sample of n = 10,607 nursing students. By country of origin, these studies were distributed as follows: Brazil (n = 7, 20.59%), Spain (n = 5, 14.70%), China (n = 4, 11.76%), USA (n = 3, 8.82%), UK (n = 2, 5.88%), Sweden (n = 2, 5.88%), Indonesia (n = 2, 5.88%), Turkey (n = 2, 5.88%), Costa Rica (n = 1, 2.94%), Australia (n = 1, 2. 94%), Portugal (n = 1, 2.94%), South Africa (n = 1, 2.94%), Cameroon (n = 1, 2.94%), Slovakia (n = 1, 2.94%) and Canada (n = 1, 2.94%).

Most studies were descriptive and cross-sectional (n = 29; 85.29%),

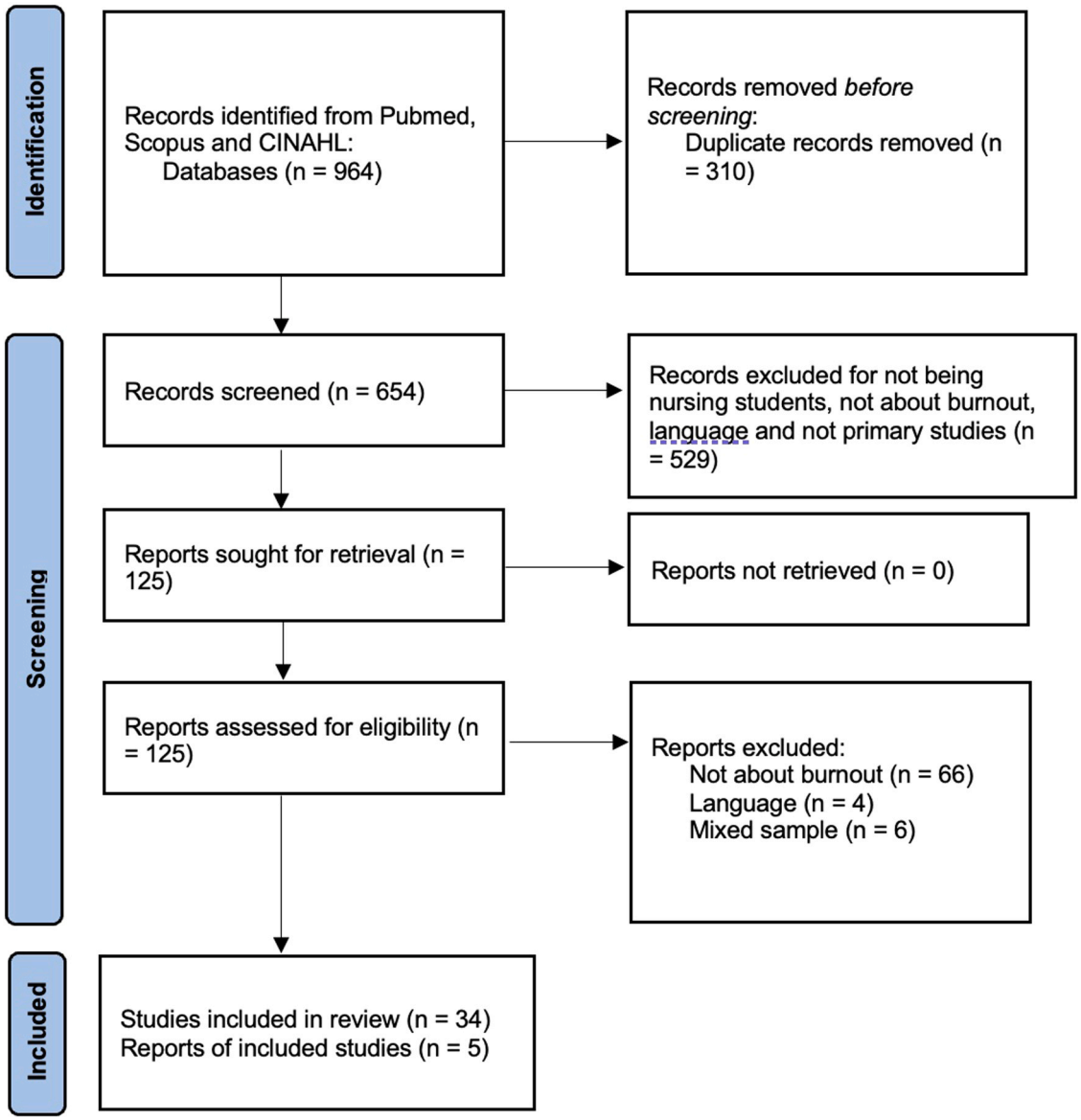

Fig. 1. Study selection process.

with the rest being prospective longitudinal studies (n = 2, 5.88%), randomised clinical trials (n = 2, 5.88%) or quasi-experimental (n = 1, 2.94%). The questionnaires used for burnout measurement were the MBI (n = 24, 68.4%), the Academic Burnout Scale (n = 3, 8.82%), the Oldenburg Burnout Scale and the Professional Quality of Life Scale, among others.

4.3. Prevalence of emotional exhaustion, depersonalization and personal accomplishment

A study carried out in Brazil reported the higher prevalence of emotional exhaustion, 90.8%, (Batista et al., 2021) with one study from United Kingdom showing an emotional exhaustion prevalence of 2.2%. (Katsifaraki and Tucker, 2013) Among all the studies considered, five reported emotional exhaustion < 33%, (Katsifaraki and Tucker, 2013; McKee-Lopez et al., 2019; Ríos-Risquez et al., 2016; Valero-Chillerón et al., 2019) four reported 34–66%(Babenko-Mould and Laschinger, 2014; da Silva et al., 2014; Lopes and Nihei, 2020; Sanches et al., 2017) and another three reported ≥ 67%.(Batista et al., 2021; Galdino et al., 2020; Vasconcelos et al., 2020).

For depersonalization, the highest prevalence found was 52.6% (Batista et al., 2021), but one study reported that none of the participants had high depersonalization(Valero-Chillerón et al., 2019). No other study obtained a value of depersonalization > 50% (the values reported ranged from 7% to 39%) (da Silva et al., 2014; Galdino et al., 2020; Katsifaraki and Tucker, 2013; Lopes and Nihei, 2020; McKee-Lopez et al., 2019; Ríos Rísquez et al., 2012; Sanches et al., 2017; Vasconcelos et al., 2020).

The lowest value obtained for low personal accomplishment was 0% (Valero-Chillerón et al., 2019) and the highest, 87%(da Silva et al., 2014). However, most of the studies reported values ranging from 20% to 30% (Galdino et al., 2020; Lopes and Nihei, 2020; McKee-Lopez et al., 2019; Ríos Rísquez et al., 2012; Sanches et al., 2017; Vasconcelos et al., 2020) and one a 41.4%(Batista et al., 2021).

4.4. Mean levels of emotional exhaustion, depersonalization and personal accomplishment

The highest mean value for emotional exhaustion, 25.9 points, was reported by Bittman (Bittman et al., 2004) and three other studies obtained similar values (Haack, 1988; Martins et al., 2017; Sanches et al., 2017). All these values represent medium levels of emotional exhaustion. All other studies reported low to medium levels of burnout, as measured with the MBI (Akansel et al., 2012; Babenko-Mould and Laschinger, 2014; da Silva et al., 2014; Deary et al., 2003; Katsifaraki and Tucker, 2013; Ríos-Risquez et al., 2016; Tomaschewski-Barlem et al., 2014). One study, performed in China, found no differences in mean emotional exhaustion between male and female participants (Hu and Schaufeli, 2009).

For depersonalization, the highest mean value reported was 18 (Martins et al., 2017) and the lowest, 1.1 (Liebana-Presa et al., 2017). Ten studies measured low mean values for depersonalization (<6), (Akansel et al., 2012; Babenko-Mould and Laschinger, 2014; Bittman et al., 2004; da Silva et al., 2014; Haack, 1988; Katsifaraki and Tucker, 2013; Ríos Rísquez et al., 2012; Tomaschewski-Barlem et al., 2014; Valero-Chillerón et al., 2019) three recorded medium levels and two recorded high values.

In most cases, the mean values for personal accomplishment were medium, but high values were obtained in one study(Deary et al., 2003).

4.5. Burnout prevalence

With respect to prevalence, one study from Costa Rica found that 18.8% of participants were experiencing burnout and 65.4% were at risk of developing it (Bolaños Reyes and Rodriguez Blanco, 2016). Prevalence levels of 20% and 24,74% were reported by three studies carried out in Brazil (da Silva et al., 2014; Galdino et al., 2020; Vasconcelos et al., 2020), while one study found that 94% of students had a medium level of burnout (Nurhidayati, 2021). The lowest values for prevalence were reported in the studies by Galdino (2020), Sanches (2021) and Rios Risquez (2016), with 10.5%, 4.9% and 2.65% respectively. The highest values were obtained for studies conducted in Indonesia (Nurhidayati, 2021) and Sweden (Frögéli et al., 2016), with 46.4% and 41% respectively. The characteristics of all included studies and the values obtained for mean burnout and prevalence are shown in Table 1. (Chamberlain et al., 2016; Chust-Hernández et al., 2019; Kong et al., 2021; Njim et al., 2020; Pelit-Aksu et al., 2021; Rohmani and Andriani, 2021; Rudman and Gustavsson, 2012; Skodova et al., 2017; Wang et al., 2021).

4.6. Meta-analytical prevalence estimate

Our meta-analysis, based on Egger's test, revealed no publication bias. The following I^2 values for inter-study heterogeneity were obtained: 96.9% for the prevalence of burnout, 98.8% for high emotional exhaustion, 96.6% for high depersonalization and 99.1% for low personal accomplishment. Sub-group analyses considering the continent of the studies were performed but the heterogeneity remained higher than 90%. The sensitivity analysis did not show a variation higher than 6% in any meta-analysis.

The meta-analysis of burnout prevalence, referring to a total sample of n = 2744 nursing students, obtained a prevalence value of 19% (95% CI 11–28%). Fig. 2.

Regarding the three burnout dimensions, the prevalence was 41% for high emotional exhaustion (95% CI 23–61%; n = 2222), 25% for high depersonalization (95% CI 15–36%; n = 2096) and 27% for low personal accomplishment (95% CI 9–49%; n = 2096). (Fig. 3).

5. Discussion

The aim of this study was to determine and analyse the prevalence of burnout, high emotional exhaustion, high depersonalization, and low personal accomplishment among nursing students. For burnout overall, the prevalence was 19%. Of the three dimensions of burnout, the highest prevalence was recorded for emotional exhaustion (41%), followed by low personal accomplishment (27%) and high depersonalization (25%).

The value for burnout is higher than the value in nursing managers (Membrive-Jiménez et al., 2022), nurses working in gynaecology and obstetrics units(De la Fuente-Solana et al., 2019) and in intensive care departments(Ramírez-Elvira et al., 2021). Similarly, the level of depersonalization among students is higher than among those mentioned professionals. However, the prevalence of low personal accomplishment among nurses working in gynaecology and obstetrics units is higher than among the students, 43%.

Compared with medical students, our results for nursing students show lower prevalence of burnout and depersonalization but similar emotional exhaustion and low personal accomplishment (Frajerman et al., 2019).

Burnout prevalence in nursing students can be affected by different factors like learning difficulties, the lack of facilitators and support, over-tasking or insufficient interaction with lecturers(Velando-Soriano et al., 2023).

Regarding the burnout evolution during the nursing degree, some studies informed of higher levels of burnout at later stages of the nursing degree, a trend that has also been observed among medical students (Dyrbye et al., 2014; Hansell et al., 2019). This may be due to the greater responsibilities encountered in clinical surroundings, the performance of clinical placements, the direct contact with patients and the need to address complex situations for which they may not feel prepared (Caminati et al., 2021). Interaction with patients and their relatives and relationships with medical staff in the hospital, and the desire to protect oneself from emotionally complex situations(Weurlander et al., 2018) can favour emotional exhaustion and depersonalization.

Table 1
Included studies and main characteristics (n = 34).

Author, year of publication, country.	Study design	Sample size, age, women percentage	Burnout questionnaire	Burnout mean			Prevalence			EL/GR
				EE	D	PA	High EE	High D	Low PA	
Akansel et al. (2012).31 Turkey	Cross-sectional descriptive study	n = 46(ND). 22 years and 32.6% women	MBI-HSS	12.42	4.56	11.49	-	-	-	2c/B
Babenko-Mould and Laschinger (2014).24 Canada	Cross-sectional descriptive study	n = 126(ND). 22.41 years and 97.6% women	MBI-GS	2.91	1.25	-	49.2%	-	-	2c/B
Batista et al. (2021).16 Brazil	Cross-sectional descriptive study	n = 301(ND). 64% between 18 and 20 years and 90.3% women	MBI-HSS	-	-	-	A = 83.6% (97) B = 90.8% (168)	A = 52.6% (61) B = 49.2% (91)	A = 41.4% (48) B = 25.4% (47)	2c/B
Bittman et al. (2004).28 USA	Quasi-experimental study	n = 75 (94.9%) 38 students in group A and 37 in group B. 27.5 years and 85.3% women	MBI-HSS	25.9 (11.7)	6.4(6.6)	34.4(7.6)	-	-	-	2b/B
Bolaños Reyes & Rodríguez Blanco, 2016.36 Costa Rica	Cross-sectional descriptive study	n = 289(ND). 52.1% between 21 and 25 years and 72% women	MBI-SS	-	-	-	18.8% had academic burnout and 65.4% were in risk of burnout.			2c/B
Chamberlain et al. (2016).40 Australia	Cross-sectional descriptive study	n = 240(ND). 29 years and 89% women	The Professional Quality of Life Scale Version	Burnout score: 28.6			-	-	-	2c/B
Chust-Hernández et al. (2019).41 Spain	Cross-sectional descriptive study	n = 494(ND). 77.7% women	MBI-SS	Burnout total = 28.4(11.16)			-	-	-	2c/B
da Silva et al. (2014).23 Brazil	Cross-sectional analytical study	n = 570(ND) 47.37% between 20 and 24 years old and 84.21% females.	MBI-SS	3.57 (1.31)	1.78 (1.29)	2.12 (0.82)	64.04% 24.74% with burnout	35.79%	87.72%	2c/B
Deary et al. (2003).32 United Kingdom	Longitudinal and prospective study	n = 168. 25.4 years and 82.74% females	MBI-HSS	15.0(7.5)	3.9(4.1)	37.1(6.5)	-	-	-	2c/B
Frögeli et al., 2016.39 Sweden	Randomized controlled trial	Control group (n = 44) Intervention group (n = 38)	Scale of the Work Engagement and Burnout	Burnout score intervention group = 2.5 (0.1) Burnout score control group = 2.4(0.1)			-	-	-	1b/A
Haack (1988).29 USA	Cross-sectional descriptive study	n = 272 (74%). 46% within 22–25 years	MBI-HSS	23.3(9.6)	5.5(4.7)	32.1(6.5)	-	-	-	2c/B
Hu and Schaufeli (2009).34 China	Cross-sectional descriptive study	386 (86.2%), Mean age: 19 years. Females: 64%	The Maslach Burnout Inventory–Student Survey	Males: 11 (2.88) Females: 11.41 (4.52)	Males:8.12 (3.91) FemaleS: 7.45(4.2)	Males: 17.75 (6.67) Females: 15.82 (5.77)	-	-	-	2c/B
Katsifaraki and Tucker (2013).17 UK	Cross-sectional descriptive study	183 (-) Mean age: 20–47 years. -	Maslach Burnout Inventory (MBI)-Human Services Survey	14.22 (9.51)	4.12 (4.05)	34.56 (9.55)	10.4%	8.7%	4.9%	2c/B
Kong et al. (2021).42 China	Cross-sectional descriptive study	1225 (86.7%) Mean age: 20.94 (SD: 1.60) Females: 91.3%	Academic Burnout Scale	2.74 (0.66)	Improper behaviour: 2.91 (0.56)	2.75 (0.56)	-	-	-	2c/B

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Table 1 (*continued*)

Author, year of publication, country.	Study design	Sample size, age, women percentage	Burnout questionnaire	Burnout mean			Prevalence			EL/ GR
				EE	D	PA	High EE	High D	Low PA	
Liébana-Presa et al., 2017.35 Spain	Cross-sectional descriptive study	134 (-) Mean age: 21.52 81% females	The Maslach Burnout Inventory–Student Survey	2.8 (1.2)	1.1 (0.99)	4.1 (0.9)	-	-	-	2c/ B
Lopes and Nihei (2020).22 Brazil	Cross-sectional descriptive study	284 (68.3%) Mean age: 18–24 (77.5%) 90.1% females	MBI (validated in Portugal)	-	-	-	36.3% Burnout: 6%	37.7%	28.2%	2c/ B
Martins et al. (2017).30 Portugal	Cross-sectional descriptive study	236 (-) Mean age: 21.17 (+/−2.487) 78.4% females	MBI	25.48 (16.22)	18.82 (15.12)	65.04 (14.03)	-	-	-	2c/ B
Mathias & Wentzel, 2017.37 South Africa	Cross-sectional descriptive study	67 (79%) Mean age: 20–24 (85.07%) 80.59% females	PROQOL	-	-	-	6% had low level of burnout. 94% had medium level of burnout.			2c/ B
McKee-Lopez et al. (2019).18 USA	Cross-sectional descriptive study	211 (-) Mean age: 24.7 75% females	MBI	-	-	-	4%	7%	20%	2c/ B
Njim et al., 2017.43 Cameroon	Cross-sectional descriptive study	447 (-) Mean age: 22.28 (SD 3.61) 81.17% females	Oldenburg burnout inventory	Total Mean 38.04(4.78)			-	-	-	2c/ B
Nurhidayati et al., 2021.38 Indonesia	Cross-sectional descriptive study	83 (-) Mean age: 19 years (59.03%) 92.77% females	burnout questionnaire adapted from Budiman (2016)	Burnout mean 35.5 (8.9)			-	-	-	2c/ B
Pelit-Asku et al., 2020.44 Turkey	Randomized clinical trial	n intervention group= 67. 86.6% female and 21.92 years. n control group= 68. 83,3% female and 22.07 age. (SD 0,84)	Burnout Measure Short (BMS)	Group 1: 3.64(1.73) Group 2: 3.32(0.97)			-	-	-	1b/ A
QuinaGaldino et al. (2020)25 Brazil	Cross-sectional descriptive study	n = 114. (95,79%). 89,5% females and 21,3(3,5) age.	MBI-SS	-	-	-	76,3% 10,5% had burnout	31,6%	21,1%	2c/ B
Ríos Rísquez et al. (2012).27 Spain	Cross-sectional descriptive study	n = 218 75,7% females and 22,74 (5,66) years	MBI-GS	2,43 (1,09)	1,65 (1,17)	4.23 (0,79)	28%	19,7%	25.2%	2c/ B
Ríos-Risquez et al. (2016).19 Spain	Cross-sectional descriptive study	n = 113 (97,41%) 75,2% females and 24,42 (5,27) years.	MBI-SS	2,4 (1,35)	1,44 (1,13)	4,20 (0,59)	Prevalence of burnout 2.65%			2c/ B
Rohmani & Andiani, 2021.45 Indonesia	Cross-sectional descriptive study	n = 69 78,3% females and 19 (0,85) years	MBI-SS	-	-	-	46.4% had severe burnout, 34.8% moderate and 18.8 mild.			2c/ B
Rudman et al., 2012.46 Sweden	Cohort study	n = 1697 91% females and 28(7) years	Oldengburg Burnout Inventory	1st year: 2.28 (0.55) 2nd year: 2.36 (0.58) 3rd year: 2.37 (0.57)	1st year: 2.06(0.5) 2nd year: 2.17(0.52) 3rd year: 2.23(0.54)	-	Burnot prevalence 1st year: 29.7% 2nd year: 36.9% 3rd year: 41.0%			2a/ B
Sanches et al. (2017).21 Brazil	Cross-sectional	n = 41 (87,23%)	MBI-SS	22 (SD 4,78)	17 (SD 3,73)	24 (SD 4,09)	48.8% Burnot in	39%	26.8%	2c/ B

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Table 1 (*continued*)

Author, year of publication, country.	Study design	Sample size, age, women percentage	Burnout questionnaire	Burnout mean			Prevalence			EL/ GR
				EE	D	PA	High EE	High D	Low PA	
	descriptive study	95,1% females and 51.2% between 20 and 25 years					the 4.9% and 73.2% in developing process			
Skodova et al. (2017).47 Slovakia	Cross-sectional descriptive study	n = 91 (78,6%) 96,9% Femlaes and 20,6 (1,3) years	School Burnout Inventory (SBI)	Burnout: 30,19 (7,86)			-	-	-	2c/ B
Tomaschewski-Barlem et al. (2014).33 Brazil	Cross-sectional descriptive study	n = 168 92,9% females and 24,5 years.	MBI-SS	4	1,8	4,54	-	-	-	2c/ B
Valero-Chillerón et al. (2019).20 Spain	Cross-sectional descriptive study	n = 126 80,2% Females and 22,83 (6,03) years	MBI-SS	-	-	-	17.07%	0%	0%	2c/ B
Vasconcelos et al. (2020).26 Brazil	Cross-sectional descriptive study	n = 100 91% females and 22,93 (5,22) age	MBI-SS	-	-	-	75% Burnout prevalence 20%	29%	33%	2c/ B
Wang et al., 2019.48 China	Cross-sectional descriptive study	n = 1083 (95,1%) 87,9% females and 20 (1,38) years	Academic Burnout Scale	General burnout score: 2,77 (0,53) Dejection: 2.72(0.71) Improper behaviour: 2.97(0.62) Low personal accomplishment: 2.61 (0.53)			Higher EE in males		Lower PA in females	2c/ B
Wang et al. (2021).49 China	Cross-sectional descriptive study	n = 733 (96,8%) 82,13% females and 20,07 (1,45) years	Academic Burnout Scale	General burnout score: 2,97 (0,34) Dejection: 2.54(0.71) Improper behaviour: 3.51(0.55) Low personal accomplishment: 3.02 (0.44)			-	-	-	2c/ B

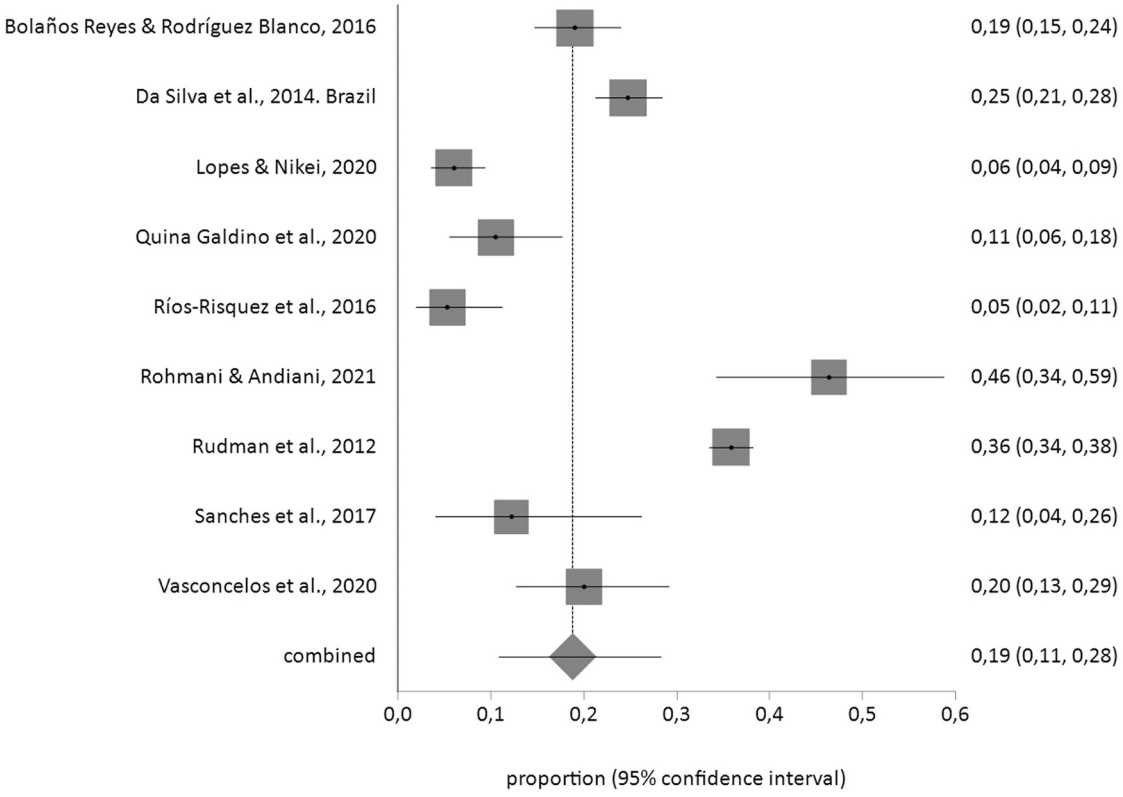

Fig. 2. Forestplot of burnout prevalence.

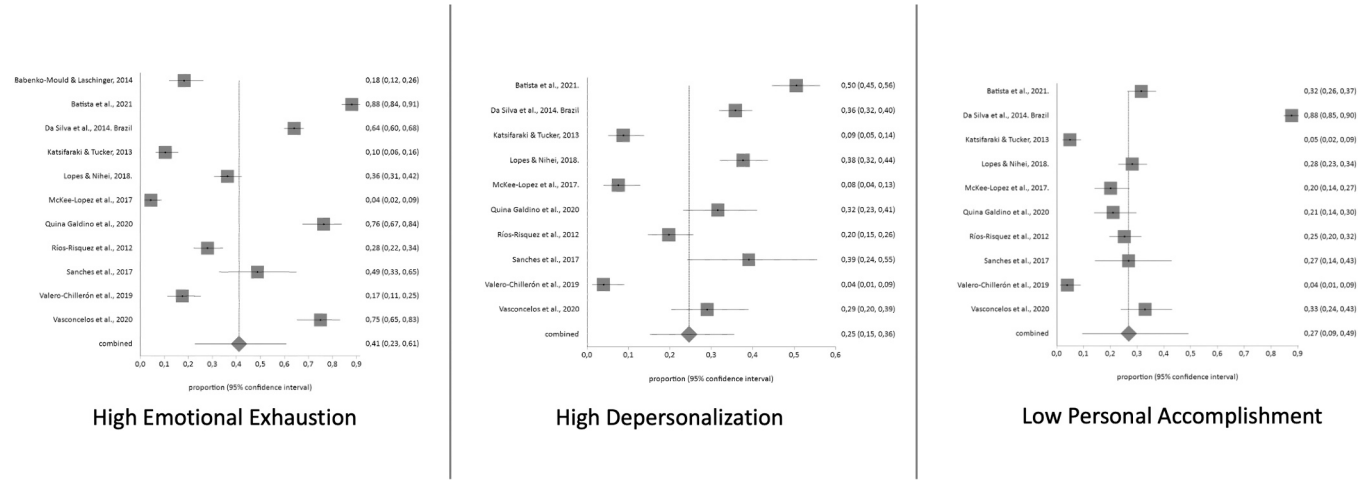

Fig. 3. Forestplot of prevalence of high emotional exhaustion, high depersonalization and low personal accomplishment.

Another factor that may be relevant to the development of burnout is that of the students' own personality, an association that has been observed among nurses (De la Fuente-Solana et al., 2021; Ortega-Campos et al., 2019). The university setting, and the clinical placements required of nursing students, can create complex situations generating anxiety, frustration, and feelings of loss or of being under threat (for example, exams, scholarship requirements, insecurity in dealing with patients and the impact of the death of patients) (Sun et al., 2020; Tambağ, 2021). Any or all of these factors may be conducive to burnout.

To prevent or reduce the impact of burnout, interventions based on group cognitive-behavioural-therapy, music, relaxation and mindfulness have shown positive results among health professionals and may also be useful for nursing students (Bagheri et al., 2019; Finnerty et al., 2022; Suleiman-Martos et al., 2020). These interventions should be included in the nursing degree in the first or second year as burnout tend to increase during the studies and taking into account that the personality and coping strategies of nursing students can influence burnout development(Gómez-Urquiza et al., 2023).

Useful area for future research is the prevention or reduction of burnout among nursing students by considering interventions that have proven positive for nurses, such as mindfulness, sport, or behavioural therapy.

Regarding the results obtained for the prevalence of emotional exhaustion among nursing students, universities should apply policies for alleviating this problem and detect students at risk of developing burnout. Another useful approach would be considering interventions to improve the situation of the students, offering them more support during clinical placements and in the final years of the degree.

5.1. Limitations

The present study has certain limitations. Firstly, the studies considered were carried out in different countries, where nursing courses and requirements may have differed significantly. In consequence, any generalisation of the results presented should be considered with caution. Furthermore, not all of these studies provided full information for our meta-analysis. Neither did they all use the same questionnaire for assessing burnout, being the MBI the most used in the included studies. Both of these questions make it difficult to compare the levels of burnout reported.

6. Conclusions

The most strongly affected dimension of burnout among nursing students is that of emotional exhaustion, followed by feelings of low personal accomplishment and depersonalisation. Our meta-analysis revealed a level of burnout among nursing students of 21%. By addressing this problem at an early stage and implementing interventions to prepare students for future professional responsibilities, the future impact of burnout among nurses could be prevented or reduced.

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CRediT authorship contribution statement

José L. Gómez-Urquiza: Conceptualization, Methodology, Investigation, Formal analysis, Writing- Original draft preparation. Almudena Velando-Soriano: Investigation, Data curation, Writing- Original draft preparation, Visualization. **María José Membrive-Soriano:** Visualization, investigation, Methodology, Data curation. **Lucía Ramírez-Baena:** Investigation, Data curation, Writing- Original draft preparation, Visualization. **Raimundo Aguayo-Estremera:** Writing- Reviewing and Editing, Supervision, Data curation, Methodology. **Guillermo A. Cañadas-De la Fuente:** Writing- Reviewing and Editing, Supervision, Project administration, Funding acquisition, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.nepr.2023.103753.

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