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Prevalence of burnout syndrome in university students: A systematic review

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ABSTRACT

Background. Burnout syndrome is a social and health problem in college students. **Objective.** To synthesize evidence from previous studies on the prevalence of burnout syndrome in university students in their three-dimensional approach. **Method.** The search strategies followed the PRISMA guidelines and were based on the following descriptive terms: "burnout," "studies," "prevalence," "students." Pubmed, Web of Science Core Collection, PsicINFO, and Scielo were consulted. An evaluation of the quality of the information was carried out applying the STROBE positioning guidelines. **Results.** We found 1,406 studies that were reduced to 46 studies for final analysis using the STROBE statement, eventually leaving 20 studies. One study (5%) was conducted in North America, five (25%) in Asia, nine (45%) in Latin America, and five (25%) in Europe. Of the 20 studies evaluated in the systematic review, those that had the best overall evaluation in the STROBE analysis were selected for discussion, corresponding to 10 (out of 75% of STROBE). Overall prevalence of each dimension of the syndrome was estimated at 55.4% for emotional exhaustion, 31.6% for cynicism, and 30.9% for academic efficacy. **Discussion and conclusion.** Moderate levels of burnout syndrome prevail in the different populations of university students of different careers worldwide. In only a few studies is the prevalence low and this could be due to multiple evaluative variables.

Keywords: Burnout, studies, prevalence, students, mental health.

RESUMEN

Introducción. El síndrome de burnout es un problema social y de salud en los estudiantes universitarios. **Objetivo.** Sintetizar las pruebas de estudios anteriores sobre la prevalencia del síndrome de burnout en estudiantes universitarios en su enfoque tridimensional. **Método.** Las estrategias de búsqueda siguieron las pautas de PRISMA y se basaron en los siguientes términos descriptivos: "burnout", "estudios", "prevalencia", "estudiantes". Se consultaron Pubmed, Web of Science Core Collection, PsicINFO y Scielo. Se llevó a cabo una evaluación de la calidad de la información aplicando las directrices de posicionamiento de STROBE. **Resultados.** Se encontraron 1,406 estudios que se redujeron a 46 estudios para el análisis final utilizando la declaración STROBE, con lo que quedaron finalmente 20 estudios. Un estudio (5%) se llevó a cabo en América del Norte, cinco (25%) en Asia, nueve (45%) en América Latina y cinco (25%) en Europa. De los 20 estudios evaluados en la revisión sistemática, se seleccionaron para su discusión aquellos que tuvieron la mejor evaluación general en el análisis de la STROBE, correspondientes a 10 (de un 75% de la STROBE). La prevalencia general de cada dimensión del síndrome se estimó en un 55.4% para el agotamiento emocional, un 31.6% para el cinismo y un 30.9% para la eficacia académica. **Discusión y conclusión.** Los niveles moderados del síndrome de burnout prevalecen en las diferentes poblaciones de estudiantes universitarios de distintas carreras en todo el mundo. En sólo unos pocos estudios la prevalencia es baja y esto podría deberse a múltiples variables evaluativas.

Palabras clave: Burnout, estudios, prevalencia, estudiantes, salud mental.

BACKGROUND

Burnout Syndrome (BOS) is nowadays a striking social and health problem taking place mostly in worplaces. This field of study has expanded drastically around the world, as research has begun in other professional fields and, more recently, studies with undergraduate university students.

One essential aspect addressed in the study of BOS has been its definition. Conceptualizing a complex process such as this syndrome, because of its similarity, but not equality, with the concept of high stress levels observed in organizations, has been continuously questioning their theories. In the study of this syndrome, the hegemonic presence of the conceptual approach is composed by the three-dimensional icons. This approach originates in the work of Maslach and Jackson (1981) and its diffusion made it possible to define this syndrome through a three-dimensional construct (emotional exhaustion, depersonalization, and low personal realization).

The generalization of the syndrome in the undergraduate student academic environment arises from the presumption that these students, like any other profesional, confront pressures and work overloads typical of the academic field. The afore mentioned students, like any other employee, maintain a direct and indirect compensation relationship with their university, evidenced by financial support, scholarships, awards, or prizes. This presumption allows us to investigate the individual's responses to stress and its implications for this group of students who are not able to be completely successful in their studies (Moreno-Jiménez, Rodríguez-Carvajal, Garrosa-Hernández & Morante Benadero, 2008).

Moreover, students with high levels of burnout are exhausted by the demands of study, have a cynical and distant attitude toward schooling, and feel ineffective as students (Martínez Martínez, Marques-Pinto, Salanova, & Lopes da Silva, 2002). According to several studies the most common manifestations of BOS in students are physical and mental exhaustion, dropping out of school and decreased academic performance (Gil-Monte, Rojas, & Ocaña, 2009; Gil-Monte & Moreno-Jiménez, 2005).

The development of the burnout study has been possible, among other studies, by the development of reliable and valid diagnostic tools. Research on burnout has pointed out that there is a common language (in terms of measurement) that comes from the Maslach Burnout Inventory (MBI) that has been, and is at the same time, the dominant measure of burnout. The MBI has been widely used to the extent that the rest of the instruments have had little significant development in scientific literature. Therefore, it can be said that the MBI remains the instrument par excellence for measuring and evaluating burnout.

The operationalization of academic burnout has been possible by the standardization of the Maslach Burnout Inventory-Student Survey (MBI-SS) of Schaufeli et al. (2002). This has made it possible to measure burnout outside the occupational realm by defining its dimensions in reference to the study in students. Its application demonstrated the presence of a significant proportion of students reflecting exhaustion from the demands of study, as well as attitudes of disinterest, self-sabotage in academic activities, doubts about the value of study (cynicism), and feelings of incompetence as students (academic effectiveness or self-efficacy) (Moreno-Jiménez et al., 2008; Pereda-Torales, Márquez Celedonio, Hoyos Vásquez, & Yánez Zamora, 2009).

The prevalence of this syndrome in university student populations has been addressed in international scientific literature in different ways, mainly on the basis of the diversity of instruments used for its assessment. This has led to a certain complexity in making comparisons and analysing results between these studies due to their heterogeneity. Unfortunately, most of these instruments were not developed and validated for students' populations, in this case on the assumption that the syndrome is not caused by work demands but by study demands. Below are some of these instruments used in students:

The MBI-SS (Schaufeli et al., 2002), has been, so far, the most used in most of the research at an international level (Hederich-Martínez & Caballero-Domínguez, 2016; Yavuz & Dogan, 2014; Adas-Garbin, Adas-Saliba, Reis dos Santos, Leal do Prado, & Isper Garbin, 2012; Faye-Dumanget, Carré, Le Borgne, & Boudoukha, 2017; Portoghese et al., 2018; Shin, Puig, Lee, Lee, & Lee, 2011; Ilic, Todorovic, Jovanovic, & Ilic, 2017) because it is specifically suitable for students and has three well-defined dimensions: exhaustion, cynicism, and academic effectiveness. In contrast, the MBI (Maslach & Jackson, 1981) is Maslach's basic general instrument and has also been frequently misused for the diagnosis of student populations (Hojat, Vergare, Isenberg, Cohen, & Spandorfer, 2015; Almeida, Souza, Almeida, Almeida, & Almeida, 2016) when it is suitable only for workers. Its three dimensions are: exhaustion, depersonalization, and reduced personal accomplishment.

The Burnout Measure (Malakh-Pines, Aronson, & Kafry, 1981) consists of 21 reagents, and evaluates BOS through the dimensions: emotional exhaustion, physical exhaustion, and mental exhaustion. As can be seen, there are different forms of exhaustion.

The Oldenburg Burnout Inventory (Halbesleben & Demerouti, 2005) describes different states of emotional exhaustion, detachment and according to each element in the four point ordinal scale.

The Questionnaire for the evaluation of BOS (Gil-Monte et al., 2009; Cáceres-Mejía et al., 2013), which, unlike the MBI, has four dimensions: illusion for work, psychic wear, indolence, and guilt.

And finally, the Copenhagen Burnout Inventory (Kristensen, Borritz, Villadsen, & Christensen, 2005) which consists of three scales measuring personal burnout, work-re-

lated burnout, and client-related burnout. In these cases, each dimension is defined differently and the same is not compared in each element, even though the predominant dimension in all three instruments is exhaustion.

Unfortunately, in these instruments, there is neither unanimous criterion among the experts to establish the diagnosis nor the percentages of prevalence and incidence, since the criteria varies for each study. Due to this absence of clear criteria, many studies have resorted to determine the syndrome using statistical standars linked to the sample: the use of one or half standard deviation around the mean, or the use of a number of predetermined percentiles (the tercil or the upper quartile are the most frequent), which the appearance of the syndrome in the sample, without this, creating the need to establish indicators that help through objective and subjective criteria, and to establish the cut-off points of the instruments that determine the presence of the syndrome. Furthermore, the fact that each instrument has different dimensions makes analysis between studies even more difficult.

Most of the previous reviews are only framed in medical students, leaving aside studies in other university students in which the prevalence of this syndrome has also been demonstrated. In addition, working students (mainly medical residents and post-graduate students who work) are mixed with full-time and undergraduate students, when the burnout of university students is fundamentally an academic and non-work organizational cause, and therefore its dimensions and content are adapted to this particular feature and cannot be confused. Also included, there are studies evaluated with various instruments, some more validated and recognized than others, which does do not allow for a true comparison between them and make a real analysis of their prevalence difficult, and in addition, studies that were evaluated with instruments not designed for student populations but for employees.

Hence, results from previous research of BOS levels in university students point out to a variable prevalence between 8% and 56.9% of the population studied (Loayza-Castro et al., 2016; Castro Bastidas, Ceballos, & Ortiz Delgado, 2011). This variation is associated, among other variables, with the instrument used, the criteria for diagnosis, and the career or specialty that a university student pursues (Loayza-Castro et al., 2016). It is limited by the possible influence of cultural aspects in the dimensions examined (Hederich-Martínez & Caballero-Domínguez, 2016). In addition to a lack of criteria for measuring subscales or dimensions when using the MBI-SS instrument (Adas-Garbin et al., 2012). Among the variables associated with the syndrome we can highlight age (20.31%), sex (20.31%), marital status or couple stability (14.06%), schooling (12.50%), the possibility of social interaction (6.25%), the number of children (3.12%), the relationship with the partner (3.12%), or the demands of the household (3.12%) (Juárez-García, Idrovo, Camacho-Ávila, & Placencia-Reyes, 2014).

BOS may persist beyond medical school, and it is, at times, associated with psychiatric disorders and suicidal ideation. A variety of personal and professional characteristics correlate well with burnout (IsHak et al., 2013). Gender, age, and whether the student came from an urban or rural setting were all identified as significant predictors. Gender could be an influence as a significant predictor of burnout or it is at least one of its constructs, with male students experiencing a greater degree of suffering than female students. The emotional exhaustion in men tends to be significantly higher than in women (Chunming, Harrison, MacIntyre, Travaglia, & Balasooriya, 2017).

The relevance of the burnout phenomenon among undergraduate university students, its differentiation, specificity, study and analysis of its prevalence with that presented in other student's groups and the early detection of significant symptomatic levels, may constitute a strong indicator of possible future difficulties in plans of academic or professional success and an excellent opportunity for early intervention.

As explained above, in order to carry out an updated analysis of the prevalence levels of BOS in university student populations in and abroad, it is necessary to carry out this study, based on the three-dimensional conceptions of the syndrome, specifically with results from the application of the MBI-SS, a specific instrument validated for university students in many countries, and based on these results, perhaps to be able to propose prevention and intervention programs in local universities.

In this context, it is intended to determine the main levels of prevalence of BOS in undergraduate university students, according to its three-dimensional approach and thus to answer questions such as: What is the degree of BOS in undergraduate university students according to its three-dimensional approach at the international level? Are there studies with other university students that are not only medical?

So, we can outline the following hypothesis:

There are insufficient studies that expose the levels of prevalence of BOS undergraduate university students according to their three-dimensional approach.

That is why, the aim of this study was therefore to synthesize the evidence from previous studies on the prevalence of BOS in university students in their three-dimensional approach (only with the use of the MBI-SS instrument, specifically for undergraduate university students) by conducting a systematic review.

METHOD

Description of the sample

The search strategies followed the PRISMA guidelines (Moher, Liberati, Tetzlaff, Altman, & Prisma Group, 2009)

and were based on the following descriptive terms and keywords defined by the authors and indexed in the Medical Subject Headings (MESH): "burnout," "studies," "prevalence," "students." The following combinations were used: "burnout" and "students," "burnout" and "prevalence," "burnout" and "studies." The search was conducted in Spanish and English (burnout, studies, prevalence, students) using the same combinations. The combination of these keywords was or taken from into the following academic journal databases: Pubmed (www.ncbi.nlm.nih.gov/pubmed/), Web of Science Core Collection (www. webofknowledge.com), PsicINFO (https://www.apa.org/pubs/databases/psycinfo) and Scielo (http://www.scielo.org).

The advanced meta-search option was performed, using the inherent resources to each database. The investigation proceedings were conducted from 1 July to 30 August 2018. The period selected for the search was: all articles, meeting the inclusion requirements, published between 1 January 2013 and 30 June 2018.

Procedure

Two different researchers performed the initial search using the list of keywords developed for this analysis by the authors who wrote the paper. The following selection procedures were implemented to determine whether the articles obtained in the initial searches were relevant to the present study: a) reading the titles: if the titles appeared relevant, the citations would be stored in a specific software (Mendeley Desktop 1.17.13) and all duplicates would be removed after the initial review; b) reading of abstracts: if abstracts did not provide sufficient information related to the inclusion criteria they would be excluded from the study; c) reading of full text articles: if the studies met the exclusion criteria, they would be excluded; d) in case of disagreement among the researchers, a third opinion was sought from an independent reviewer to assist with the assessment (including, excluding, and questioning) and discussion of the articles until consensus was obtained for their inclusion or exclusion in the systematic review; and e) to verify the quality of the information (QoI) from each study using STROBE (Von Elm et al., 2008) to assess the methodological quality of the studies. This ensures the reliability of the data obtained and the quality of the selected studies and the conclusions that can be drawn from them. In order to be accepted, they had to have 66.6% or more of the correct items, i.e., 15 or more items out of a possible 22. For them to move on to the final discussion they had to have 17 items out of 22, i.e., about 75.0%.

The scientific journal repositories of Pubmed (www.ncbi.nlm.nih.gov/pubmed/), ISI Web of Knowledge (www.webofknowledge.com), Scielo (http://www.scielo.org), ScienceDirect (https://www.sciencedirect.com), Scopus (https://www.scopus.com/home.uri) and PsycoINFO (http://www.apa.org/pubs/databases/psycinfo/index.aspx) were accessed through the search engines of their respective websites, from the virtual search platform of the University of Ambato library.

For our study we were able to access most of the international scientific databases, but we selected the previous ones because they were considered by the authors to be the most academically relevant and those that could have the highest number of articles on BOS prevalence in undergraduate students with the required quality.

In addition, if during the review of full-text articles, a study provided incomplete data, authors might have been contacted by email requesting missing information. If no response was obtained, the article was excluded from the study as well.

Study selection criteria

The inclusion criteria used were: Articles from journals indexed in ISI Web of Knowledge (Core Collection), Pubmed, ScienceDirect, Scopus, PsicINFO and Scielo; in English or Spanish; last five years, i.e., studies published between 1 January 2013 and 30 June 2018; original and observational in nature; undergraduate university students only; exclusively MBI-SS is used for diagnosis (three-dimensional approach).

Within the exclusion criteria, the following criteria was taken into account: studies in employees or student-employee populations; in medical and health science residents; in graduate students; use of diagnostic instruments other than MBI-SS; stress and other variables related to mental health and not BOS; review articles and/or meta-analysis. Articles that had no response from the authors.

The presentation of data on the prevalence of burnout was made based on the results found in the previous bases and discriminating them according to their level of quality using STROBE guidelines.

Quality assessment (QA)

The positioning guidelines of the PRISMA Declaration were followed (Moher et al., 2009) to assist in the methodological design of this study. These guidelines describe the four stages (identification, selection, eligibility, final selection) for conducting research and selecting manuscripts within a systematic review (SR) and present the graphic option of drawing a study flowchart (Moher et al., 2009). In addition, this SR follows the acronym PICOS ("patient, problem or population," "intervention," "comparison, control," "results") which guides the refinement of systematic research, making the process more effective (Panic, Leoncini, de Belvis, Ricciardi, & Boccia, 2013).

The authors of the selected articles were contacted by email. First, the main author and, then, if he did not respond,

to the following authors. A period of 30 days was defined for the respective response.

The assessment of heterogeneity determines whether or not there is a significant difference between the results of the randomised studies. Since our study was a systematic review without reaching a quantitative meta-analysis, we did not quantitatively assess the heterogeneity of the selected studies. From a methodological point of view, there may be many sources of heterogeneity: chance, differences in delineation, the way patients were selected, differences in the interventions and in the way tests were evaluated (de Sousa & Ribeiro, 2009; Dinnes, Deeks, Kirby, & Roderick, 2005). The variation in the cut-off points for the reference values of the test in question. The Cochrane manual proposes seven strategies to address heterogeneity, the final decision should be discussed and made by the research group. In our case we used four because of the explained characteristics of our study (Higgins et al., 2019): verification the data again, to reduce the possibility of heterogeneity the selection of the studies was made by two reviewers independently, in order to increase the reliability and safety of the process. When there were discrepancies between the two reviewers regarding the decision to include or not an article, a third independent investigator was appointed to arbitrate the discrepancies and ultimately make the final decision. The failure to perform a meta-analysis was taken on the basis of the large differences found between the student prevalence studies. Ignoring the heterogeneity, in this case the respective mathematical calculation was not carried out as a result of the elements explained above. Excluded studies, according to the criteria proposed above, that did not meet the above characteristics and thus reduce possible confusion in the results of the included studies.

Qualitative data were then extracted from the articles included in the study and organized into a specific table, using the PRISMA method. The different items included: authors, year of publication, country where the study was conducted, sample: type and number, age of the sample, sex of the sample, design of the research, factors controlled in the study, statistical treatment, and main results of the study (Table 1).

An assessment of the quality of information (QoI) of the articles included in the systematic review based on the application of STROBE (STrengthening the Reporting of Observational Studies in Epidemiology) positioning guidelines was performed. The method evaluates a list of 22 items capable of quantitatively evaluating the quality of the information. The QoI value for the items and sub-items established a criterion for assigning a point for each completed item and sub-item. The checklist was conducted by two separate researchers. A minimum QoI criterion of 50% was established at ≥ to select the article to be included in the final RH, qualifying it as a highly relevant article for the topic under study. After performing the STROBE analysis the papers were reduced to a final sample of 20 studies that were accepted with an average of 74.3%, which were used in the systematic review (Table 1). Then the selection process is summarized in the PRISMA flowchart (Figure 1).

In the total search of all the above databases, 1,406 studies were found according to the descriptors used. Most of these were not directly linked to the systematic review study on the prevalence of BOS in university students, and many were not even linked to the syndrome previously exposed by title and keywords, leaving 596 studies. From these studies, later, we proceeded to read the title and abstract of each article and excluded duplicates and studies that met the exclusion criteria. There were 140 studies left, documents for full text reading, which were reduced to 46 studies for final analysis by means of the STROBE statement. Finally, there were 20 studies to take into account to conclude the research at this level.

RESULTS

The 20 studies selected were original and directed in foreign scenarios. One study (5%) was conducted in North America, five (25%) in Asia, nine (45%) in Latin America, and five (25%) in Europe. Out of the 20 studies evaluated in the systematic review, the ones that had the best overall evaluation in the STROBE analysis were selected for discussion, corresponding to 10 (out of 75% of STROBE) and therefore the ones with the highest quality (Table 1).

Among the variety of university students studied, the most important were those in medicine with 12 studies (60%), seven in dentistry (35%), and six in nursing (30%). The other types of students found are: pharmacy, engineering, arts, information technology, psychology and social sciences. The range of samples ranged from 113 to 5,647 students. The systematic review was finally carried out with the 10 selected studies. The sum of the samples from the previous studies is 11,002 patient students. The characteristics of each study are detailed in Table 2.

All the selected studies coincided in being cross-sectional. The differences in their analysis methodology may have partly limited the possibility of comparing the results between them, although only studies using the MBI-SS as the only internationally validated three-dimensional instrument were selected to reduce the possible heterogeneity of the results.

The studies that gave the highest value according to this STROBE analysis were those by Kristanto, Chen, & Thoo (2016) and Eren et al. (2016) that were over 80% stronger in methods and discussion of results. In contrast to Liu et al. (2018); Mafla et al. (2015); Escuderos, Colorado, & Sañudo (2017); Lee, Choi, & Chae (2017); and Ríos-Risquez, García-Izquierdo, Sabuco-Tebar, Carrillo-Garcia, & Martinez-Roche (2016) who were below 70% (Table 1).

Table 1
Analysis STROBE

	Title and abstract	*Introduction: Context and rationale*	*Introduction: Objectives*	*Methods: Study design*	*Methods: Context*	*Methods: Participants*	*Methods: variables*	*Methods: Data, measures*	*Methods: biases*	*Methods: sample size*	*Methods: Quantitative variables*	*Statistical methods*	*Results: Participants*	*Results: descriptive data*	*Results: Data outcome variables*	*Main results*	*Other analyzes*	*Discussion: Key Results*	*Discussion: Limitations*	*Discussion: interpretation*	*Discussion: generalizability*	*Financial information*	*Total sum items*	*Total percentage*
Author (year)	*I*	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*	*IX*	*X*	*XI*	*XII*	*XIII*	*XIV*	*XV*	*XVI*	*XVII*	*XVIII*	*XIX*	*XX*	*XXI*	*XXII*	*22*	*100%*
Almalki et al., 2017*	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	1	1	1	0	0	17	77.3%
Pagnin et al., 2013	1	1	1	1	1	1	1	1	0	0	1	1	0	1	1	1	0	1	0	1	0	0	15	68.2%
Boni et al., 2018*	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	1	1	1	0	0	17	77.3%
Tomaschewski-Barlem et al., 2014	1	1	1	1	1	0	1	1	0	0	1	1	1	1	1	1	0	1	1	1	0	0	16	72.7%
da Silva et al., 2014*	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	0	1	0	0	17	77.3%
Pagnin & de Queiroz, 2015	1	1	1	1	1	0	1	1	0	0	1	1	1	1	1	1	0	1	0	1	0	0	15	68.2%
Pagnin & de Queiroz, 2015*	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	0	0	18	81.8%
Liu et al., 2018	1	1	1	1	1	0	0	1	0	1	1	1	1	1	1	1	0	1	0	1	0	0	15	68.2%
Mafla et al., 2015	1	1	1	1	0	1	0	1	0	0	1	1	1	1	1	1	0	1	1	1	0	0	15	68.2%
Ferrel-Ortega et al., 2017*	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	0	1	1	1	0	0	17	77.3%
Escuderos et al., 2017	1	1	1	1	0	0	1	1	0	1	1	1	1	1	1	1	0	1	0	1	0	0	15	68.2%
Chae, Jeong, & Chung, 2017	1	1	1	1	0	0	1	1	0	1	1	1	1	1	1	1	0	1	1	1	0	0	16	72.7%
Lee et al., 2017	1	1	1	1	0	0	1	1	0	1	1	1	1	1	1	1	0	1	0	1	0	0	15	68.2%
Galán, Ríos-Santos, Polo, Rios-Carrasco, & Bullón, 2014	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	0	1	0	0	16	72.7%
Ríos-Risquez et al., 2016	1	1	1	1	0	0	1	1	0	1	1	1	1	1	1	1	0	1	0	1	0	0	15	68.2%
Győrffy et al., 2016*	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	0	0	17	77.3%
Kristanto et al., 2016*	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	0	0	18	81.8%
Atalayin et al., 2015*	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	0	1	0	0	17	77.3%
Eren et al., 2016*	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	0	19	86.4%
Bughi et al., 2017*	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	0	1	0	0	17	77.3%
Average total percentage																								74.3%

* Above 75% STROBE

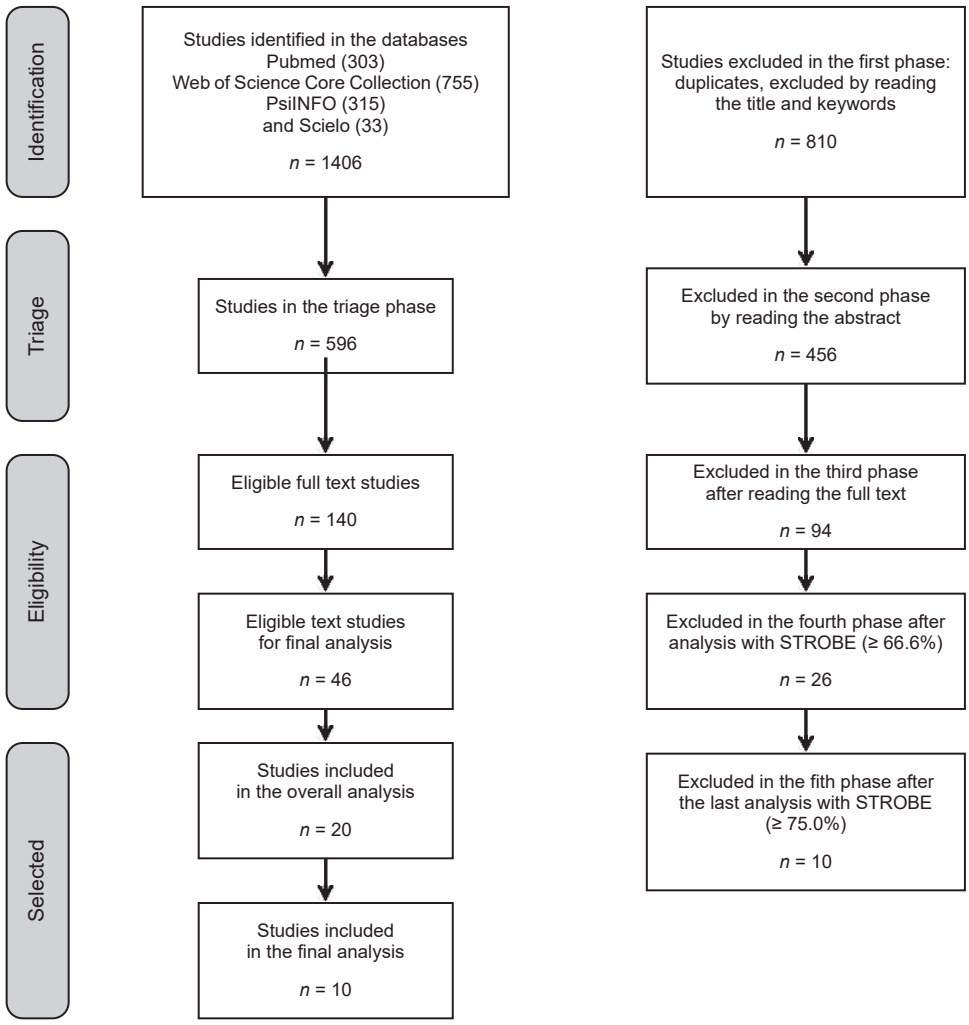

Figure 1. PRISMA Flowchart of the selection process.

The analysis of overall prevalence was extracted from 10 studies that had the best overall evaluation in the STROBE analysis (over 75% STROBE, Table 1).

Information on the overall prevalence of each dimension of the syndrome was estimated at 55.4% (6095 of 11002 students) for emotional exhaustion, 31.6% (3482/11002) for cynicism, and 30.9% (3399/11002) for academic efficacy. In all of them, the specific instrument for students MBI-SS was used for their evaluation. Showing a considerably high prevalence globally and also individually in each study (Table 2).

As it can be seen in the general results above, the emotional exhaustion dimension was the highest in the studies analyzed with a maximum of 70.6% in medical students in Brazil (Boni et al., 2018) and a minimum of 9.8% in psychology, medicine, dentistry, environmental engineering, civil systems, electronics, and industrial students in Colombia (Ferrel-Ortega, Ferrel-Ballestas, Cantillo-Aguirre, Jaramillo-Campo, & Jiménez-Suárez 2017). A high prevalence was found not only in the first study presented but also in others such as those conducted in Brazilian nursing students with a prevalence of 64% (da Silva et al., 2014), in arts and social sciences, business, engineering, information technology, medicine, health sciences, and pharmacy students from Malaysia (Kristanto et al., 2016) with 66.7% and in medical students from the United States with a prevalence over 60% of exhaustion (Bughi, Lie, Zia, & Rosenthal, 2017). In contrast, in European medical students from Hungary (Győrffy, Birkás, & Sándor, 2016) and Turkey (Atalayin, Balkis, Tezel, Onal, & Kayrak, 2015) the prevalence levels of burnout were slightly lower than average (38.6% and 22.3%, respectively). And thus, slightly reducing the average overall depletion levels, the main dimension of the BOS.

In contrast, the prevalence of the cynicism dimension was slightly lower overall and individually in the studies. The highest levels were found in 58.6% of medical students in Saudi Arabia (Almalki, Almojali, Alothman, Masuadi, & Alaqeel, 2017) and again in students in Malaysia (58.3%).

Table 2
Summary and characteristics of the final studies selected

Authors	*Year*	*Country*	*Mean characteristic*	*Statistical treatment*	*Main aims*	*Prevalence results*
Almalki et al.	2017	Saudi Arabia	249 medical students. Both genders. 32.5% women. Between 19 and 30 years, with a mean age of 21.8 years (*SD* = 1.4).	Frequency and percentage. Chi-square test of Pearson. Odds ratios (OR) and confidence intervals of 95% (95% *CI*). *p* < .05 statistically significant.	Assess levels of burnout of students of a medical college in Saudi Arabia.	Burnout level of 67.1% (*n* = 167). Most (62.3%, *n* = 155) of students had high levels of cynicism, 58.6% (*n* = 146) had high levels of emotional exhaustion, and 60.2% (*n* = 150) had low levels of professional efficiency.
Boni et al.	2018	Brazil	279 medical students of both sexes enrolled in the first and fourth year.	Frequency tables for qualitative variables and mean and standard deviation χ test, *p* value. Multiple logistic regression.	To evaluate the prevalence and associated factors with the development of burnout among medical students.	*n* = 187, 70.6%, students with high emotional exhaustion, 140 (*n* = 140, 52.8%) as high cynicism, and 129 (*n* = 129, 48.7%) exhibit low academic efficiency. According to the study bidimensional (high cynicism high exhaustion +), 119 (*n* = 119, 44.9%) experienced students exhaustion
da Silva et al.	2014	Brazil	570 nursing students of both sexes.	Minimum and maximum values, average, standard deviation. Exact probability test Fischer Cronbach's alpha.	To determine the association between stress and burnout in nursing students from Brazilian universities.	64.04% of students had a high level of emotional exhaustion, 35.79% had a high level of cynicism and 87.72% a low level of professional efficiency.
Pagnin & de Queiroz.	2015	Brazil	127 Medical Students sophomore at Fluminense Federal University (Niteroi, Brazil). Average age 21 (*M* = 21.35, *SD* = 2.27), and women accounted for 55% (70%). 127 of the sample.	Descriptive statistics such as frequency, relative frequency, mean and standard deviation.	Evaluate the relationship between burnout and sleep disorders in students the preclinical phase of medical school.	Emotional exhaustion 76 students (59.8%). Average: 4.15 (*SD* = 1.08) Cynicism 26 students (20.5%). MDia 2.29 (*SD* = 1.62); Academic Effectiveness 22 (17.3%). Average of 3.95 (*SD* = 0.99).
Ferrel-Ortega et al.	2017	Colombia	Stratified sample of 280 students of Psychology, Medicine Dentistry, Environmental Engineering, Civil Systems, Electronics and Industrial. Both genders.	Software SPSS v19.0 ANOVA statistical analysis for the respective Variances.	Compare the dimensions of burnout and engineering students. Health Sciences in relation to academic and sociodemographic variables.	47.6% had a low level of emotional exhaustion, 42.5% had an average level and 9.8% had a high level. Cynicism, most students (92.5%) had a level low, 4.7% had an average 2.8% level and high level. Academic efficiency, it was found that 66.1% has a high level, 32.3% and an average level only 1.6% showed a low level.
Győrffy et al.	2016	Hungary	721 students of general medicine in the four Hungarian hospitals medical universities (Budapest, Debrecen, Pécs and Szeged). M f	Frequency, average and standard deviation. Percentage differences between variables. *t*-test and chi-square test.	Relation between altruistic student engagement and burnout.	Emotional exhaustion low: 61.45% (438 students), medium or high: 38.6% (275 students). Cynicism under: 65.5% (472 students), medium or high: 34.0% (249 students). Reduced academic efficiency low: 76.0% (544 students), medium or high: 24.0% (172 students).
Kristanto et al.	2016	Malaysia	132 students of the School of Arts and Social Sciences, School Business, School of Engineering, School of Information Technology, School of Medicine and Health Sciences Jeffrey Cheah School of Sciences and the School of Pharmacy.	(Mean, standard deviation, median, minimum descriptive statistics and maximum) frequency and internal consistency percentage (Cronbach). Wilcoxon test Mann-Whitney test was conducted in abnormal cases distributed data.	Research the prevalence of academic exhaustion as well as exploring the potential relationship between academic burnout and eating disorder among college students.	66.7% of participants had a high level of exhaustion, 58.3% had low level of Cynicism and 50.0% had low academic efficiency. 11.4% of participants had a low level of academic burnout, 25.0% had a medium level and 63.6% high level. Exhaustion: Moderate Low 20 15.1% 24 18.2% 88 66.7% High Cynicism: 9 6.8% Moderate Low 46 High 77 34.9% 58.3% Academic effectiveness: Moderate Low 66 50.0% 48 36.4% 18 13.6% High
Atalayin et al.	2015	Turkey	Preclinical Dentistry School students randomly selected Dentistry (*n* = 329, 50.5% women and 49.5% men) from 18 to 24 years old.	Pearson Correlation was used to establish the relationship between variations; ty testing the way ANOVA was also used to test if the variation dependent with respect to independent changes differed. Chi-square (c2), Mean square error of approximation (RMSEA).	Investigate the prevalence of burnout among a group of Turkish students in pre-clinical dentistry.	22.3% of students had a high level of emotional exhaustion, 16.7% of students had a high level of cynicism and 17.9% of students were suffering from a high level of academic effectiveness reduced.
Eren et al.	2016	Turkey	Preclinical and clinical students at the Faculty of Dentistry at the University of Ankara in Turkey periods. 458 dental students were included.	Simple descriptive statistics, Kruskal-Wallis test was performed, the correlation analysis and t test. Statistical significance was indicated by *P* < .05.	To investigate the prevalence of burnout and limiting occupational participation among students of a dental school in Turkey.	26% of students were exhausted and 25% of the students had emotional exhaustion, 18% of students had cynicism and 14% of the students had academic effectiveness reduced.
Bughi et al.	2017	USA	182 medical students of 1st year at a school in urban medicine in California. (52.3%) were male students.	Descriptive to report demographics and prevalence statistics. We check the quality of the data using effect sizes and reliability. Parametric tests based on our adequate sample size and distribution.	To examine the relationship between levels of stress and burnout.	Higher scores were reported by exhaustion 118/182 (64.8%), cynicism in 76/182 (41.8%), and decreased professional effectiveness in 38/182 (20.9%) 21 (11.5%) of respondents had high scores in the three dimensions of exhaustion (i.e., exhaustion, cynicism, and decreasing professional effectiveness), 6 (3.3%) of moderate level 6 (3.3%) and low scores 149 (81.9%).

Low levels were found in two studies conducted in Eurasian Turkey with prevalence in dentistry students below 20% (Atalayin et al., 2015; Eren et al., 2016).

The female gender (62.7%, 6898) was most affected by the syndrome over the male (37.3%, 4104) in the overall results of the studies analyzed.

DISCUSSION AND CONCLUSION

The primary objective of this study was to synthesize evidence from previous research over the past five years on the prevalence of BOS levels in its three-dimensional approach (only the use of the MBI-SS instrument, specifically for undergraduate university students) by conducting a systematic review of university students worldwide.

Information in the overall prevalence of each dimension of the syndrome was estimated at 55.4% for emotional exhaustion, 31.6% for cynicism, and 30.9% for academic efficacy. Overall in the BOS, there was almost a 40% prevalence in the selected studies. Hence, showing a considerably high prevalence globally and also individually in each study. By career, the highest prevalence levels were found in medical careers (Almalki et al., 2017; Bughi et al., 2017; Boni et al., 2018), nursing careers (da Silva et al., 2014), and engineering and information technology students (Kristanto et al., 2016). In contrast, there were lower levels in students of arts, social sciences, business (Kristanto et al., 2016), and dentistry (Atalayin et al., 2015; Eren et al., 2016).

A comparison of the results between the different studies selected shows that they are very diverse. High levels of prevalence of the BOS depletion dimension were found in studies conducted among medical students in Saudi Arabia (Almalki et al., 2017), medical students in Brazil (Boni et al., 2018; da Silva et al., 2014), nurses in Brazil (da Silva et al., 2014), in students from various university courses such as arts and social sciences, business, engineering, information technology, medicine, health sciences, and pharmacy from Malaysia (Kristanto et al., 2016), and in medical students from the United States (Bughi et al., 2017). In contrast, medical students in Hungary (Győrffy et al., 2016) and Turkey (Atalayin et al., 2015) had lower levels of depletion prevalence than before. The highest prevalence levels of the cynicism dimension were found in medical students from Saudi Arabia (Almalki et al., 2017) and again in students from Malaysia (Kristanto et al., 2016). Two studies in Eurasia Turkey found low levels among dentistry students (Atalayin et al., 2015; Eren et al, 2016). They were also moderately low in Central European students in Hungary (Győrffy et al., 2016). In this overall analysis it can be seen that, at least in the selected studies, the highest levels of BOS prevail over students from Latin America, the USA, and Asia, while in European students the levels found in the dimensions exhaustion and cynicism, the two main dimensions of BOS in university students, were considerably lower. The possible explanation for the cause of these two particular situations would require another study, although we find this peculiarity very interesting.

Two studies, similar to our systematic review, have been conducted in recent years with different results. But these researchers have used different instruments from the MBI-SS, which is the specific one for students, and at the same time they can be compared with other similar studies in the evaluation of the prevalence of the syndrome. On the opposite, they will have done the research more exhausting and uncertain. On the other hand, by using the MBI-SS, we will have approached to certainty, so here is the difference and fundamental contribution of our study. The greater number of studies in the other systematic reviews with or without meta-analysis is given because they do not discriminate the instruments. In fact, some were elaborated and validated only for populations of employees and not students. Consequently, they would not be evaluating what is really desired: levels of BOS in students.

At the same time, we also consider that to study prevalence only in medical students could be a mistake, because even though it is in this population where the syndrome has been studied the most, this might not represent the reality of its prevalence since it is also very common in most university students as other studies show (Kristanto et al., 2016; Boni et al., 2018; Ferrel-Ortega et al., 2017).

As a matter of fact, our study does not discriminate student populations from any other part of the world, because the selection of students is based on their quality according to the STROBE criteria and therefore they may include or not studies from all regions and may gain or not in representativeness as a possible limitation.

Examples of these studies are those conducted by Frajerman, Morvan, Krebs, Gorwood, & Chaumette (2019). This was aimed at estimating the prevalence of BOS in medical students worldwide. The BOS should have been evaluated using a validated scale (in this case the Maslach Burnout Inventory or the Copenhagen Burnout Inventory, which, as mentioned above, but none neither instrument was developed for students and comparing studies is complicated by the difference in dimensions that make up the syndrome between the two instruments). The prevalence was 8,060 undergraduate students who suffered from BOS (44.2%). Information on the prevalence of each dimension of the syndrome was estimated at 40.8% for emotional exhaustion, 35.1% for depersonalization, and 27.4% for personal achievement. In our study the overall prevalence of each dimension was 55.4% for emotional exhaustion, 31.6% for cynicism, and 30.9% for academic effectiveness. In this case only the exhaustion dimension would coincide because in the other cases depersonalization is neither considered cynicism nor personal achievement as academic efficacy. Even though the first dimension match the name,

it is not the same because the first one is work product of emotional exhaustion, but the one we studied is product of the research according to the instrument we used.

And the second research made by Erschens et al. (2019), with the same objective as the first: to analyze the prevalence of BOS among medical students. But in this case we used only studies that applied the Maslach Burnout Inventory Human Services Survey (MBI-HSS) instrument, an instrument that is focused on the detection of the syndrome only in service employees populations, a similar situation to the previous study in terms of the instruments used for employees adapted to students. The weighted mean values for the three dimensions of the MBI-HSS were M¼22.93 (SD¼10.25) for Emotional Exhaustion, M¼8.88 (SD¼5.64) for Depersonalization, and M¼35.11 (SD¼8.03) for Self-Realization. The rates of professional exhaustion ranged from 7.0% to 75.2%. In our case the oscillations found were between 9.8% and 70.6%, relatively similar, although it is difficult to analyze and compare them due to the instrument used for workers, similar to the previous case.

Our study assumes that BOS may occur in any university population, and not only in medical students, as demonstrated by the results of this systematic review. There are examples of other similar quality reviews, but framed only for populations of medical students (Dyrbye & Shanafelt, 2016; Erschens et al., 2019; Chunming et al., 2017).

In our case, the spectrum was extended to all types of undergraduate university students, since it might be considered a mistake to think that the university burnout occurs only in medical students, even though it has been more studied in them. In addition, the MBI-SS instrument is considered to be the most suitable and specific instrument for diagnosing burnout in these student populations. The use of other instruments is considered to not really assess the syndrome in this population as they are not specific for this population, therefore, only the studies that used this instrument were considered in this review.

Three included investigations from Europe and the United States made some difference in the overall results of our study because of the moderate levels found. This may have led to a slight reduction in the average prevalence found, at least in the depletion and cynicism dimensions. Overall, BOS levels, at least in the studies analyzed in this systematic review, were slightly higher in university students from Latin America than from Europe and the United States.

The strength of this study is to consider it as one of the first reviews that takes into account all undergraduate university student populations, regardless of the degree they study, and not just health and specifically medical students as is the case with most similar reviews to date. In addition, it only includes studies that use MBI-SS as it is the most specific and validated instrument for this population.

In contrast, the limitations are that, while a comprehensive systematic review was conducted in the main international databases, the quantitative level of meta-analysis was not reached. Only a search of materials published in the last five years was carried out: this may be a strength in really presenting the latest research on the subject, but it could also be a limitation for not going further in time. What is more, the prevalence values by career and age group of students are not specified.

For future studies it would be recommended to analyze why there is such a high prevalence of this syndrome among university students, by possibly performing a meta-analysis. To determine whether sex or gender influence the prevalence levels of BOS in student populations or is a determining factor, through correlational studies. Also determine whether the prevalence is higher in undergraduate students than in other types of students (e.g., graduate or high school). In addition, determine the possible explanation as to why higher levels of BOS are prevalent among students in Latin America, the United States, and Asia, while lower levels are found among European students. Finally, it is proposed to carry out psychological, psychosocial, and health promotion intervention studies in this important population.

As it can be seen from previous studies, moderate levels of BOS generally prevail in the different populations of university students of various degrees worldwide. In only a few studies the prevalence is low and this could be due to multiple evaluative variables that are not the case in our study. The prevalence of each dimension of the syndrome was estimated at 55.4% for emotional exhaustion, 31.6% for cynicism and 30.9% for academic efficacy. Consequentially, showing a considerable high prevalence globally and also individually in each study. The female gender (62.7%) was most affected by the syndrome over men (37.3%).

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Conflict of interest

The authors declare they have no conflicts of interest.

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