

## Scientific evidence on the association between burnout and metabolic syndrome: integrative review

Evidências científicas sobre a associação entre *burnout* e síndrome metabólica: revisão integrativa

Evidencias científicas sobre la asociación entre el *burnout* y el síndrome metabólico: revisión integradora

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### Abstract

**Objective:** To evaluate the scientific evidence available in the literature on the association between Burnout Syndrome and Metabolic Syndrome.

**Methods:** Integrative literature review, searching the databases of the Cumulative Index to Nursing and Allied Health Literature, National Library of Medicine, National Institutes of Health, Web of Science, Scopus, Cochrane Library, Latin American and Caribbean Center on Health Sciences Information, Scientific Electronic Library Online and Springer Link. The selected articles were analyzed according to the Agency for Healthcare Research and Quality.

**Results:** Most (80%) of the 5 studies that met the selection criteria were in English language and indexed in the Web of Science and Scopus databases. Among the studies, 80% had physicians as the main authors. The Asian continent (Israel, Japan and China) concentrated the majority of production. There was no predominance of study design. The financial area corresponded to 60% of the study participants.

**Conclusion:** The available evidence in the literature is incipient, only 20% of the eligible articles showed association between the syndromes studied and the others, indicate association between Burnout and MS components separately.

### Resumo

**Objetivo:** Avaliar as evidências científicas disponíveis na literatura sobre a associação entre Síndrome de *Burnout* e Síndrome Metabólica.

**Métodos:** Revisão integrativa da literatura, com buscas nas bases de dados do *Cumulative Index to Nursing and Allied Health Literature*, *National Library of Medicine*, *National Institutes of Health*, *Web of Science*, *Scopus*, *Cochrane Library*, *Latin American and Caribbean Center on Health Sciences Information*, *Scientific Electronic Library Online* e *Springer Link*. Os artigos selecionados foram analisados de acordo com a *Agency for Healthcare Research and Quality*.

**Resultados:** A maioria (80%) dos 5 artigos que atenderam aos critérios de seleção estava na língua inglesa e indexada nas bases de dados *Web of Science* e *Scopus*. Dentre os trabalhos, 80% tinham médicos como autores principais. O continente asiático (Israel, Japão e China) concentrou a maior parte de produção. Não ocorreu predominância de desenho de estudo. A área financeira correspondeu a 60% do público pesquisado.

**Conclusão:** As evidências disponíveis na literatura são incipientes, apenas 20% dos artigos elegíveis apresentou associação entre as síndromes estudadas e os demais, indicam associação entre *Burnout* e componentes da SM separadamente.

### Resumen

**Objetivo:** evaluar las evidencias científicas disponibles en la literatura sobre la asociación entre el síndrome de *burnout* y el síndrome metabólico.

**Métodos:** revisión integradora de la literatura, con búsquedas en las bases de datos del *Cumulative Index to Nursing and Allied Health Literature*, *National Library of Medicine*, *National Institutes of Health*, *Web of Science*, *Scopus*, *Cochrane Library*, *Latin American and Caribbean Center on Health Sciences Information*, *Scientific Electronic Library Online* y *Springer Link*. Los artículos seleccionados fueron analizados de acuerdo con la *Agency for Healthcare Research and Quality*.

**Resultados:** la mayoría (80%) de los cinco artículos que cumplieron los criterios de selección estaba en inglés e indexada en las bases de datos *Web of Science* y *Scopus*. Entre los trabajos, 80% tenía médicos como autores principales. El continente asiático (Israel, Japón y China) concentró la mayor parte de la producción. No ocurrió predominio de diseño de estudio. El área financiera correspondió al 60% del público investigado.

**Conclusión:** las evidencias disponibles en la literatura son incipientes, solo el 20% de los artículos elegibles presentó asociación entre los síndromes estudiados y los demás indican asociación entre *burnout* y componentes del SM separadamente.

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**Conflict of interest:** article extracted from the PhD thesis "*Síndrome de Burnout e Síndrome Metabólica em Profissionais de Enfermagem da Atenção Primária à Saúde*", developed at the Medical School, Universidade Federal da Bahia, Salvador, Bahia, Brazil.

## Introduction

The multiple metamorphoses that occur in the world of work in Brazil are notable, mainly due to the inconsequential ideological, social and political crisis of austerity. In the context of the work, the core goes through the proletarianization and sub-proletarianization of productive segments and services in an unrestrained and irreversible perspective, fleeing metaphorically from the Gaussian curve.<sup>(1)</sup>

Proletarianization is based on the loss of autonomy over the labor process and subproletarianization, such as precarious, temporary, outsourced and fragmented work.<sup>(1)</sup> These conditions give rise to suffering, adversity and degrading conditions of exploitation in the work-place. The logic of privatization, posed as a soft sine wave, presents detrimental outcomes to the health of the worker.

Faced with this complex scenario, mental attrition occurs at work, resulting in Common Mental Disorders (CMD), occupational stress and Burnout Syndrome (BS). BS, also known as the syndrome of professional exhaustion, is a phenomenon initiated by chronic stress at work and affects mainly workers who have continuous contact with people. BS has three related and independent dimensions, namely: (a) emotional exhaustion, which refers to lack of energy, physical and mental exhaustion; (b) depersonalization, which gives rise to emotional insensitivity; (c) reduced professional achievement, generating dissatisfaction with work activities, low self-esteem, reduced interaction with peers, feeling of incompetence.<sup>(2)</sup>

The prevalence of BS varies in professional categories, from 4.8% to 39.3% in health professionals, from 54.9% to 56% in police officers, from 5.7% to 15.4% in professors.<sup>(3-8)</sup> These variations between the prevalences arise from the use of non-robust criteria for the definition of the syndrome. Studies indicate that BS is an exposure factor for: TMC, iatrogenies, psychoactive substances use, suicidal ideation and suicide attempt, musculoskeletal pain, sleep disorders, impaired immunity, abdominal adiposity, insulin resistance, hypercholesterolemia, type 2 diabetes and Metabolic Syndrome (MS).<sup>(9-19)</sup>

MS, according to the National Cholesterol Education Program's Adult Treatment Panel III and the I Brazilian Guideline for the Diagnosis and Treatment of Metabolic Syndrome, is characterized as "[...] a complex disorder represented by a set of cardiovascular risk factors usually related to central fat deposition and insulin resistance".<sup>(20)</sup> For diagnosis of MS, the individual should present a combination of at least three of the five components: elevated waist circumference, hypertriglyceridemia, reduction of HDL cholesterol, systemic hypertension, and hyperglycemia. The association of MS with cardiovascular disease raises overall mortality by approximately 1.5 times and cardiovascular mortality by 2.5 times.<sup>(20)</sup>

Investigations on MS have been conducted in distinct populations, such as Venezuelan, Mexican, North American and Asian, and their occurrence, albeit high, varies. It is estimated that, from 2003 to 2012, the overall prevalence of MS in the United States was 33%, with significant superiority in women compared to men.<sup>(20,21)</sup> Data referring to the predominance of MS in Brazil are scarce and do not show the actual occurrence of this event at the population level.

The literature points to exposure factors for MS, such as periodontitis, Acanthosis nigricans, non-alcoholic fatty liver disease, biomarkers (adipokines, neuropeptides, proinflammatory cytokines, anti-inflammatory cytokines, antioxidant status markers and prothrombotic factors), schizophrenia, anxiety, working conditions, occupational stress and BS.<sup>(22-29)</sup> However, many other factors have not yet been identified.

The changes in the world of work and the current precarious conditions and also the chronic exposure to multiple deleterious factors lead to occupational stress and exacerbation of this, to the presence of BS. Therefore, these conditions will contribute to the reduction of biological resilience and, therefore, will affect the homeostasis, contributing to the development of MS.<sup>(16,30)</sup>

Thus, stressful work situations stimulate the response of the Hypothalamic Adrenal Hypophysis axis (HHA), leading to insulin resistance as a consequence of excessive production of cortisol. The in-

crease in the levels of cortisol released by the adrenal cortex, related in turn to the stimulation of the adrenocorticotrophic hormone (ACTH) released by the pituitary gland, would be related to abdominal adiposity, since there is lipid mobilization from adipose tissue, and of glucose, from hepatic glycogen, aiming to increase the amount of energy available for stress situations.<sup>(16)</sup>

The objective of the study is to evaluate the scientific evidence available in the literature on the association between Burnout Syndrome and Metabolic Syndrome.

## Methods

An integrative literature review was conducted, which gathers, evaluates and synthesizes findings from primary studies, based on available scientific evidence on a particular topic. To systematize this review, six steps were followed: elaboration of the guiding question; search or sampling in the literature; data collection; critical appraisal of included studies; discussion of results; presentation of the integrative review.<sup>(31)</sup>

It is noteworthy that the recommendations of the Statement for Reporting Systematic Reviews and Meta-Analyses of Studies (PRISMA) were followed. In this sense, the PICO strategy was used to elaborate the guiding question. This strategy represents an acronym for Patient, Intervention, Comparison and Outcomes.<sup>(32)</sup> Also, the P referred to the workers exposed to the development of BS and MS, I to the stressful working site, C comparisons between the levels of scientific evidence and the possible association between BS and MS. Therefore, the guiding question was obtained: What scientific evidence is available in the literature about the association between BS and MS?

The search for publications was carried out from September to December of 2018, using Boolean operator AND, truncation techniques, in articles published in the following databases: Cumulative Index to Nursing and Allied Health Literature (CINAHL), National Library of Medicine National Institutes of Health (PubMed), Web of Science,

Scopus, Cochrane Library, Latin American and Caribbean Center on Health Sciences Information (LILACS), Scientific Electronic Library Online (SciELO) and Springer Link. The keywords were defined according to the descriptors in health sciences (DeCS) and Medical Subject Headings (MeSH), in Portuguese, Spanish and English, being: *Esgotamento Profissional*, *Agotamiento Profesional*, *Burnout*, *Profesional*; *Síndrome Metabólica*, *Síndrome Metabólico*, *Metabolic Syndrome*.

Articles published in Portuguese, Spanish and English, without date limit, available electronically in the abovementioned databases and dealing with the association between Burnout and MS, were considered eligible. The exclusion criteria were: articles that had no relation with the object; experience reports and case-reports, monographs, dissertations, theses, summaries in annals of events, book chapters. Duplicate items were considered only once.

A built instrument was used to collect and construct the database, containing information that included: identification; institution of the study; type of publication; methodological characteristics of the study; and evaluation of methodological rigor.

The Agency for Healthcare Research and Quality (AHRQ) ranks six levels of evidence: (I) evidence resulting from meta-analysis and systematic review; (II) evidence obtained in clinical trials with randomization; (III) evidence obtained in clinical trials without randomization; (IV) evidence from cohort and case-control studies; (V) evidence from a systematic review of descriptive and qualitative studies; (VI) evidence based on a descriptive or qualitative study.

After reading and critically analyzing the articles, a table was prepared with a summary of the selected publications, containing author/year/journal, country where the study was conducted, thematic considerations, type of study, conclusions synthesis and AHRQ classification.

## Results

A total of 199 articles were found in the databases, namely: 22.6% CINAHL, 25.6% PubMed, 13.1%

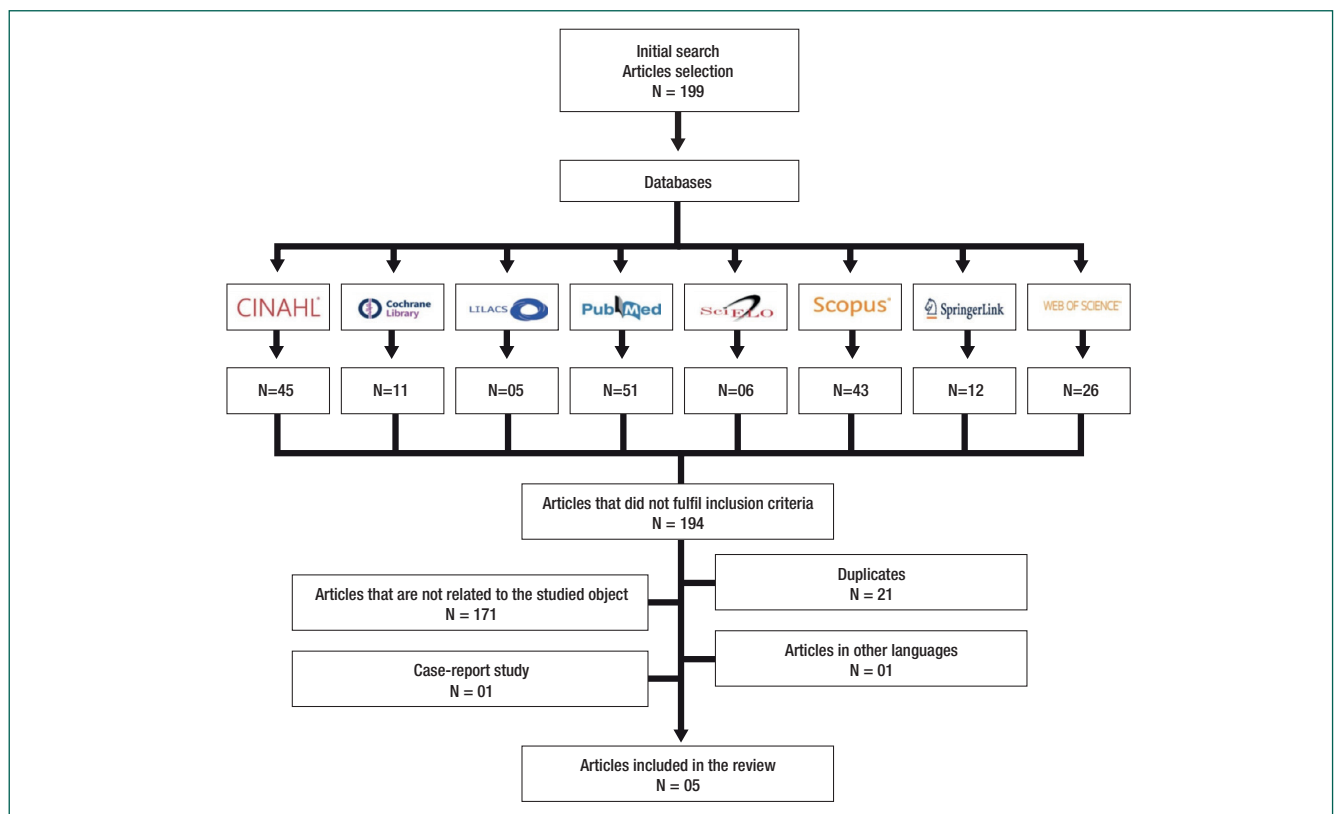
Web of Science, 21.6% Scopus, 5.5% Cochrane Library, 2.5% LILACS, 3.1% SciELO and 6.0% Springer Link. Based on the eligibility criteria and the detailed analysis of the publications, 194 articles did not meet the criteria, equivalent to: 10.9% duplicated, 88.1% were not related to the object of study, 0.5% in another language and 0.5% case report. In light of the above, in this review, five articles were selected, which are summarized in figure 1.

Of the five eligible studies, 80% were in English and 20% in Spanish, mostly indexed in the Web of Science and Scopus databases. It should be noted that four (80%) journals were from the worker's health area and only one (20%) from the medical area. Regarding the years of publication, they were between 2006 and 2018. The search criteria did not include a temporal cut. Regarding the training of the main authors of each study, 80% were doctors and 20% were nurses. There was a greater concentration of articles in the Asian continent - Israel, Japan and China - (60%). In Europe, the countries that conducted studies were Spain and France, representing 40% of the sample.

There was no predominance of study design, being: literature review, cross-sectional, cohort, non-randomized quasi-experimental and case-control, representing 20% each. The population investigated in the studies was mainly composed of professionals who developed labor activities in the financial area (60%). A single study was conducted with high school teachers, and no research was identified with health workers.

According to AHRQ categories, 40% of the articles were classified as level of evidence IV (cohort and case-control); 20%, level of evidence V (literature review); 20%, level of evidence VI (cross-sectional); and 20%, level of evidence III (quasi-experimental/non-randomized study).

All the studies that composed the integrative literature review described Burnout as a predictive variable for MS. In 20% of the studies, the association between the syndromes was evident; in 60%, the association between Burnout and MS components separately. The articles of this review are summarized in chart 1, according to the year of publication.



**Figure 1.** Integrative Review Flowchart on Scientific Evidence Between Burnout and Metabolic Syndrome

**Chart 1.** Characterization of the publications included in the integrative review, second year/author/journal, type and country where the study was conducted, level of scientific evidence, thematic considerations, summary conclusions

Year of publication/Author/Journal	Type and country of study / Level of Evidence	Thematic considerations	Summary conclusions
2006 Melamed S, Shirom A, Toker S, Berliner S, Shapira I <sup>(15)</sup> Psychological Bulletin	Systematic review Israel Level V	They evaluate the accumulated evidence in the international literature on Burnout and exhaustion associated with the increased risk of cardiovascular events, highlighting Metabolic Syndrome.	Burnout can trigger sleep disorders, depression, inflammatory processes, immune changes, diabetes mellitus, Metabolic Syndrome and other cardiometabolic events.
2008 Ranchal-Sánchez A, Vaquero-Abellán M <sup>(3)</sup> Medicina y Seguridad del Trabajo	Cross-sectional Spain Level VI	They evaluate the association between Burnout and biochemical dosages, namely: serum glucose and cholesterol levels, as well as body mass index in a random sample of 186 secondary school teachers.	The findings indicate that there was no association between Burnout and the components of the Metabolic Syndrome, however, it was found that the higher the professional achievement, which integrates one of the dimensions of Burnout, the lower the body mass index.
2009 Kitaoka-Higashiguchi K, Morikawa Y, Miura K <sup>(34)</sup> Journal of Occupational Health	Cohort Japan Level IV	Investigate the Burnout and risk factors for atherosclerotic disease, highlighting the Metabolic Syndrome among 442 middle managers of a factory.	Changes in waist circumference, body weight and body mass index were significantly higher in managers with Burnout. Despite describing the biological plausibility that indicates the association between Burnout and Metabolic Syndrome, no statistical significance was found in the path described.
2013 Tsai HH, Yeh CY, Su CT, Chen CJ, Peng SM, Chen RY <sup>(19)</sup> Industrial Health	Quasi-experimental non-randomized China Level III	They estimate that physical activity is an intervention factor that affects the relationship between Burnout and components of the Metabolic Syndrome among 109 financial advisors and administrators of an insurance bank.	A well-designed exercise program establishes better health behavior in the workplace, relieving Burnout and components of the Metabolic Syndrome. There is an association between Burnout and components of the Metabolic Syndrome.
2018 Mettlaine A, Sauvet F, Gomez-Merino D, Boucher T, Elbaz M, Delafosse JY <sup>(17)</sup> PloS ONE	Case-control France Level IV	They investigate chronic exposure to stress (Burnout), sleep quality and specific biological repercussion, in particular metabolic and inflammatory responses among 140 employees of a financial company.	Burnout participants had higher levels of HbA1c, glycemia, CRP, lower levels of vitamin D, increased numbers of leukocytes, neutrophils and monocytes (P <0.001 for all) and higher total cholesterol (P = 0.01). There was no association between Burnout and Metabolic Syndrome.

## Discussion

This is the first Brazilian study to investigate the scientific evidence on the association between BS and MS. The results of the present integrative review contribute to the recognition of the emergency in research and interventions in the workplace, highlighting the burnout and its outcomes as deleterious conditions to the health of the worker.

In the context of Brazil, the history involving the rights of workers is dominated by struggles and bloodshed, free of any moral stain. Only in 2012 was the National Worker and Worker Health Policy promulgated. However, data registered in the Social Security Yearbook published by the National Social Security Institute (INSS) have been disseminated for more than a decade. The amount of sickness benefits granted, with mental and behavioral disorders, including Burnout, among the main causes of withdrawal.

In the databases, several descriptive studies were found that point out the frequency of BS.<sup>(3,8)</sup> Its magnitude, transcendence, severity and vulnerability are clear in the literature.

Most of the articles (80%) present a physician as the first author, but the object studied should be conducted by multiprofessional health areas, since

the care of the worker with MS, with BS as an independent variable, will require follow-up multi-professional. In addition, scientific production is an important factor in the improvement of health care actions.<sup>(2)</sup>

The largest number of articles focused on the Asian continent, certainly by the investment of countries like Japan and China in Science and Technology (S & T).<sup>(35)</sup> It is observed that, in Brazil, no records were found. This fact is justified by the lack of investment in S&T, and *Ad aeternum slogan*: “Research in Brazil is in consolidation”.

No research has been identified with health workers. We emphasize the importance of studies that evaluate the association and causality between BS and MS, since it is also a risk group that experiences unhealthy work environments, with long working hours and excessive or ineffective allostatic response.<sup>(28,33,34)</sup>

Of the studies identified in this review, according to the AHRQ categories, most are classified as level of evidence IV (cohort and case-control), which results in a level of median evidence. Regarding the association between the syndromes, more than half indicates association between Burnout and MS components separately. Of all the eligible articles, none had as main scope the association between the

syndromes. These were presented as secondary or tertiary objectives, which can be pointed out as a limitation of this integrative review.

The relevance of conducting epidemiological studies with robust analyzes and clinical trials to better understand, compare and evaluate the effects of Burnout Syndrome.

## Conclusion

It is concluded that the available evidence in the literature is incipient, only 20% of the eligible articles showed association between the syndromes studied and the others, indicate association between Burnout and MS components separately. The results of this review suggest that future studies should prioritize health professionals as participants, since they have too much exposure to work stress and Burnout Syndrome, and present more robust designs that better explain the path of association/causality between the syndromes discussed here.

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