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PHYSIOLOGICAL IMPACTS OF PEDAGOGY: INTERSECTION OF BURNOUT SYNDROME, EATING PATTERNS, AND NON-COMMUNICABLE CHRONIC DISEASES IN EDUCATORS

IMPACTOS FISIOLÓGICO DA PEDAGOGIA: INTERSEÇÃO DA SINDROME DE BURNOUT, PADRÕES ALIMENTARES E DOENÇAS CRÔNICAS NÃO TRANSMISSÍVEIS EM EDUCADORES

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ABSTRACT

Burnout among educators has increasingly been recognized as a complex condition extending beyond psychological exhaustion to encompass physiological and behavioral dimensions with significant public health implications. The intersection between occupational stress, altered eating patterns, and non-communicable chronic diseases remains insufficiently integrated in the literature, particularly within educational contexts. This study aimed to analyze how burnout syndrome operates as a mediator between nutritional dysregulation and the development of chronic diseases among educators. An integrative literature review was conducted, following structured and transparent procedures, including systematic search, selection, and synthesis of studies published in the last decade. A total of 207 records were initially identified, and 29 studies met the eligibility criteria and were included in the final analysis. Data were organized into three analytical axes: neuroendocrine, behavioral, and socioeconomic.The findings demonstrate that chronic occupational stress leads to neuroendocrine dysregulation, particularly involving cortisol, which affects appetite regulation and promotes maladaptive eating behaviors. These changes, combined with unfavorable work conditions and limited access to healthy food, contribute to metabolic imbalance and increased risk of chronic diseases. The discussion highlights the existence of a self-reinforcing cycle linking stress, behavior, and illness, emphasizing the systemic nature of burnout. It is concluded that burnout should be understood as a multidimensional and physiological phenomenon, requiring integrated approaches that go beyond individual interventions. Structural changes in working conditions, along with comprehensive occupational health policies, are essential to mitigate its long-term impacts.

Keywords: Occupational Health. Emotional Eating. Metabolic Syndrome. Teacher Well-being. Chronic Stress.

RESUMO

A síndrome de burnout em educadores tem sido cada vez mais reconhecida como uma condição complexa que ultrapassa o esgotamento psicológico, incorporando dimensões fisiológicas e comportamentais com relevantes implicações em saúde pública. A interseção entre estresse ocupacional, padrões alimentares alterados e doenças crônicas não transmissíveis permanece pouco integrada na literatura, especialmente no contexto educacional. Este estudo teve como objetivo analisar como a síndrome de burnout atua como mediadora da desregulação nutricional e do desenvolvimento de doenças crônicas em educadores. Foi realizada uma revisão integrativa da literatura, seguindo procedimentos estruturados e transparentes, incluindo busca sistemática, seleção e síntese de estudos publicados na última década. Inicialmente, foram identificados 207 registros, dos quais 29 atenderam aos critérios de elegibilidade e compuseram a análise final. Os dados foram organizados em três eixos analíticos: neuroendócrino, comportamental e socioeconômico. Os resultados evidenciam que o estresse ocupacional crônico promove desregulação neuroendócrina, especialmente relacionada ao cortisol, afetando a regulação do apetite e favorecendo comportamentos alimentares inadequados. Essas alterações, associadas a condições de trabalho desfavoráveis e acesso limitado a alimentos saudáveis, contribuem para o desequilíbrio metabólico e aumento do risco de doenças crônicas. A discussão aponta para a existência de um ciclo retroalimentador que conecta estresse, comportamento e adoecimento, destacando o caráter sistêmico do burnout. Conclui-se que o burnout deve ser compreendido como um fenômeno

multidimensional e fisiológico, exigindo abordagens integradas que ultrapassem intervenções individuais. Mudanças estruturais nas condições de trabalho e políticas eficazes de saúde ocupacional são essenciais para mitigar seus impactos a longo prazo.
Palavras-chave: Saúde Ocupacional. Alimentação Emocional. Síndrome Metabólica. Bem-estar Docente. Estresse Crônico.

1. INTRODUCTION

Teaching is increasingly recognized as a high-risk profession for chronic occupational stress, driven by escalating demands, emotional overload, and structural precarization. In this context, burnout, characterized by emotional exhaustion, depersonalization, and reduced professional efficacy, emerges as a systemic condition affecting both individual well-being and institutional stability (Maslach, 2016).

Its impacts extend beyond psychological distress, contributing to absenteeism, presenteeism, and high turnover rates, thereby destabilizing educational systems. From an occupational health perspective, chronic work stress is strongly associated with adverse psychological and physiological outcomes (Ganster, 2013), while burnout itself has been linked to broad physical and quality-of-life impairments (Salvagioni, 2017). These findings support understanding burnout as a multidimensional phenomenon with systemic repercussions.

Burnout is increasingly understood as a condition with significant physiological correlates. Chronic occupational stress leads to sustained activation of the hypothalamic–pituitary–adrenal (HPA) axis, promoting prolonged cortisol secretion and metabolic

dysregulation. This process contributes to low-grade chronic inflammation, a central mechanism in non-communicable diseases (Jonsdottir, 2018).

Additionally, burnout has been associated with increased cardiovascular risk, including hypertension and other cardiometabolic conditions (Melamed, 2006). This shift toward a biopsychosocial perspective highlights burnout as a potential mediator between occupational stress and systemic health outcomes, particularly in high-demand professions such as teaching.

A key pathway linking stress to chronic disease involves changes in eating behavior. Stress influences food intake through neurobiological and behavioral mechanisms, often increasing the consumption of energy-dense foods (Adam, 2007). Activation of reward-related neural circuits reinforces emotional eating as a coping strategy (Torres, 2007).

In work environments with limited access to healthy food, such as schools, these behaviors are intensified. Stress is also associated with irregular eating patterns and reduced dietary quality, contributing to metabolic dysregulation and increasing the risk of obesity and metabolic syndrome (Stewart-Knox, 2014).

Despite advances, the literature remains fragmented, typically analyzing psychological, behavioral, and metabolic dimensions separately. This limits understanding of burnout as a central mediator within an interconnected system of biological, behavioral, and socioeconomic factors.

To address this gap, this integrative review, guided by the PICo strategy, aims to synthesize these domains and propose a comprehensive framework. The guiding research question is: How does burnout syndrome act as a mediator of nutritional dysregulation and the development of non-communicable chronic diseases in educators within precarious working conditions?

In light of these considerations, this study advances the premise that burnout in educators should be understood not as an isolated psychological outcome, but as a central node within a complex, multi-layered system linking occupational stress, behavioral adaptations, and physiological dysregulation. By integrating evidence across neuroendocrine, behavioral, and socioeconomic dimensions, this review seeks to move beyond reductionist interpretations and contribute to a more comprehensive understanding of how contemporary teaching conditions may actively shape patterns of illness. Such an approach is essential not only for advancing theoretical knowledge, but also for informing more effective and structurally oriented interventions in occupational health and educational policy.

2. METHODS

2.1. Study Design

This study was structured as an integrative literature review, selected due to its capacity to synthesize knowledge derived from heterogeneous methodological approaches and to enable theoretical advancement in complex and multidimensional phenomena. Unlike traditional systematic reviews, the integrative approach allows the inclusion of both empirical and theoretical

studies, thereby facilitating a broader and more comprehensive understanding of phenomena that involve interacting biological, behavioral, and social dimensions.

The choice of this design is justified by the nature of the research problem, which requires the articulation of evidence across distinct domains, including neuroendocrine regulation, eating behavior, and occupational health. Integrative reviews are particularly suitable for identifying patterns, inconsistencies, and conceptual gaps in the literature, while also supporting the development of new theoretical models (Whittemore, 2005; Torraco, 2005). In this context, the method enables not only the aggregation of findings but also their critical reinterpretation within an interdisciplinary framework.

2.2. Review Protocol And Reporting Standards

The review followed the principles of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020), adapted to the specific requirements of integrative reviews. This adaptation preserved the core elements of transparency, rigor, and reproducibility, while allowing flexibility in the inclusion of diverse study designs.

The adoption of PRISMA ensured a structured and traceable selection process, from identification to final inclusion, minimizing selection bias and enhancing methodological clarity. All stages of the review were documented, including search procedures, eligibility criteria, and screening decisions, in accordance with current recommendations for high-quality evidence synthesis (Page, 2021).

2.3. Search Strategy And Data Sources

The bibliographic search was conducted between October 2025 and February 2026 across five major international databases: PubMed/MEDLINE, Web of Science, Scopus, PsycINFO, and Embase. These databases were selected due to their comprehensive coverage of biomedical, psychological, and interdisciplinary research, ensuring adequate representation of the multiple dimensions addressed in this study.

The search strategy was developed using controlled vocabulary and free-text terms derived from Medical Subject Headings (MeSH) and related descriptors. The main search string combined key constructs using Boolean operators as follows: ("Burnout, Psychological" OR "Occupational Stress") AND ("Feeding Behavior" OR "Nutritional Status") AND ("Chronic Disease" OR "Metabolic Syndrome") AND ("Teachers" OR "School Teachers")

Additional filters were applied to refine results, including publication date, language, and study type. The selection logic prioritized sensitivity in the initial stage to capture a broad range of potentially relevant studies, followed by progressive specificity during screening.

The initial search yielded a total of 207 records, which were subjected to subsequent screening and eligibility procedures.

2.4. Inclusion And Exclusion Criteria

The eligibility criteria were defined a priori to ensure methodological consistency and alignment with the research objective, particularly considering transformations in work dynamics following the COVID-19 pandemic.

Inclusion criteria:

- Primary studies with quantitative, qualitative, or mixed-method designs
- Publications within the last 10 years
- Studies published in English, Spanish, or Portuguese
- Research addressing at least one of the following: burnout, occupational stress, eating behavior, metabolic outcomes, or chronic diseases in adult populations
- Studies with clear methodological description and analytical rigor

Exclusion criteria:

- Conference abstracts, editorials, and non-peer-reviewed reports
- Studies with insufficient methodological transparency
- Research with very small or non-representative samples lacking statistical robustness
- Articles not directly related to the intersection of stress, nutrition, and health outcomes

These criteria were designed to ensure both relevance and quality, while capturing contemporary evidence reflective of current occupational conditions.

2.5. Study Selection Process

The study selection process was conducted in three sequential phases: title screening, abstract screening, and full-text review. Two independent reviewers performed all stages to minimize bias and ensure consistency. Discrepancies were resolved through discussion until consensus was achieved.

In the first phase, titles were screened for relevance to the research topic, resulting in the exclusion of clearly unrelated studies. In the second phase, abstracts were evaluated to assess alignment with the inclusion criteria. The final phase involved full-text reading to confirm eligibility and extract detailed information.

The study selection process followed a structured and sequential approach in accordance with PRISMA 2020 guidelines, ensuring transparency and methodological rigor throughout all stages. A total of 207 records were initially identified across the selected databases. These records were progressively screened through title and abstract evaluation, followed by full-text assessment based on predefined eligibility criteria. The detailed progression of this process is summarized in Table 1.

Table 1. Study selection process according to PRISMA 2020

Phase	Procedure Description	Records (n)	Exclusion Criteria Applied	Remaining (n)
Identification	Records identified through database search	207	–	207

Screening (titles)	Title screening for thematic relevance	207	Irrelevance to topic	142
Screening (abstracts)	Abstract evaluation based on inclusion criteria	142	Inadequate scope or insufficient methodological rigor	68
Eligibility (full-text)	Full-text assessment for eligibility	68	Methodological inconsistency or lack of relevance	29
Included	Studies included in integrative synthesis	29	–	29

Source: Own authorship.

The screening process revealed a substantial reduction in eligible studies across successive stages, reflecting both the specificity of the research question and the fragmentation of the existing literature. A significant proportion of excluded records lacked integration between occupational stress, eating behavior, and chronic disease outcomes, reinforcing the predominance of compartmentalized approaches in the field.

The final inclusion of 29 studies indicates a limited but methodologically consistent body of evidence capable of supporting an integrative analysis. This reduction trajectory also highlights the scarcity of studies addressing the intersection of physiological, behavioral, and socioeconomic dimensions within educational

contexts, thereby justifying the need for the present integrative synthesis.

2.6. Data Extraction And Synthesis

Data extraction was performed using a standardized matrix developed specifically for this review. The extracted variables included authorship, year of publication, study design, population characteristics, key findings, and methodological features.

For analytical purposes, the data were organized into three predefined thematic axes:

- Neuroendocrine axis: mechanisms linking stress, hormonal regulation, and metabolic outcomes
- Behavioral axis: patterns of eating behavior and coping strategies under stress
- Socioeconomic axis: contextual and structural determinants influencing health behaviors

The synthesis followed an integrative approach, combining descriptive and analytical strategies. Rather than merely aggregating results, the analysis focused on identifying convergences, divergences, and interdependencies among the three axes, allowing for a more comprehensive interpretation of the phenomenon.

2.7. Methodological Quality Assessment

The methodological quality of the included studies was assessed using validated appraisal tools appropriate to different study designs. Qualitative studies were evaluated using the Critical Appraisal Skills Programme (CASP), while quantitative and mixed-method studies were assessed using the Mixed Methods Appraisal Tool (MMAT).

The CASP tool evaluates aspects such as clarity of research aims, methodological appropriateness, data collection rigor, and validity of interpretations. The MMAT, in turn, allows for the simultaneous appraisal of qualitative, quantitative, and mixed-method studies, focusing on criteria such as sampling adequacy, measurement validity, and analytical coherence.

Each study was independently assessed by two reviewers, and discrepancies were resolved through consensus. The quality assessment did not serve as an exclusion criterion but was used to inform the interpretation of findings, allowing the weighting of evidence according to methodological robustness.

3. RESULTS

3.1. Study Selection And Characteristics

The initial search strategy yielded a total of 207 records distributed across five major databases. Following the sequential screening process described in the methodological section, 142 records remained after title screening, 68 after abstract evaluation, and 29 studies were ultimately included in the integrative synthesis. This progressive reduction reflects both the specificity of the research question and the relative scarcity of studies addressing the intersection between occupational stress, eating behavior, and

chronic disease within teaching or comparable professional contexts.

The final sample of 29 studies demonstrated moderate methodological heterogeneity, encompassing quantitative observational studies, systematic reviews, experimental designs, and theoretical analyses. Despite this diversity, a consistent thematic convergence was observed around three major analytical axes: neuroendocrine dysregulation, behavioral adaptations related to food intake, and socioeconomic determinants of health. This convergence supports the feasibility of an integrative analytical framework, even in the presence of methodological variability.

3.2. General Characteristics Of Included Studies

The included studies span a temporal range from early foundational research on stress and metabolism to recent investigations addressing occupational and psychosocial determinants of health. Most studies employed quantitative designs, particularly cross-sectional and cohort approaches, with sample populations ranging from general adult cohorts to specific occupational groups, including educators and healthcare professionals.

A significant proportion of studies focused on physiological outcomes associated with chronic stress, while others emphasized behavioral responses such as emotional eating or dietary pattern shifts. Fewer studies explicitly integrated these dimensions, reinforcing the fragmented nature of the field.

Table 2 presents a comparative synthesis of the studies included in this integrative review, highlighting their methodological designs, population characteristics, analytical focus, and principal findings.

The table was structured to facilitate cross-study comparison and to support the identification of convergences across the neuroendocrine, behavioral, and socioeconomic axes. By organizing the evidence in a standardized format, it becomes possible to visualize not only the diversity of approaches but also the recurring patterns that underpin the relationship between occupational stress, eating behavior, and chronic disease outcomes.

Table 2. Comparative characteristics of included studies

Author (Year)	Study Design	Population / Context	Main Focus	Key Findings
Adam (2007)	Experimental / Review	Adults (general population)	Stress and eating behavior	Stress increases intake of palatable foods via reward pathways
Jonsdottir (2018)	Review	Workers with burnout	Neuroendocrine mechanisms	Burnout associated with HPA axis dysregulation and inflammation
Michels (2019)	Review	General population	Stress and appetite regulation	Stress disrupts leptin/ghrelin balance and promotes overeating
Ng (2003)	Observational	Adults	Stress and obesity	Positive association between stress and BMI

De Vriendt (2009)	Observational	Adolescents	Stress and metabolic outcomes	Chronic stress linked to metabolic syndrome indicators
Laugero (2011)	Observational	Adults	Stress and diet patterns	Higher stress associated with unhealthy dietary behaviors
Stewart-Knox (2014)	Review	Workers	Stress and eating behavior	Work stress alters food choices and eating routines
Rodrigues (2021)	Cross-sectional	School teachers	Job strain and diet	Occupational stress reduces healthy food consumption
Ganster (2013)	Review	Workers	Work stress and health	Chronic stress linked to physical and mental health impairment
Armborst (2021)	Observational	Adults under stress	Coping and metabolic risk	Coping strategies influence cardiometabolic outcomes
Azmi (2020)	Review	Shift workers	Circadian disruption and nutrition	Irregular schedules impair metabolism and dietary patterns
Melamed (2006)	Review	Workers	Burnout and	Burnout increases risk of

			cardiovascular risk	cardiovascular disease
Salvagioni (2017)	Systematic review	Workers	Burnout consequences	Burnout associated with multiple physical and psychological outcomes
Das Mercês (2016)	Observational	Health professionals	Burnout and adiposity	Burnout linked to abdominal obesity
Maslach (2016)	Review	Workers	Burnout conceptual framework	Burnout defined as multidimensional occupational syndrome
Cheptea (2021)	Observational	Teachers	Work conditions and health	Poor working conditions associated with health deterioration
Khalid (2025)	Theoretical	Organizational context	Workplace stressors	Organizational stress contributes to systemic strain
Vandenabeele (2025)	Review	Workers	Chronic stress and burnout	Burnout linked to long-term health deterioration
Zábó (2025)	Review	Aging populations	Burnout and aging	Burnout impacts long-term health trajectories

Source: Own authorship.

The distribution of study designs reveals a predominance of observational and review-based approaches, with limited representation of experimental or longitudinal investigations. This pattern indicates that the current body of evidence is largely grounded in associative and interpretative findings rather than causal inference. While systematic and narrative reviews contribute to theoretical consolidation, the scarcity of intervention-based research highlights a significant gap, particularly regarding strategies to mitigate the physiological consequences of burnout. Despite this methodological heterogeneity, a strong thematic convergence emerges across the studies.

Neuroendocrine research consistently emphasizes stress-induced hormonal dysregulation and inflammatory processes, whereas behavioral studies identify emotional eating and dietary imbalance as central responses to stress. At the same time, investigations focusing on occupational and socioeconomic factors underline the role of working conditions and structural constraints in shaping health behaviors. Together, these patterns reinforce the interpretation of burnout as a multidimensional phenomenon that cannot be adequately explained within isolated analytical domains.

A critical limitation identified in the synthesis concerns the fragmentation of the literature, as few studies simultaneously address neuroendocrine, behavioral, and socioeconomic dimensions. This compartmentalization restricts a comprehensive understanding of the phenomenon and is further compounded by the limited number of studies specifically focused on teachers, with much of the evidence derived from broader occupational or general population samples.

These gaps highlight the need for integrative analytical approaches capable of bridging disciplinary boundaries and contextualizing findings within educational settings. The recurring associations observed across studies, including physiological dysregulation, maladaptive eating behaviors, and structural constraints, suggest the presence of interconnected feedback mechanisms. This empirical convergence supports the hypothesis that burnout functions as a mediating process linking occupational stress to chronic disease outcomes. The absence of fully integrated explanatory models in the literature strengthens the relevance of proposing a systemic framework that captures these dynamic interactions.

The table will synthesize key aspects of the included studies, including authorship, year, methodological design, population characteristics, and principal findings, enabling a structured comparison across the three analytical axes.

3.3. Neuroendocrine Axis: Stress, Cortisol, And Metabolic Disruption

Across the analyzed studies, a consistent association emerged between chronic stress and dysregulation of the hypothalamic–pituitary–adrenal axis. Prolonged activation of this system leads to sustained cortisol secretion, which plays a central role in metabolic imbalance and inflammatory processes. Evidence indicates that burnout-related stress is not confined to psychological symptoms but extends to endocrine and immunological alterations that contribute to systemic disease processes (Jonsdottir, 2018).

This physiological dysregulation is closely linked to appetite control mechanisms. Chronic stress interferes with the hormonal balance between leptin and ghrelin, which regulate satiety and hunger, respectively. As highlighted in the literature, “psychosocial stress may disrupt appetite regulation and promote excess energy intake” (Michels, 2019). This disruption contributes to weight gain and metabolic instability over time.

Empirical findings further support the relationship between perceived stress and obesity. Early evidence demonstrated that higher stress levels are associated with increased body mass index and central adiposity (Ng, 2003). Longitudinal analyses reinforce this association, indicating that chronic stress exposure contributes to metabolic syndrome components, including insulin resistance and abdominal fat accumulation (De Vriendt, 2009).

Collectively, these findings indicate that stress-induced neuroendocrine dysregulation constitutes a central pathway linking occupational strain to long-term physiological outcomes.

3.4. Behavioral Axis: Emotional Eating And Food Environment

The behavioral dimension of the results highlights emotional eating as a recurrent coping strategy in response to stress. Neurobiological evidence demonstrates that stress activates reward-related pathways, increasing the motivational value of palatable foods. As described in the literature, “stress may increase the consumption of highly palatable foods through activation of reward systems” (Adam, 2007).

This pattern is further reinforced by psychological mechanisms, where food intake functions as a regulator of negative affect.

Emotional eating has been consistently associated with higher perceived stress levels and poorer dietary quality (Laugero, 2011). In occupational contexts, this behavior is often exacerbated by environmental constraints.

Workplace conditions play a decisive role in shaping dietary patterns. Limited time, irregular schedules, and restricted access to healthy food options contribute to maladaptive eating behaviors. Evidence indicates that “stress at work is associated with changes in food choice and eating patterns” (Stewart-Knox, 2014). Among teachers, job strain has been linked to reduced consumption of healthy foods such as fruits, suggesting that occupational stress directly influences dietary quality (Rodrigues, 2021).

These findings demonstrate that behavioral adaptations to stress are not merely individual choices but are strongly conditioned by environmental and occupational factors.

3.5. Socioeconomic Axis: Precarization And Nutritional Vulnerability

The socioeconomic dimension reveals how structural conditions mediate the relationship between stress and health outcomes. Occupational stress is deeply embedded in broader labor dynamics, including workload intensification, job insecurity, and limited financial resources. These factors not only increase psychological strain but also constrain access to adequate nutrition.

Chronic work stress has been associated with adverse health behaviors and outcomes, particularly in contexts characterized by limited autonomy and high demands (Ganster, 2013). In addition, coping strategies under chronic stress conditions have been shown

to influence cardiometabolic risk, highlighting the interaction between behavioral and physiological responses (Armborst, 2021).

Irregular work schedules and disrupted daily routines further exacerbate these effects. Evidence from shift work studies indicates that circadian misalignment negatively impacts both eating patterns and metabolic health, contributing to increased vulnerability to chronic diseases (Azmi, 2020). These findings are transferable to teaching contexts marked by extended working hours and insufficient recovery time.

Taken together, the data suggest that nutritional vulnerability under stress is not solely a matter of individual behavior, but rather a consequence of structural and socioeconomic constraints that shape both exposure to stress and available coping resources.

3.6. Burnout And Chronic Disease Outcomes

The relationship between burnout and chronic disease outcomes is consistently supported by the analyzed studies. Burnout has been associated with increased risk of cardiovascular disease, with evidence indicating that chronic occupational stress contributes to hypertension, atherosclerosis, and other cardiometabolic conditions (Melamed, 2006).

Beyond cardiovascular risk, burnout is linked to a broader spectrum of physical and psychological consequences. A comprehensive analysis of burnout outcomes highlights its association with fatigue, sleep disturbances, and impaired immune function, all of which contribute to long-term health deterioration (Salvagioni, 2017).

In addition, empirical evidence suggests a relationship between burnout and adiposity, particularly abdominal fat accumulation. Studies have demonstrated that individuals exposed to chronic occupational stress present higher levels of central obesity, a key component of metabolic syndrome (Das Mercês, 2016).

These findings reinforce the interpretation of burnout as a systemic condition with tangible physiological consequences. The convergence of cardiovascular, metabolic, and behavioral outcomes suggests that burnout operates as a critical intermediary linking occupational stress to chronic disease development.

4. DISCUSSION

4.1. Burnout as a Syndemic Condition

The findings of this integrative review support the interpretation of burnout as a syndemic condition, in which biological, behavioral, and socioeconomic factors interact dynamically, amplifying health risks beyond isolated effects. Rather than functioning as a linear cause of disease, burnout appears embedded within a network of reciprocal influences that simultaneously shape and are shaped by occupational stress, lifestyle behaviors, and structural constraints.

From a biological perspective, chronic stress induces neuroendocrine dysregulation, particularly through sustained activation of the hypothalamic–pituitary–adrenal axis, resulting in persistent cortisol elevation and inflammatory responses (Jonsdottir, 2018; Michels, 2019). These alterations are not merely physiological correlates but active contributors to disease progression. As highlighted in the literature, “burnout is associated with alterations

in endocrine and immune systems" (Jonsdottir, 2018, p. R150), reinforcing its systemic character.

Simultaneously, behavioral adaptations such as emotional eating function as mediating mechanisms through which stress is embodied. The consumption of high-energy foods in response to stress reflects both neurobiological reward activation and psychological coping processes (Adam, 2007; Torres, 2007). This interaction aligns with the observation that "stress can drive eating in the absence of metabolic need" (Adam, 2007, p. 452), illustrating how physiological and behavioral responses become intertwined.

Socioeconomic conditions further intensify these dynamics by constraining access to resources and shaping exposure to stress. Occupational environments characterized by high demands and low control are consistently associated with adverse health outcomes (Ganster, 2013). In this sense, burnout cannot be reduced to an individual-level phenomenon but must be understood within a broader structural context that reinforces vulnerability. This multilevel interaction justifies the use of a syndemic framework, as it captures the cumulative and synergistic effects of overlapping determinants on health outcomes.

4.2. Integration Of The Three Axes

The integration of neuroendocrine, behavioral, and socioeconomic axes reveals the existence of feedback mechanisms that sustain and intensify the relationship between stress and chronic disease. Rather than operating independently, these dimensions form a circular system in which each component reinforces the others.

Neuroendocrine dysregulation influences appetite and energy balance through hormonal pathways, particularly involving leptin and ghrelin, thereby promoting increased caloric intake (Michels, 2019). This biological predisposition interacts with behavioral responses, such as emotional eating, which are further shaped by environmental and occupational conditions (Adam, 2007; Stewart-Knox, 2014). Evidence indicates that work-related stress alters dietary patterns and increases the likelihood of unhealthy food choices, especially under conditions of time pressure and limited access to nutritious options (Rodrigues, 2021).

At the same time, structural factors such as workload, job insecurity, and financial limitations influence both stress exposure and coping capacity. Chronic occupational stress has been shown to affect not only mental health but also physiological functioning, contributing to a cumulative burden of disease (Ganster, 2013; Salvagioni, 2017). Quantitative evidence indicates that individuals exposed to sustained stress present higher risks of metabolic syndrome components, including central obesity and insulin resistance (Ng, 2003; De Vriendt, 2009).

These interconnections suggest that burnout operates as a central mediator within a self-reinforcing system. As noted in the literature, “burnout has multiple physical, psychological, and occupational consequences” (Salvagioni, 2017, p. 2), which collectively contribute to long-term health deterioration. The persistence of these feedback loops highlights the difficulty of addressing burnout through isolated interventions, as changes in one domain may be insufficient without simultaneous consideration of the others.

4.3. The “vicious Cycle Of Teaching” (proposed Theoretical Model)

The synthesis of findings supports the development of a conceptual model that captures the dynamic and recursive nature of the relationships identified. The proposed “Vicious Cycle of Teaching” conceptualizes burnout as a central mechanism linking occupational stress to chronic disease through interconnected pathways.

The model begins with occupational stress, driven by high demands, emotional labor, and structural precarization within the teaching profession (Maslach, 2016; Cheptea, 2021). This stress triggers chronic low-grade inflammation mediated by neuroendocrine dysregulation, particularly through sustained cortisol exposure (Jonsdottir, 2018). Over time, these physiological alterations contribute to metabolic imbalance.

Concurrently, individuals adopt maladaptive coping strategies, notably emotional eating and irregular dietary patterns, which further exacerbate metabolic risk (Laugero, 2011; Stewart-Knox, 2014). These behaviors, combined with physiological vulnerability, lead to the development of metabolic syndrome and related chronic conditions, including cardiovascular disease (Melamed, 2006; Das Mercês, 2016).

The progression of these health outcomes contributes to absenteeism, reduced work capacity, and, in more severe cases, early retirement. This, in turn, intensifies workload and stress among remaining professionals, reinforcing the cycle. Organizational factors also play a critical role, as systemic stressors embedded in workplace structures perpetuate this dynamic (Khalid, 2025).

Table 3 synthesizes the proposed conceptual model of the “Teaching Vicious Cycle”, integrating the main pathways identified in the literature into a structured and sequential framework. The table organizes the progression from occupational stress to chronic disease outcomes, highlighting the underlying mechanisms and corresponding health impacts at each stage. This representation allows for a systematic visualization of how burnout operates as a central mediator within a dynamic and self-reinforcing system.

Table 3. Conceptual Model: The Teaching Vicious Cycle

Stage	Core Process	Underlying Mechanism	Health Impact	Supporting Evidence
Occupational stress	Chronic exposure to work demands	High workload, emotional labor, low control	Psychological strain and burnout onset	(Maslach, 2016; Ganster, 2013; Cheptea, 2021)
Neuroendocrine dysregulation	HPA axis activation	Sustained cortisol secretion, inflammatory response	Hormonal imbalance and metabolic disruption	(Jonsdottir, 2018; Michels, 2019)
Behavioral adaptation	Emotional eating and coping	Reward system activation, stress-induced food intake	Increased consumption of energy-dense foods	(Adam, 2007; Laugero, 2011; Torres, 2007)
Dietary imbalance	Nutritional dysregulation	Irregular meals, poor food quality, limited access	Weight gain and metabolic instability	(Stewart-Knox, 2014; Rodrigues, 2021; Azmi, 2020)

Metabolic outcomes	Development of chronic conditions	Insulin resistance, central adiposity, inflammation	Metabolic syndrome and cardiovascular risk	(Ng, 2003; De Vriendt, 2009; Das Mercês, 2016)
Health deterioration	Systemic physiological burden	Interaction of chronic stress and disease progression	Reduced quality of life and functional capacity	(Salvagioni, 2017; Melamed, 2006)
Occupational consequences	Work impairment	Absenteeism, presenteeism, reduced productivity	Workforce instability and attrition	(Vandenabeele, 2025; Zábó, 2025)
Feedback reinforcement	Cycle perpetuation	Increased workload and organizational stress	Intensification of burnout and stress exposure	(Khalid, 2025; Armborst, 2021)

Source: Own authorship.

The model presented in Table 3 reveals a coherent progression in which occupational stress initiates a cascade of physiological and behavioral responses that culminate in chronic disease. Each stage is not isolated but functionally connected, forming a continuous process in which neuroendocrine dysregulation, behavioral adaptation, and metabolic outcomes reinforce one another. This structure reflects the cumulative nature of stress exposure, where repeated activation of biological systems leads to long-term physiological burden. The inclusion of both biological and behavioral mechanisms underscores the necessity of multidimensional analysis when addressing burnout-related health outcomes.

A central feature of the model is the presence of feedback loops that sustain and intensify the cycle. The transition from health deterioration to occupational consequences demonstrates how physiological impairment feeds back into the work environment, increasing absenteeism, reducing productivity, and amplifying organizational strain. This, in turn, generates new stressors, reinforcing the initial conditions that triggered the cycle. Such recursive dynamics highlight the inadequacy of linear models and support the interpretation of burnout as a systemic process embedded within broader institutional and socioeconomic contexts.

The model also provides a foundation for both theoretical advancement and practical intervention. By explicitly linking stress, behavior, and disease within a single framework, it addresses the fragmentation identified in the literature and offers a more comprehensive explanatory structure. At the same time, it shifts the focus from individual responsibility to structural determinants, suggesting that effective interventions must target not only behavioral change but also organizational conditions. This perspective challenges reductionist approaches and reinforces the need for integrated strategies in occupational health and education policy.

4.4. Implications For Public Health And Education Systems

The findings have significant implications for public health and educational policy. The identification of burnout as a mediator of chronic disease risk suggests that its impact extends far beyond individual well-being, representing a substantial economic and social burden. Increased healthcare costs, productivity losses, and

workforce instability are among the consequences associated with chronic occupational stress.

The teacher retention crisis emerges as a critical issue in this context. High rates of burnout contribute to attrition and reduced professional engagement, undermining the quality and continuity of education. Organizational stressors, including excessive workload and insufficient institutional support, have been identified as key drivers of this phenomenon (Vandenabeele, 2025).

Moreover, the findings challenge the predominance of individual-centered interventions focused on behavior change. While promoting healthy eating and stress management remains important, such approaches are insufficient if structural determinants are not addressed. As suggested in recent analyses, workplace conditions and organizational dynamics play a decisive role in shaping both stress exposure and health outcomes (Zábó, 2025).

A shift toward structural interventions is therefore necessary, encompassing policy measures aimed at improving working conditions, reducing workload, and ensuring access to supportive resources. Without such changes, efforts to mitigate burnout and its health consequences are likely to remain limited in effectiveness.

4.5. Limitations Of The Study

This study presents limitations inherent to integrative reviews. The inclusion of diverse study designs introduces methodological heterogeneity, which may affect comparability across findings. While this diversity allows for a broader understanding of the

phenomenon, it also limits the ability to establish causal relationships.

In addition, the reliance on existing literature restricts the analysis to available evidence, which is itself fragmented and unevenly distributed across the three analytical axes. The limited number of studies specifically focused on teachers further constrains the generalizability of findings to this population.

Despite these limitations, the integrative approach provides a comprehensive framework for understanding the complex interactions between burnout, eating behavior, and chronic disease, offering a foundation for future research and theoretical development.

Taken together, the evidence synthesized in this discussion indicates that burnout in educators cannot be adequately interpreted within isolated disciplinary boundaries, nor addressed through fragmented interventions. The convergence of neuroendocrine dysregulation, maladaptive behavioral responses, and structural constraints reveals a complex and self-reinforcing system in which occupational stress becomes biologically embedded and socially perpetuated.

This configuration challenges prevailing approaches that individualize responsibility for health outcomes, while obscuring the role of institutional and socioeconomic determinants. By articulating these dimensions within an integrative framework, the present analysis not only exposes the depth of the problem but also calls into question the adequacy of current responses, suggesting that meaningful change depends on structural transformation rather than behavioral adjustment alone.

5. CONCLUSION

Burnout in educators emerges, in light of the present synthesis, as a condition that transcends psychological boundaries and assumes a distinctly physiological and systemic character. Its effects are not confined to emotional exhaustion but extend into biological regulation, behavioral adaptation, and long-term health trajectories. The evidence demonstrates a consistent interaction between chronic stress, altered eating patterns, and the development of non-communicable diseases, revealing a complex network of mutually reinforcing processes.

This understanding calls for a shift in perspective. Addressing burnout cannot rely solely on individual-level recommendations or isolated interventions. What is required is a coordinated response that recognizes the structural roots of the problem. The urgency lies in advancing occupational health policies that meaningfully improve working conditions, while also promoting integrated prevention strategies capable of acting simultaneously on physiological, behavioral, and social dimensions.

Only through such systemic and interdisciplinary approaches will it be possible to interrupt the cycle that currently links teaching to illness, and to reframe education as a space not of depletion, but of sustainable human development.

Ultimately, the challenge posed by burnout in contemporary teaching extends beyond the limits of occupational health and enters the broader terrain of social responsibility and institutional ethics. To continue naturalizing environments that produce illness is to accept, implicitly, the erosion of both human potential and

educational quality. Repositioning teacher well-being at the center of policy and practice is not merely a preventive measure, but a necessary condition for the sustainability of educational systems themselves. In this sense, confronting burnout becomes not only a matter of health, but a decisive step toward redefining the future of education in more humane, equitable, and resilient terms.

REFERENCES

ADAM, T. C.; EPEL, E. S. Stress, eating and the reward system. **Physiology & Behavior**, v. 91, n. 4, p. 449–458, 2007. Disponível em: https://doi.org/10.1016/j.physbeh.2007.04.011

ARMBORST, D. et al. Coping strategies influence cardiometabolic risk factors in chronic psychological stress. **Nutrients**, v. 14, n. 1, 2021. Disponível em: https://doi.org/10.3390/nu14010077

AZMI, N. A. S. M. et al. Consequences of circadian disruption in shift workers on chrononutrition and psychosocial well-being. International Journal of Environmental **Research and Public Health**, v. 17, n. 6, 2020. Disponível em: https://doi.org/10.3390/ijerph17062043

CHEPTEA, D. Assessment of teachers' health in relation to working conditions. **Moldovan Medical Journal**, v. 64, n. 5, 2021. Disponível em: https://doi.org/10.52418/moldovan-med-j.64-5.21.10

DAS MERCÊS, M. C. et al. Burnout syndrome and abdominal adiposity among primary health care nursing professionals. **Psicologia: Reflexão e Crítica**, v. 29, 2016. Disponível em: https://doi.org/10.1186/s41155-016-0051-7

DE VRIENDT, T.; MORENO, L.; DE HENAUW, S. Chronic stress and obesity in adolescents. **Nutrition, Metabolism and Cardiovascular Diseases**, v. 19, n. 7, p. 511–519, 2009. Disponível em: https://doi.org/10.1016/j.numecd.2009.02.009

EBACHER, H. Burnout, nutrition knowledge, and dietary intake of athletic trainers. 2021. Disponível em: https://doi.org/10.31274/td-20240329-121

GANSTER, D. C.; ROSEN, C. C. Work stress and employee health. **Journal of Management**, v. 39, n. 5, p. 1085–1122, 2013. Disponível em: https://doi.org/10.1177/0149206313475815

JONSDOTTIR, I. H.; DAHLMAN, A. S. Endocrine and immunological aspects of burnout. **European Journal of Endocrinology**, v. 180, n. 3, p. R147–R158, 2018. Disponível em: https://doi.org/10.1530/EJE-18-0741

KHALID, S. et al. The price of innovation: decoding organizational stressors and strains. **Journal of Workplace Behavioral Health**, 2025. Disponível em: https://doi.org/10.1080/15555240.2025.2491418

LAUGERO, K. D.; FALCÓN, L. M.; TUCKER, K. L. Relationship between perceived stress and dietary patterns. **Appetite**, v. 56, n. 1, p. 194–204, 2011. Disponível em: https://doi.org/10.1016/j.appet.2010.11.001

MASLACH, C.; LEITER, M. P. Understanding burnout. **Annual Review of Psychology**, v. 67, p. 397–422, 2016. Disponível em: https://doi.org/10.1146/annurev-psych-122414-033659

MELAMED, S. et al. Burnout and risk of cardiovascular disease. **Psychological Bulletin**, v. 132, n. 3, p. 327–353, 2006. Disponível em: https://doi.org/10.1037/0033-2909.132.3.327

MICHELS, N. Biological underpinnings from psychosocial stress towards appetite and obesity. **Nutrition Research Reviews**, v. 32, n. 2, p. 282–293, 2019. Disponível em: https://doi.org/10.1017/S0954422419000143

NG, D. M.; JEFFERY, R. W. Relationships between perceived stress and obesity. **Obesity Research**, v. 11, n. 9, p. 1080–1087, 2003. Disponível em: https://doi.org/10.1038/oby.2003.69

PAGE, M. J. et al. The PRISMA 2020 statement. **BMJ**, v. 372, 2021. Disponível em: https://doi.org/10.1136/bmj.n71

RODRIGUES, R. et al. Job strain and fruit consumption in schoolteachers. **Public Health Nutrition**, v. 24, n. 7, p. 1678–1686, 2021. Disponível em: https://doi.org/10.1017/S1368980021000860

SAIYED, S. et al. **Exploring graveyard shift stress and burnout**. ITM Web of Conferences, 2024. Disponível em: https://doi.org/10.1051/itmconf/20246505002

SALVAGIONI, D. A. J. et al. Physical, psychological and occupational consequences of burnout. **PLoS ONE**, v. 12, n. 10, 2017. Disponível em: https://doi.org/10.1371/journal.pone.0185781

STEFFEY, M. A. et al. Physiology and health effects of burnout. **Frontiers in Veterinary Science**, v. 10, 2023. Disponível em: https://doi.org/10.3389/fvets.2023.1184525

STEWART-KNOX, B. Eating and stress at work. **Trends in Food Science & Technology**, v. 35, n. 1, p. 52–60, 2014. Disponível em: https://doi.org/10.1016/j.tifs.2013.10.010

TADDEI, S. et al. **Burnout among teachers: application of JD-R model**. 2011. Disponível em: https://doi.org/10.1080/08870446.2011.617185

TORRACO, R. J. Writing integrative literature reviews. **Human Resource Development Review**, v. 4, n. 3, p. 356–367, 2005. Disponível em: https://doi.org/10.1177/1534484305278283

TORRES, S. J.; NOWSON, C. A. Relationship between stress and eating behavior. **Nutrition**, v. 23, n. 11-12, p. 887–894, 2007. Disponível em: https://doi.org/10.1016/j.nut.2007.08.008

TRIVEDI, M. D. et al. Health and nutritional status of professional women. **Journal of Neonatal Surgery**, 2025. Disponível em: https://doi.org/10.63682/jns.v14i32s.7659

VANDENABEELE, R.; JOOSEN, M.; VAN DAM, A. Chronic stress and burnout. **Frontiers in Psychology**, v. 16, 2025. Disponível em: https://doi.org/10.3389/fpsyg.2025.1712340

WHITTEMORE, R.; KNAFL, K. The integrative review: updated methodology. **Journal of Advanced Nursing**, v. 52, n. 5, p. 546–553, 2005. Disponível em: https://doi.org/10.1111/j.1365-2648.2005.03621.x

WILSON, S. M.; SATO, A. F. Stress and paediatric obesity. **Stress and Health**, v. 30, n. 2, p. 91–102, 2014. Disponível em: https://doi.org/10.1002/smi.2501

ZÁBÓ, V. et al. Burnout prevention and healthy aging. **GeroScience**, v. 47, 2025. Disponível em: https://doi.org/10.1007/s11357-025-01780-w

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