Title: Academic Burnout in Mexican Medical Students: A Critical Review of Prevalence, Risk Factors, and Gaps in Intervention

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Discussion Points: Have you ever wondered about the toll of medical education on students? ABS is a widespread issue affecting 25-45% of medical students globally. Explore the challenges, implications, and potential solutions. #StudentWellBeing #chronicfatigue #burnout

How does academic burnout impact medical students in Mexico? Dive into the research findings, identify neglected aspects, and join the conversation on prevention and intervention strategies. #MedSchool #ABSInMexico

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ABSTRACT.

Academic Burnout Syndrome (ABS) is defined as a state of exhaustion and disengagement related to the educational environment that affects university students in diverse disciplines. The combination of an intense academic load, high expectations, competitiveness among students, and other factors during their education has the potential to affect negatively, among other things, academic performance, decision-making ability, physical and mental well-being, self-esteem, and overall quality of life. This review aims to delineate the most prominent findings and advancements on ABS in medical students in Mexico while identifying areas that require further attention and developing research proposals to enhance the comprehension and treatment of this problem. A critical narrative analysis was conducted following an exhaustive bibliographic search for articles in both English and Spanish across a range of databases, including PubMed, Google Scholar, Redalyc, SciELO, and DOAJ. The search took place in the period from January to July 2023. Randomized trial articles and original research were included in the analysis. Meta-analyses and incomplete studies were excluded while the articles were reviewed, resulting in a final selection of 22 relevant articles. Despite the vast number of studies conducted on ABS in medical students in Mexico, a significant part focuses on descriptive characteristics. At the same time, other aspects, such as prevention, treatment, and awareness of this problem, are often overlooked. To effectively address ABS, academic communities must implement comprehensive preventive and curricular measures that prioritize the well-being of students, fostering a healthy and supportive learning environment.

Key Words: Academic Burnout, Mexico, Medical education, mental health, consequences (Source: MeSH-NLM).

INTRODUCTION

The term “Burnout” was initially coined by American psychiatrist Herbert Freudenberger to describe a state of exhaustion, fatigue, or demotivation resulting from an excessive workload. This phenomenon leads to a decreased effectiveness within an individual’s environment, exhibiting signs of impairment in both behavior and physical condition.[1] Subsequently, Maslach and Jackson redefined burnout as a psychological syndrome characterized by the presence of discouraging emotions, including emotional exhaustion, depersonalization, and low personal efficacy perception.[2] Burnout syndrome (BS) represents a persistent and adverse mental state that develops from chronic interpersonal tensions within the work environment among individuals who are otherwise considered normal.[3-4] Initially, it was thought that BS only affected professionals with constant and direct

interaction with others. However, evidence has shown its capacity to influence anyone, regardless of their activities, even in sports and academic settings.[5-6]

In the academic context, "Academic Burnout Syndrome (ABS)" refers to a condition in which students experience physical and emotional exhaustion due to prolonged academic demands. This syndrome is characterized by fatigue, a declining interest in academic activities, and feelings of cynicism, inadequacy, and incompetence regarding their performance as students.[6] ABS impacts their sense of achievement and satisfaction with their studies and diminishes their overall motivation and well-being.[6-8]

The assessment of ABS has been made possible by the standardization of some instruments, such as the Maslach Burnout Inventory and the General Survey (MBI-GS) in university students, which led to the development of the Burnout Inventory-Student Survey (MBI-SS) by Schaufeli et al. in 2002.[6] The ABS is diagnosed when an individual exhibits elevated scores on the emotional exhaustion and depersonalization subscales while exhibiting diminished scores on the personal accomplishment subscale.

Students are subject to several pressures and academic demands, which, when combined with the effects of intense stress, mood swings, psychological disorders, cognitive appraisal, and coping strategies, can contribute to the development of ABS,[8-11] as demonstrated in university students from Spain, Portugal and the Netherlands.[6]

Medical students are exposed to these factors from the beginning of their undergraduate studies, with the intensity of this exposure culminating during their undergraduate internship in a hospital setting. These students are simultaneously undergoing medical education and assuming the role of hospital workers. This dual role places them in a position where they must navigate the responsibilities assigned to them concerning patients and the specific demands of each hospital service.[12-14] Many studies have shown that ABS occurs more frequently, ranging from 15 to 36 percent in medical students, residents, and physicians compared to undergraduate students in other disciplines and the general population.[8,13-15]

Recent systematic reviews and meta-analyses involving 44,255 medical students worldwide have reported a general prevalence of ABS ranging from 37.2% to 44.2%.[16-17] These findings align with those observed in Latin America. In Brazil, ABS is observed in 13.1 to 28.2% of medical students.[18-20] In Peru, the prevalence varies from 2.44 to 57.6%.[21] In Colombia, the prevalence of ABS ranges from 14% to 30.8%.[22-23] In Guatemala, the prevalence fluctuates from 5% to 13%,[24] and in Ecuador, the prevalence varies from 14% to 90%.[25-26]

The consequences of ABS are far-reaching, affecting not only the mental health and well-being of students but also their academic performance and their ability to provide high-quality medical care.[10-11] The value of studying ABS among university students lies in the avoidance or mitigation of potential adversities in the short term, particularly regarding well-being and negative affections in their academic activities and performance.[8,11,27] In the long term, it can influence job satisfaction, the incorrect execution of procedures, and the probability of experiencing exhaustion in further medical practice.[28]

This knowledge highlights the necessity of implementing early interventions and prevention strategies that integrate psychological and practical approaches within academic medical institutions. These strategies aim to reduce ABS among medical students by fostering self-care, self-compassion, and resilience while promoting a balanced approach to study and personal life.[15,19] Furthermore, it is recommended that stress management techniques, such as meditation and regular exercise, be encouraged.[29-31] The creation of emotional support spaces, the implementation of psychological counseling, and the implementation of wellness programs and psychological assistance should be considered as well.[31-33]

As previously mentioned, the Mexican medical education system presents several characteristics that may contribute to the development of ABS among its students. Furthermore, there are deficiencies in the availability and accessibility of psychological services with adequate follow-up, limited flexibility in schedules, and other factors that slow the proper study of ABS. Therefore, this review aims to delineate the prominent advancements in ABS among medical students in Mexico, identify potential areas that require further attention, and develop research proposals to enhance our understanding, prevention, and treatment of this phenomenon.

METHODS

A critical narrative analysis was conducted, derived from an exhaustive literature search in search engines such as PubMed, Google Scholar, Redalyc, SciELO, and DOAJ, covering the period from January 2023 to July 2023. The objective was to identify references on the measurement of ABS in Mexican medical universities. This objective was accomplished by a combination of English and Spanish terms, including "burnout," "burnout syndrome," "academic burnout," "medical students," "medical school students," "medical school," "Mexico," and "Mexicans." To refine the results, Boolean operators such as "and," "or," and "not" were employed. These operators were used to systematically search the databases mentioned above, ensuring comprehensive and meticulous coverage of the study topic.

The search yielded articles measuring ABS in medical students published during the specified period. The articles were available in English and Spanish and offered free or full access. Priority was given to randomized trials and original articles to obtain a comprehensive and current perspective on the subject. The following types of articles were excluded: review articles, systematic reviews, and meta-analyses; articles with incomplete results; and studies not directly related to burnout in Mexican medical students. As a result of this rigorous selection process, a total of twenty-two relevant articles were identified and included in the review, as shown in Figure 1.

Study selection and data extraction

A single reviewer conducted the study selection and data extraction process, initially assessing the titles and abstracts. A second author selectively reviewed some titles and abstracts to ensure consistency and accuracy. Any discrepancies were discussed until a consensus was reached. Full articles were obtained for potentially relevant studies. The inclusion criteria were then applied, and the following data were extracted: lead author, publication year, country, sample, outcome measure, primary aim, and key findings.

Data Analysis and Quality Assessment

The findings were subjected to a comprehensive data synthesis approach conducted in stages aligned with the review's objectives. Data patterns were manually explored to identify consistent findings related to the study objectives. Summarize eligible studies and their results were compiled and presented in Table 1. The quality assessment ensured that the conclusions drawn were based on high-quality evidence by examining crucial factors in each study, such as the clarity of research objectives, the appropriateness of the study design, the recruitment strategy, the data collection techniques, the ethical considerations, and the validity and reliability of the findings.

RESULTS

Epidemiological of ABS among Mexican medical students.

The available research in Mexico indicates that the prevalence of ABS ranges from zero to 96% (Table 1).[35-56] In undergraduate students, the most frequently reported prevalence ranges from 15 to 45%.[35-43,45-48,50-51,56] On the contrary, some studies have documented a lower prevalence rate of below 10%,[40,44,49,54] while others have reported a higher rate of above 70%.[36,39,41,52-53,55]

Concerning gender, some reports indicate the absence of significant differences in ABS prevalence.[25-26,28,50,56] However, other studies have found that male students exhibit a prevalence and intensity of the ABS components up to 20% higher than that observed in females.[35,39,42,44,46] Jezzini-Martinez et al (2022),[46] indicate that men are three times more likely to develop burnout than women. Additionally,

higher levels of depersonalization have been observed in men (37.7%) compared to women (15.7%),[44] as well as a higher probability of experiencing severe emotional exhaustion.[39] Furthermore, some researchers have proposed an alternative viewpoint, suggesting that women are more likely to exhibit ABS or its constituent elements.[30,52]

Insert Table 1

A number of studies concur that ABS is more prevalent and more pronounced among students in their final semesters, with a frequency that ranges between 7 and 36.9%.[12,35-46,48,52,56] For instance, observations have revealed that fifth- and sixth-year students demonstrate elevated levels of ABS. Students exhibit elevated levels of ABS components compared to their earlier years.[28,42] Additionally, as the academic semester progresses, the prevalence of cynicism also increases.[40]

Conversely, numerous studies have demonstrated a positive association between older age of students and the incidence of ABS.[35,38] A study conducted on students at the Military Medical School revealed that the older age group exhibited a frequency of burnout between 6 and 12% higher than that observed in students under 25.[35] In studies that have included undergraduate medical interns, the reported prevalence has ranged from 3.6% to 70%. The most frequently reported figures are around 15% and 35%.[37-38,40,48] However, studies have also identified prevalence as low as 5%,[44] and as high as 70%.[53]

ABS diagnosis among medical students in Mexico

Various instruments have been developed and employed in Mexico to assess burnout among medical students. The most used instruments are the Maslach Burnout Inventory-Student Survey (MBI-SS) and its variants, including the Maslach Burnout Inventory (MBI); Human Services Survey (MBI-HSS),[35-50,55-56] the Unidimensional Scale for Academic Burnout (EUBE),[36] the Questionnaire for Professional Burnout- Abbreviated (CDPE-A),[52] and the Questionnaire for Evaluation of Burnout at Work (CESQT).[53]

The MBI-SS is an adaptation of the MBI, designed with the specific purpose of assessing burnout in students. It consists of 22 items in three subscales assessing emotional exhaustion, depersonalization, and academic self-actualization. The MBI-SS is considered a valid and reliable instrument, the most widely used worldwide, and serves as a benchmark for comparison, allowing researchers to contextualize findings across research settings.[35-50]

The EUBE is a unidimensional instrument comprising 15 items that assess burnout across three subdimensions: physical, emotional, and cognitive exhaustion. These subdimensions are further subdivided into behavioral and attitudinal indicators of academic burnout.[36,52]

The CDPE-A is a psychometric instrument designed to assess variables associated with the process of professional burnout and resilience personality.[57] This questionnaire has been adapted to align with the characteristics of the university population immersed in the hospital environment. It comprises 65 items distributed across five subscales.[53]

The CESQT, developed by Gil-Montes in 2011,58 comprises 20 items divided into three dimensions: (a) cognitive impairment, (b) affective impairment, and (c) indolence. Low scores in cognitive impairment and high scores in affective impairment are considered the initial indications of BS. These symptoms can elicit negative attitudes toward colleagues, as reflected in elevated scores in indolence.[59]

Risk Factors for ABS in Mexican Medical Students

Several studies have identified factors contributing to the development of ABS in medical students in Mexico (Figure 2). One of the main factors is belonging to advanced semesters. A number of reports have concluded that students in late semesters exhibit a higher prevalence and severity of ABS components compared to those in early semesters.[35-36,39,42-43,52,56]

Insert figure 2

Similarly, gender is another widely reported risk factor among medical students in Mexico. As previously indicated, some research suggests that men exhibit a higher prevalence and more severe symptoms of ABS compared to women.[42,44,46] Conversely, several studies indicate that women demonstrate a higher prevalence of ABS.[36,39,47,52] This trend is reinforced by some authors' observations indicating that women tend to experience greater emotional exhaustion.[39,52]

On the other hand, research has demonstrated a notable correlation between students experiencing psychological disorders, such as anxiety and depression, and elevated levels of ABS, which is a significant risk factor.[36,38,43,50-51,55] Additionally, a positive correlation has been identified between the manifestation of risky eating behaviors and higher levels of burnout.[43]

Other variables that may be considered risk factors for emotional exhaustion, depersonalization, and lack of personal accomplishment include age,[35,38] socioeconomic level,[52,55-56] foreign origin or residence in a different city,[42] alcohol, tobacco, and illicit drug consumption,[36,47] travel time to the

faculty and university of origin,[37] class and clinical practice schedules, classroom environment, as well as the relationship with teachers.[30] Furthermore, Plett-Torres et al. (2018) have suggested that the level of pressure or difficulty of programs may also be a risk factor for the development of ABS components.[49]

In the context of undergraduate medical interns, it has been observed that they present higher levels of ABS or various dimensions compared to students who have not yet begun this stage.[36,38,44,55] Furthermore, it has been found that belonging to the emergency, internal medicine,[37] surgery,[38] gynecology and obstetrics[37] services are associated with an elevated risk of developing ABS.

Additional factors that have been identified as potential contributors to the development of this syndrome include greater seniority in the undergraduate internship, the average number of surgeries performed during the working day, the number of hours of service, the number of hours of sleep, scarcity of resources, on-call duty, the work environment, and feelings of pressure associated with the work. These factors have been found to be related to a greater risk of developing this syndrome.[38,45,48,54-56]

Protective factors against ABS in Mexican Medical Students

Additionally, few studies have addressed the factors that could act as protectors for the development of ABS. It has been reported that medical students who engage in sports are negatively associated with the development of ABS.[43] Similarly, students who participate in artistic activities such as playing a musical instrument, singing, or acting present fewer components of ABS and experience lower levels of cynicism and burnout.[49]

Furthermore, research suggests that a personality trait known as "resiliency" may play a moderating role in the development of burnout. Individuals with higher scores in resiliency tend to demonstrate lower levels of burnout, particularly in the context of ABS components.[53] Additionally, findings from a study by Joanico-Morales et al. (2019) highlight a potential protective effect of being single or divorced on the likelihood of developing burnout.[37]

The impact of ABS on medical students in Mexico

The potential implications of the introduction of ABS in medical education in Mexico have not been extensively investigated. It has been demonstrated that individuals experiencing elevated fatigue levels tend to present a decline in their capacity to make decisions, learn effectively, and achieve academic success.[35,46]

A study by Jezzini-Martinez et al. (2022)[46] indicated that men who exhibited a greater tendency towards cynicism and ABS demonstrated lower academic efficacy, which could be attributed to the consequences of burnout. In the context of the ongoing pandemic, recent reports have indicated that medical students experiencing burnout exhibit various concerning behaviors and attitudes. These include distrust in the knowledge they have acquired, fear of academic failure, concern about their future professional prospects, family pressure, lack of leisure time, and substance abuse.[47]

On the other hand, an investigation into the academic performance of surgeons at the Military Medical School indicated that those at risk of burnout exhibited a marginally higher academic average than their counterparts without ABS. This observation may indicate that academic pressure plays a significant role in the emergence of the syndrome.[35]

DISCUSSION

In general, ABS in medical students has been the subject of a substantial number of publications at the national level. These publications have primarily focused on the determination of its prevalence and the comparison between semesters, ages, and genders. Additionally, they have sought to identify risk and protective factors that helped elucidate the problem. In Mexico, the prevalence of ABS among medical students ranges from 20 to 45%. The main risk factors identified are the semester, gender, excessive academic load, and comorbidity with anxiety and depression, among others. Conversely, the protective factors identified include participating in sports, playing musical instruments, and singing. It is evident that it is necessary to ascertain the consequences and implement intervention strategies to diminish the prevalence and impact of ABS within the faculties.

The prevalence of ABS exhibits considerable variation in studies conducted in other geographic regions, with reported rates ranging from 25% to 45%.[16-26] Although prevalence within this range has been reported in Mexico,[35-38,42,45-46,48,50-51] some studies have documented prevalence of less than 10%,[40,44,49,54]. In contrast, others reports exceed 70%.[36,39,41,52-53,55] The discrepancies in the prevalence observed in several studies in Mexico can be attributed to various factors, including the period in which the research was conducted, the size of the sample, the methodology applied, the semester in which the students were studying, the type of institution, the use of different assessment tools and diagnostic criteria for the syndrome.[16-17,57-58] Additionally, it should be considered into account that this syndrome is a complex condition that is influenced by the interaction of numerous variables (Figure 1).

Although most of the studies employed the Maslach Burnout Inventory in its two validated versions, there are discrepancies in the interpretation of the diagnostic criteria. The ABS is diagnosed when all

three dimensions are present: high scores on the emotional exhaustion and depersonalization subscales and low scores on the personal accomplishment subscales.[57-62] For decades, ABS has adopted a tridimensional perspective, which is divided into the following categories: (I) Emotional exhaustion, which refers to the diminished emotional resources to face demands related to their studies; (II) Depersonalization, which implies the development of negative attitudes, insensitivity, and cynicism towards their peers or professors; (III) Lack of personal accomplishment, which dimension is closely related to negative self-evaluation of academic performance and experiencing low professional efficacy.[6-7,34]

However, some studies indicate that the presence of two or even only one component is sufficient to consider that ABS exists.[7,27,60-62] Furthermore, some studies fail to mention the criteria used. By understanding the diagnostic criteria and omitting others, errors in interpretation and the problems of underestimating or overestimating ABS in the student population can be minimized.[57] This is a pertinent consideration, as most studies conducted in Mexico that have reported a high prevalence of ABS did not incorporate these criteria or utilize alternative instruments (Table 1).

To the extent possible, it is of the utmost importance to refrain from using other instruments, as they may impede the comparison between different populations or result in misinterpretations. This perspective does not question the validity, consistency, and reliability of other ABS diagnostic tools used at the national level. Rather, it emphasizes the need to consider the differences that may arise in comparison with studies in which the MBI-SS was used. In this sense, it is important to exercise caution to avoid indiscriminate generalizations or the extrapolation of results to similar populations.

As in international research, ABS among medical students in Mexico has been associated with a number of personal and academic/work environment factors. The most significant factors are gender, age, academic level, inadequate support from faculty and parents, hospital conditions, stress related to teaching and learning, depression, anxiety, academic and family pressure, working while studying, and substance use.[8,11,14,16,18-19,24-27,63] However, additional factors, such as the structure of clinical training and exposure to cynical residents, as well as aspects of mental health, including suicidal ideation and impulsivity, have been linked to an increased likelihood of ABS. These factors have not been extensively investigated in our country.[8,14,27]

Regarding protective factors, it is notable that there has been comparatively little research conducted in Mexico in this area, particularly in comparison with international studies. These studies have identified several factors that may protect against burnout, including resilience, high level of commitment, satisfaction, suitable rest periods, advanced age, marital status, and good academic performance. Abreu-Alves et al. (2022) showed that the higher the social support satisfaction,

adaptive coping mechanisms, and academic engagement, the smaller the dropout intention. Academic engagement reduces the impact of burnout on dropout intention, working as a protective factor.[6,11,19,29-31,64] Medical schools should implement interventions to prevent dropout intentions, address students' stress and academic challenges, and enhance their levels of academic engagement.

Despite evidence from studies in other countries, there is a lack of research focusing on individual competencies, such as emotional intelligence and resilience, and their role in the progression or prevention of ABS. An inverse relationship has been reported between adaptive coping mechanisms, such as spending time with family and friends, and the development of ABS. Furthermore, students with higher levels of resilience had a lower prevalence of ABS (46.9% vs. 86.0%), highlighting resilience as a key factor in mitigating burnout.[19]

In Mexico, studies specifically examining the development of ABS among students during their academic careers are scarce. In other countries, the detrimental effects of ABS have been well-documented, including reduced well-being, academic performance, and exam results.[67-68] Furthermore, medical students experiencing ABS show a decline in professional integrity, with decreased values such as honesty, altruism, and empathy, and an increased tendency toward academic dishonesty, including plagiarism and cheating. ABS also affects job satisfaction, patient care, empathy, and professional conduct, increasing the likelihood of burnout during medical practice. Additionally, ABS has been linked to higher rates of suicidal ideation and thoughts of dropping out of school, as observed in various countries. These findings highlight the necessity for further investigation within the Mexican context to enhance comprehension of and strategies for addressing the challenges posed by ABS to medical students, their well-being, and their prospective professional practice.

On the other hand, given light of the elevated rates of ABS, depression, and suicidal ideation and attempts among Mexican medical students, academic institutions must prioritize the identification and implementation of preventive and curricular intervention measures that promote student well-being and reduce psychological distress. Integrating intervention strategies, such as mindfulness, yoga, coping skills training, burnout education, stress, and time management, and the incorporation of wellness programs into the curriculum for future physicians is a critical issue in our country.

In recent times, there has been a notable increase in the use of mindfulness-based interventions (MBIs), stress management techniques, and small-group discussions in the field of medical education. Furthermore, studies have indicated that these strategies can reduce burnout component scores by more than 10%.[18-20,31,65] Additionally, social support or support networks have demonstrated to serve

as an efficacious protective factor against burnout in medical students.[65] Despite the encouraging results observed in current interventions, further research is imperative to identify the most effective and cost-effective strategies and to ascertain how these strategies should be tailored to different educational contexts and specific student needs to ensure optimal implementation and long-term outcomes.

Currently, the accreditation standards of the Liaison Committee on Medical Education and the Accreditation Commission for Osteopathic Colleges do not explicitly consider the systemic factors that impact student well-being. To address this issue, accreditation standards that integrate wellness as a core component of medical education have been proposed. These standards include the assessment of the influence of the learning environment on student wellness, implementing continuous improvement strategies to address adverse structural factors, and incorporating evidence-based strategies into the curriculum to promote wellness.[66]

This highlights the need for school authorities in our country to implement some of the measures already developed in other countries. A 2016 national survey of 27 U.S. medical schools revealed that institutions have implemented a wide range of well-being programs to promote self-care, reduce stress, and foster social support among medical students. However, these initiatives vary in resources, infrastructure, and evaluation methods. Establishing dedicated well-being competencies and rigorously assessing their impact would help optimize the allocation of time and resources, ensuring that these strategies are effective. Strengthening evaluation efforts is crucial to reducing learner's distress and enhancing overall student well-being.[32]

A study conducted by Dyrbye et al. (2018),[33] found that 60% of the 32 medical schools in the United States include wellness activities in their curriculum. The most common wellness activities are music therapy, mindfulness, stress management and reduction techniques, animal-assisted therapy, social events (such as movie nights, art activities, board games, musical performances, and talent shows), athletic competitions, yoga, running groups, and other events.

In recent times, the Medical College of Wisconsin has developed a mandatory comprehensive curriculum with the objective of promoting student wellness and preparing first- and second-year medical students for the emotional challenges inherent to the medical profession. The curriculum, designated "REACH" (Recognize, Empathize, Enable, Care, Support Each Other), underscores the necessity of self-care as a fundamental competency alongside clinical and scientific abilities. The curriculum is based on effective approaches, including mindfulness training and the sharing of personal experiences by instructors during didactic sessions in small groups. During the initial two years of implementation (2018-2020), it was observed that 70-84% of students who have participated

in the program presented an improvement in their ability to engage in self-care, mindfulness, and seeking support.[69]

This underscores the imperative for research aimed at elucidating the underlying causes of burnout and devising effective strategies within academic institutions to fortify students' emotional competencies and resilience. It is equally necessary to consider institutional policies designed to enhance academic conditions. This encompasses reducing class schedules and shift lengths, promoting flexibility, fostering a healthy learning and working environment, and improving relationships with superiors during academic training and internships. Prevention of harassment, prolonged exposure to poor teaching conditions, and excessive academic demands should also be a priority, as these factors are significant contributors to depression, anxiety, and burnout.[30]

Limitations

Several key limitations were identified in this literature review on ABS among medical students in Mexico. First, there is a lack of research focused on developing and evaluating interventions or support programs. Furthermore, discrepancies in assessment methodologies and diagnostic criteria for ABS across studies hinder comparison and synthesis of results. Some studies may also be subject to bias due to the inclusion of specific populations, such as first-semester students or undergraduate medical interns, which limits the representativeness of the findings. Additionally, the geographic heterogeneity of the studies may reflect distinctive characteristics of each region, which complicates the generalization of the results and does not provide a comprehensive national perspective.

Future research directions on Academic Burnout Syndrome among Mexican Medical Students

The analysis of the literature available on this topic in Mexico shows that there is a lack of national research examining the individual factors that may protect or predispose medical students to ABS during their training. In addition, there is a lack of longitudinal studies that examine the evolution of ABS throughout the career and its short- and long-term consequences. Research must be conducted to assess individual competencies, such as emotional intelligence and resilience, and their influence as protectors against burnout. Adaptive and maladaptive coping mechanisms that may protect or predispose students to the development of burnout should also be explored. For example, as noted above, interactions with family and friends are protective against ABS, while substance use has been linked to the development of burnout.

To investigate the influence of ABS on Mexican medical students throughout their training, it is essential to implement longitudinal studies that track their progress from the outset to the conclusion of their academic careers. Such studies should not only assess ABS levels but also correlate them with biological markers of stress, such as salivary cortisol levels, in order to establish a link between physiological responses, the emotional and academic impact. Furthermore, it is imperative to

investigate the effects of ABS on essential competencies in medical practice, such as empathy, clinical judgment, and decision-making, utilizing clinical simulations and structured objective assessments. The association between ABS and mental health disorders, including depression and anxiety, must also be addressed, examining how these disorders affect students' academic performance and quality of life. This would facilitate the identification of critical stages in the development of burnout and its immediate and long-term consequences.

To prevent and reduce the ABS, anxiety and depression symptoms in medical students in Mexico, it is essential to implement wellness programs integrated into the curriculum. Such initiatives should include activities like as music therapy, mindfulness, yoga, stress management techniques, and social and sporting events. Furthermore, it is imperative to establish support networks and academic clubs through discussion groups and guidance, where students can share experiences, receive counsel, and access facilities dedicated to mental health care and academic stress reduction.

In addition, educational institutions and hospitals should implement strategies promoting student well-being, such as modified schedules and policies that prioritize adequate rest, prohibit psychological abuse, and allow for flexibility in extracurricular activities focused on mental health. It is imperative to ensure access to cost-effective psychological services that prioritize preventing and treating burnout. Additionally, it is crucial to implement awareness campaigns on self-care and stress management adapted to the academic and clinical context. In addition, multicenter studies with representative samples of public and private universities in different regions of Mexico are required to evaluate the prevalence of burnout, its risk factors, and the most effective interventions. This will yield a more comprehensive and generalizable understanding of the matter.

It is also crucial to implement a system for regular assessment of student well-being and to modify interventions based on the findings. Furthermore, it is advised to engage with international institutions that have effectively implemented strategies to mitigate burnout, adapting optimal practices to the requirements of the Mexican context. These interventions not only align institutions with national and international standards but also safeguard students' mental health and prepare them for the challenges of their future careers.

CONCLUSION

ABS presents a significant challenge to medical students worldwide, including those in Mexico, where a substantial percentage of students experience its detrimental effects. Despite the existing body of research in México, much of the focus remains on descriptive studies, leaving gaps in our understanding of how to effectively prevent, treat, and raise awareness about ABS.

This review highlights the critical need for more comprehensive research that identifies the prevalence and characteristics of burnout among Mexican medical students and delves into individual protective factors, such as emotional intelligence and resilience. Additionally, adaptive coping mechanisms should be further explored to offer better insights into mitigating burnout. Universities must prioritize the development of preventive strategies and curricular reforms that foster a supportive and healthy learning environment, ensuring that students are equipped with the emotional and psychological tools to thrive throughout their academic journey.

The findings underscore the urgency of targeted interventions aimed at preventing ABS and more rigorous, longitudinal studies to track the evolution of burnout and its long-term consequences. By addressing these gaps, academic institutions can better support the well-being of future healthcare professionals, ultimately enhancing their academic success, personal health, and the quality of care they provide as physicians.

SUMMARY - ACCELERATING TRANSLATION

Burnout en Estudiantes de Medicina Mexicanos: Una revisión bibliográfica de la situación actual

El síndrome de burnout académico (SBA) revela un preocupante estado de agotamiento y falta de compromiso entre los estudiantes de medicina. Las intensas exigencias académicas, las altas expectativas y el entorno competitivo contribuyen a su elevada prevalencia. El SBA no solo afecta al rendimiento académico, sino que también pone en peligro el bienestar y la calidad de vida general de los estudiantes de medicina en todo el mundo. En México, el SBA es una preocupación importante, con tasas de prevalencia que en algunos casos superan el 70%, superando las cifras internacionales. Aunque numerosos estudios arrojan luz sobre el tema, ciertos aspectos han sido insuficientemente explorados, lo que enfatiza la urgencia de realizar más investigaciones. Esta revisión tiene como objetivo destacar los hallazgos y avances más relevantes en la comprensión del SBA entre los estudiantes de medicina en México, identificando áreas que requieren atención inmediata.

En esta revisión, se realizó un análisis narrativo crítico tras una exhaustiva búsqueda bibliográfica de artículos tanto en inglés como en español en diversas bases de datos, como PubMed, Google Scholar, Redalyc, SciELO y DOAJ. La búsqueda se realizó en el periodo comprendido entre enero y julio de 2023. Se incluyeron en el análisis artículos de ensayos aleatorizados e investigaciones originales. Se excluyeron los metaanálisis y los estudios incompletos mientras se revisaban los artículos, lo que dio como resultado una selección final de 22 artículos relevantes.

Las investigaciones en estudiantes de medicina en México revelan amplias variaciones en las prevalencias del SBA, oscilando desde la ausencia hasta el 96%. Las prevalencias comúnmente reportadas se sitúan entre el 15% y el 35%, aunque algunos estudios registran cifras inferiores al 10% y otros superiores al 70%. Respecto al género, semestre y edad, hay hallazgos contradictorios; algunos estudios no encuentran diferencias significativas en la prevalencia del SBA, mientras que otros sugieren discrepancias de hasta el 20%. En cuanto al semestre, se observa un aumento del 7% al 36.9% en la prevalencia en semestres superiores. Además, diversos estudios indican una asociación positiva entre la mayor edad de los estudiantes y la incidencia del SBA.

Los principales factores de riesgo identificados son el semestre, el género, la edad, la sobrecarga académica/laboral, la comorbilidad con ansiedad y depresión, la relación con superiores y compañeros, la competitividad, las horas de sueño, la dificultad del programa académico, las prácticas de pregrado, el ambiente hospitalario y escolar, entre otros. Por otro lado, los factores protectores asociados a menores prevalencias del SBA son el estado civil, la personalidad resiliente, la realización de actividades como practicar deporte, tocar un instrumento y cantar.

De las escasas evidencias sobre las posibles consecuencias del desarrollo del SBA en estudiantes de medicina en México, se destaca la disminución en su capacidad para tomar decisiones acertadas, menor rendimiento académico, eficacia académica reducida, mayor propensión al cinismo, desconfianza en los conocimientos médicos adquiridos, temor al fracaso académico, preocupación por el futuro profesional, presión familiar, falta de tiempo libre, abuso de sustancias, así como el desarrollo de ansiedad y depresión.

Dadas las altas tasas de SBA entre los estudiantes de medicina mexicanos, las comunidades académicas deben identificar e implementar medidas preventivas y curriculares que promuevan el bienestar estudiantil y eviten el malestar psicológico. Lamentablemente en México se carece de evidencias de investigaciones centradas en la evaluación de las competencias individuales, como la inteligencia emocional o la resiliencia, y su impacto en el desarrollo o la prevención del burnout, una relación que ya ha sido corroborada en investigaciones realizadas en otros países mediante la implementación de estrategias de intervención como: mindfulness, yoga, entrenamiento en habilidades de afrontamiento, educación en Burnout, manejo del estrés y del tiempo, así como la inclusión de programas de bienestar dentro del plan de estudios en la formación de los futuros médicos es un tema necesario en nuestro país.

Es imperante prestar atención a las políticas institucionales y proponer la mejora de las condiciones académicas docentes, incluyendo la reducción de los horarios de clase y duración de los turnos, la flexibilidad laboral, la búsqueda y promoción de un ambiente estudiantil y laboral saludable, así como

la mejora de las relaciones con los superiores durante los estudios y en el internado de pregrado, enfatizando en evitar el acoso, la exposición prolongada a malas condiciones docentes y las excesivas exigencias académicas que pueden conducir al desarrollo de problemas de salud mental.

En resumen, la mayoría de los estudios en México se han centrado en cuantificar la magnitud del SBA, pero se necesitan investigaciones más profundas que identifiquen los factores de riesgo y protección específicos del contexto mexicano. Además, la falta de estudios que desarrollen e implementen estrategias de intervención para prevenir o reducir la prevalencia del SBA en esta población es evidente.

Este trabajo es crucial para comprender la problemática actual en México y, al mismo tiempo, constituye un llamado a fomentar la colaboración entre los sectores académico y hospitalario para crear un entorno más saludable. Se busca mejorar la satisfacción, el bienestar y la salud mental, contribuyendo a una formación médica de alta calidad mediante estrategias centradas en la prevención, sensibilización y tratamiento de los problemas de salud mental durante la educación médica. Estas estrategias abordan tanto las presiones académicas como el desarrollo de habilidades de inteligencia emocional, subrayando la necesidad de un enfoque integral y multidimensional.

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FIGURES AND TABLES.

Figure 1. PRISMA flowchart of inclusion and exclusion screening and accepted studies from the review on ABS in Mexican medical students**.**

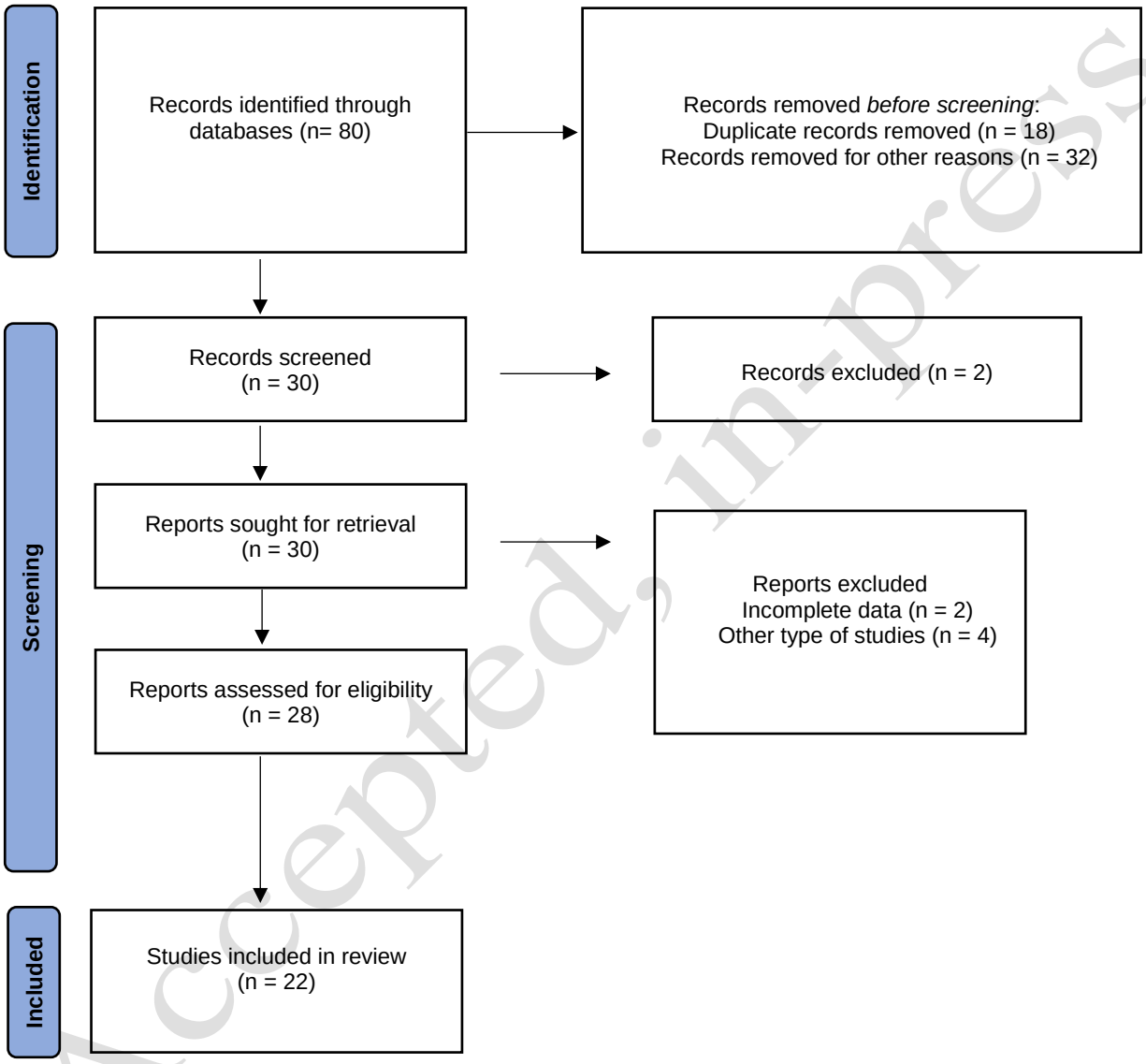

Figure 2. Risk and protective factors associated with the development of academic burnout syndrome in Mexican medical students.

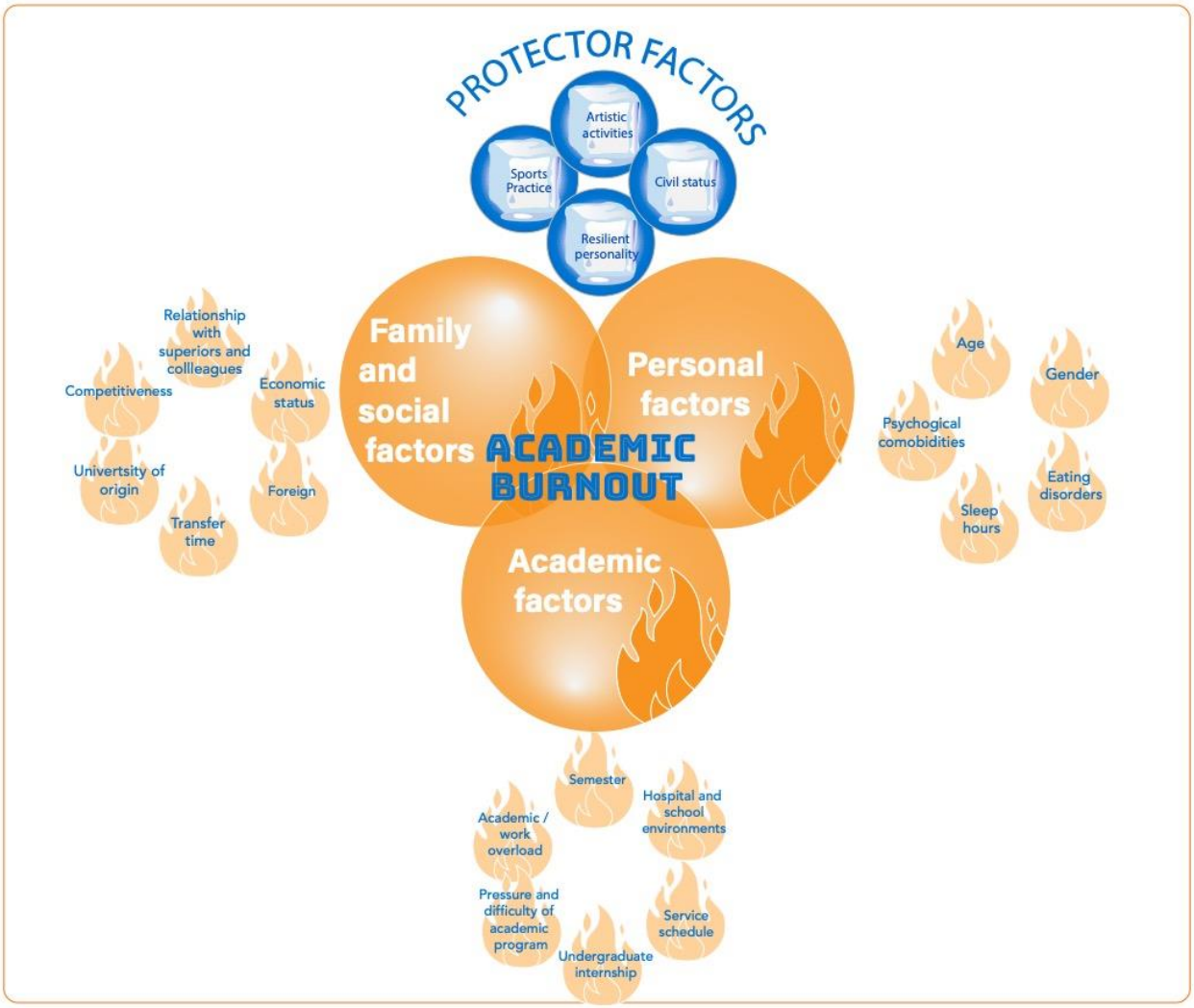

Table 1. Major ABS studies among medical students in Mexico in the last fifteen years.

Authors	Objective	Method	Main results
Barraza-Salas et al., 2009[38]	To determine the prevalence and intensity of ABS in UMIs. To know the general and mental health status of UMI and to identify the relationship between ABS and mental health status with personal and general characteristics.	Cross-sectional, descriptive study. **Population:** 25 UMIs of a Social Security Institution in the state of Nayarit. **Instrument:** MBI short version **Diagnostic criteria:** These are not specified in the paper.	**Prevalence:** 36% of the UMIs presented three dimensions of ABS. **Main findings:** High levels of ABS were reported to be associated with older age and the number of surgeries per day. High levels of Emotional Exhaustion were related to work overload, low Personal Accomplishment was associated with the work environment, and depersonalization was associated with the feeling of work pressure. 28% of the UMIs were proven to have a mental disorder.
Barraza-Salas et al., 2009[51]	To identify mental health indicators and ABS in medical students in a rotating internship in a health institution in Tepic, Nayarit.	Observational, descriptive, cross-sectional study **Population:** 17 UMIs of the general hospital of the Ministry of Health in Tepic, Nayarit. **Instrument:** MBI. **Diagnostic criteria:** High values of emotional exhaustion, depersonalization, and low values of personal accomplishment	**Prevalence:** 29.4% of the UMIs present ABS. **Main findings:** 94.1% considered that they have some mental disorder.

Barraza-Salas et al., 2009[55]	To identify the frequency and percentage of ABS in medical interns, their general health status, and the relationship of the syndrome and their general health status with personal and general characteristics.	Observational, descriptive, cross-sectional study **Population:** 18 UMIs of the ISSSTE in Tepic, Nayarit. **Instrument:** MBI. **Diagnostic criteria:** These are not specified in the paper.	**Prevalence:** 88.8% obtained 2 and 3 dimensions of ABS. **Main findings:** Significant associations were found between lower monthly income and low accomplishment and between work overload and emotional exhaustion and depersonalization. Similarly, a relationship was found between feeling pressured at work, emotional exhaustion, depersonalization, and the likelihood of developing a mental disorder.
Alcalá-Pacas et al., 2010[35]	To determine prevalence of the risk of presenting ABS and its relationship with the academic average and disciplinary indicators in students of the E.M.M.	Exploratory, descriptive, observational, cross-sectional, cause-effect study. **Population**: 380 Medical students (from 2nd to 5th year) of the E.M.M. **Instrument**: MBI. **Diagnostic criteria**: High values of emotional exhaustion, depersonalization, and low personal accomplishment.	**Prevalence**: 19.5% of the students present ABS. **Main findings**: Fifth-year and older students are at higher risk of developing ABS.

Camacho-Ávila et al., 2010[54]	To determine the prevalence of ABS in undergraduate and graduate medical students and its relationship with psychosocial factors, personality patterns and sociodemographic variables.	Observational, descriptive-correlational, cross-sectional study **Population**: 82 Medical students (39 undergraduates, 43 graduate) assigned to the Hospital General Regional # 1 of the IMSS. **Instrument**: CESQT. **Diagnostic criteria**: The perception of the frequency of symptoms was considered according to the anchors of the frequency scale.	**Prevalence**: 1.64% of the medical students presented ABS. **Main findings**: Scarcity of resources was found to be negatively associated with social support at work and positively related to Emotional Exhaustion. Sex and marital status were not found to be associated with ABS dimensions.
Ortega et al., 2014[53]	To analyze the association between perceived self-efficacy, hardy personality, locus of control, perceived stress, and ABS in undergraduate medical students.	Longitudinal descriptive study, **Population**: 40 UMIs of three public hospitals of the second and third level of care in Xalapa, Veracruz. **Instrument**: CDPE-A, **Diagnostic criteria**: These are not specified in the paper.	**Prevalence**: 70% of the students showed high levels of ABS and high perceived stress. **Main findings**: The UMIs who perceived high-stress levels exhibited low scores on indicators of resilient personality. Additionally, there was a negative correlation between a resilient personality and a history of ABS. As the score on resilient personality increased, the scores on these indicators decreased.

Asencio-López et al., 2016[36]	To assess the prevalence of ABS in 1st to 6th-year medical students at a private university.	Cross-sectional study **Population**: 225 Medical students (153 were from first to third year and 72 from fourth to sixth year) of a private Med. Fac. in the state of Durango. **Instruments**: EUBE and MBI, **Diagnostic criteria**: These are not specified in the paper.	**Prevalence**: 94.1% of students in the first to third year exhibited mild ABS, while 2.8% demonstrated moderate ABS. In the fourth to sixth year, 27.8% displayed moderate ABS, and 8.3% exhibited severe ABS. **Main findings**: The analysis revealed that working status, having economic dependents, chronic diseases, death of a family member in the last year, drug use, and belonging to an ethnic group did not exert a significant influence on the overall assessment of ABS.
Athié-Gutiérrez et al., 2016[37]	To determine the prevalence of ABS in medical students enrolled in the fifth year at the Hospital and to determine the associated risk factors.	Cross-sectional, observational, and descriptive study **Population**: 141 UMIs of the Hospital General de México Dr. Eduardo Liceaga, Mexico City. **Instrument**: MBI. **Diagnostic criteria**: high values of emotional exhaustion, depersonalization, and low values in personal accomplishment.	**Prevalence**: 16.3% of the UMIs presented ABS. **Main findings**: Burnout, commuting time, and university of origin were found to be related; on the other hand, no differences in ABS were found between genders.
Galván-Molina et al., 2017[43]	To assess psychopathology and associated factors in medical students using an electronic self-report survey.	Cross-sectional, observational, and comparative study **Population**: 323 Medical students (1st, 3rd, and 5th years) of medicine at the Universidad	**Prevalence**: 13% of the students presented ABS. **Main findings**: A positive association was found between ABS, grade, depression, and risky eating behavior, while a negative association was observed with the practice of sports.

		Autónoma de San Luis Potosí. **Instrument**: MBI **Diagnostic criteria**: High values of emotional exhaustion, depersonalization, and low values in personal accomplishment.	
González-Padilla et al., 2018[44]	To determine the prevalence of ABS and the intensity of its component variables in undergraduate medical students of clinical and internship cycles	Cross-sectional, correlational comparative study **Population**: 110 medical students (from 5th to 8th semester) from the Faculty of Medicine of the Quetzalcoatl University in Irapuato and UMIs of the IMSS and ISSSTE in the state of Guanajuato. **Instrument**: MBI-HSS. **Diagnostic criteria**: High values of emotional exhaustion, depersonalization, and low values in personal accomplishment.	**Prevalence**: 3.64% of the students presented ABS (1.82% for students and 1.82% in the UMIs). **Main findings**: Males presented greater depersonalization than females. The UMIs presented greater emotional exhaustion than the students.
Plett-Torres et al., 2018[49]	To determine the frequency of ABS, its dimensions in six students, and its correlation with sociodemographic, academic, and habit characteristics.	Descriptive, correlational study **Population**: 56 Medical students of the Combined Studies Plan in Medicine at UNAM, Mexico City. **Instrument**: MBI-SS. **Diagnostic criteria**: High values of	**Prevalence**: No student showed ABS **Main findings:** 61% of the sample showed no ABS dimensions, 34% showed one dimension, and 5% showed two.

		emotional exhaustion, depersonalization, and low values in personal accomplishment.	
Guillén-Graf et al., 2019[45]	To assess the prevalence of burnout at baseline and after one month of clinical rotation.	Observational and descriptive study. **Population**: 172 UMIs (in their clinical rotation of General Surgery, under a regimen of 80 hours per week of work, with guard duty every third or fourth day) the Fac. of Med. of the Tecnológico de Monterrey, in the state of Nuevo León. **Instrument**: MBI-HSS **Diagnostic criteria**: High values of emotional exhaustion, depersonalization, and low values in personal accomplishment.	**Prevalence**: 31.6% at baseline and 44.2% presented ABS after one month, indicating a significant increase. **Main findings**: There was an increase between baseline and after one month in emotional fatigue and depersonalization.
Joanico-Morales et al., 2019[48]	To estimate the prevalence and identify the factors associated with ABS in undergraduate medical interns.	Analytical cross-sectional study, **Population**: 108 UMIs of the IMSS, Hospital General Regional # 1 Vicente Guerrero, in the state of Guerrero. **Instrument**: MBI. **Diagnostic criteria**: High values of emotional exhaustion, depersonalization, and	**Prevalence**: 17.5% of the UMIs present ABS. **Main findings:** Higher prevalence of ABS and its dimensions in UMIs with greater seniority.

		low values in personal accomplishment.	
Miranda-Ackerman et al., 2019[56]	To determine the prevalence of ABS in medical interns and establish the relationships between this condition and the time and type of hospital students worked at during their medical internship.	Analytical cross-sectional study, **Population:** 176 UMIs at two public and two private hospitals in Jalisco. **Instrument:** MBI. **Diagnostic criteria:** High values of emotional exhaustion, depersonalization, and low values in personal accomplishment.	**Prevalence:** 20% of the UMIs present ABS. **Main findings:** The prevalence of ABS among second-semester IMUs (29%) was significantly higher than that first-semester (15%, p = 0.02). No significant differences were observed in ABS prevalence by gender, age, or between public and private hospitals.
Estrada-Hernández et al., 2020[42]	To identify the existence of ABS and its manifestations in medical students, comparing the intensity of the manifestations between first- and fifth-year students.	Observational, analytical, comparative, cross-sectional, and prospective study, **Population**: 114 medical students (1st and 5th year) of the faculty. de Med, private, in the state of Nuevo Leon. **Instrument**: MBI-SS. **Diagnostic criteria**: High values of emotional exhaustion, depersonalization, and low values in personal accomplishment.	**Prevalence**: 39.5% of the students presented ABS, of which 8.8% presented clinical ABS. **Main findings**: Those in the fifth year showed greater intensity of ABS manifestations. Students of foreign origin presented more ABS than those of Mexican origin.

Cano-Contreras et al., 2021[39]	To determine the association between academic grade and the incidence of ABS in medical students at the UV, Veracruz-Boca del Río campus.	Prospective, observational, descriptive study. **Population**: 177 Medical students (third and fifth year) of the Faculty of Medicine of the Veracruz-Boca del Río region of the UV. **Instrument**: MBI. **Diagnostic criteria**: High levels in at least one of the three dimensions.	**Prevalence**: 94% of the students presented some altered component of the ABS. **Main findings**: No differences were observed in gender and semester variables. Emotional exhaustion and personal accomplishment were observed to a greater degree in women.
Cantú-Alejo et al., 2021[40]	To describe the prevalence of ABS in medical students.	Cross-sectional, observational, and descriptive study **Population**: 385 Medical students (from 1st to 6th year) of the UANL School of Medicine. **Instrument**: MBI-SS. **Diagnostic criteria**: Use of percentiles where both extremes represent abnormal data according to each subscale.	**Prevalence**: 7% of the students presented ABS. **Main findings**: Emotional exhaustion was elevated in 6th-year students compared to the rest. A positive association between cynicism and semester was reported.
Martínez-García et al., 2021[52]	To estimate the prevalence of ABS in medical school students and to evaluate the internal consistency of the unidimensional student burnout scale (EUBE),	Observational, prospective, cross-sectional, descriptive study **Population**: 843 Medical students (from 1st to 5th year) of the School of Medicine of the Autonomous University of Sinaloa.	**Prevalence**: 85.9% of the students presented ABS. **Main findings**: More ABS in the female sex, higher school grade, and medium socioeconomic level

		Instrument: EUBE. **Diagnostic criteria**: Negative 0 to 25%, mild 25%- 50%, moderate 51%- 75%, and profound or severe 76%- 100%.	
Puig-Lagunes et al., 2021[50]	To determine the prevalence and symptomatology of anxiety and ABS, as well as to identify their impact on the academic performance of medical students.	Cross-sectional, observational, and descriptive study **Population**: 72 medical students (last semester) from the Faculty of Medicine, UV, Minatitlan campus. **Instrument**: MBI. **Diagnostic criteria**: High values of emotional exhaustion, depersonalization, and low values in personal accomplishment.	**Prevalence**: 15.6% of the students showed ABS. **Main findings:** An association was found between ABS and the severity of state and trait anxiety. There is no relationship between Burnout and academic performance and gender.
Díaz-Flores et al., 2022[41]	To examine the academic demands and health behavior determinants of ABS in students at the School of Human Medicine of the UAZ.	Observational, analytical, and cross-sectional study, **Population**: 203 medical students (10th semester) in the state of Zacatecas. **Instrument**: MBI-SS. **Diagnostic criteria:** These are not specified in the paper.	**Prevalence**: 69.8% of the students presented ABS. **Main findings:** Classroom and clinical practice schedules influenced emotional exhaustion. The classroom environment was associated with personal accomplishment. An association was found between the relationship with teachers, lack of personal accomplishment, and depersonalization.

Jezzini-Martínez et al., 2022[46]	To establish the prevalence of ABS in first-year medical students.	Cross-sectional study **Population**: 154 medical students (1st year) from the UANL's faculty of medicine. **Instrument**: MBI-SS. **Diagnostic criteria**: High values of emotional exhaustion, depersonalization, and low values in personal accomplishment.	**Prevalence**: 14.9% of the students showed ABS. **Main findings:** 53.9% scored high on emotional exhaustion, 16.9% scored high on cynicism and 34.4% scored low on academic efficacy; Higher probability of developing ABS in males.
Jezzini-Martínez et al., 2023[47]	To establish the prevalence and factors associated with ABS among medical students during the COVID-19 pandemic.	Cross-sectional, prospective, and descriptive study **Population**: 613 Medical students in all semesters of a medical school in the state of Nuevo León. **Instrument**: MBI-SS. **Diagnostic criteria:** High values of emotional exhaustion, depersonalization and low values in personal accomplishment.	**Prevalence**: 54.2% of the students presented ABS. **Main findings:** Females had a higher incidence of ABS (60.2% vs 44.2%) and its components than males. The sixth-year students showed higher levels of ABS and cynicism than the other years. They found a correlation between ABS and previous diagnosis of a psychiatric disorder, substance use, and other factors.

IMSS: Instituto Mexicano del Seguro Social, ISSSTE: Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado; UNAM Universidad Autónoma Nacional de México; UMI; Undergraduate medical intern; Fac. de Med: School of Medicine; UV: Universidad Veracruzana; UANL: Universidad Autónoma de Nuevo León; E.M.M: Military Medical School