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The Price of Academic Success - Stress and Mental Well-Being of Medical Students

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ABSTRACT

Background. High school graduates are increasingly showing interest in medical studies, particulary in medicine and dentristy. Prospective students most commonly cite a personal interest in medicine as the primary reason for choosing these educational paths. However, studying in medical programs is associated with significant stress, arising mainly from participation in clinical classes and high expectations regarding academic performance.

Aim. The aim of this research paper is to present the issue of stress among students of various medical disciplines.

Material and methods. This article reviews available literature from 2017 to 2025 concerning stress among students in different medical fields, particularly medical, dental, physiotherapy, and paramedic students. For the purpose of this study, the following databases were used: Elsevier, Google Scholar, and PubMed. Ultimately, 39 articles and 7 online sources were included.

Results. Stress is a natural physiological response that arises during change or challenge. It may trigger a wide range of physical, emotional, and behavioral reactions, including the development of depression, anxiety, and impaired cognitive functioning. Identifying sources of

stress and factors that exacerbate it enables the development of coping strategies and reduces its negative consequences, which may influence both the quality of future professional decision-making and students' physical and mental health.

Conclusions. Students in medical fields experience high levels of stress, which may lead to mental health problems, burnout, and substance use. They employ adaptive coping strategies, such as active problem-solving and seeking support, while mindfulness-based programs, mentoring, and clinical counseling help reduce stress and improve overall well-being.

Keywords: stress, psychological stress, students, medical students, environmental medicine

Introduction

In recent years, an increasing interest in medical degree programs has been observed among high school graduates [1]. Medical fields include, among others, medicine, dentistry, dietetics, pharmacy, physiotherapy, nursing, midwifery, emergency medical services, medical laboratory science, and electroradiology [2]. The most frequently chosen programs are medicine and dentistry, mainly due to their prestige and professional stability after graduation [1]. Owing to the high demand within the healthcare system, the number of individuals pursuing nursing, emergency medical services, and physiotherapy has also been steadily rising [3]. The most common reasons cited by students choosing nursing programs include personal interests, high school subjects, previous life experiences related to healthcare, and having a close role model among family members or friends working in the profession [4]. In comparison, students of medicine typically reported a desire to help others and the prestige of the profession as their primary motivations [5]. This profession is characterized by high social prestige, placing it relatively high among medical occupations. Students' choice of this career path is driven by the high level of public trust, the profession's prestige, and the perception of paramedics as individuals who demonstrate professionalism in emergency situations [5,6]. A common factor among all medical students, regardless of their future profession, is the pressure and responsibility associated with providing patient care [7].

The aim of this paper is to discuss the issue of stress among students of various medical disciplines. Identifying the sources of stress and the factors that intensify it enables the development of coping strategies and the mitigation of its negative consequences. These consequences include reduced quality of future clinical decision-making and deterioration of both physical and mental health. Moreover, stress may impair communication with patients during clinical practice and negatively affect the quality and safety of healthcare provided [8].

Aim of the study

The aim of this study is to discuss stress, its consequences, and coping strategies among students of medical disciplines.

Methods

This literature review was based on an analysis of scientific publications available in Google Scholar, PubMed, and Elsevier. The search was limited to articles published between 2017 and 2025. The following keywords were used: stress, psychological stress, medical students, stress-coping strategies. Out of all identified sources, 39 articles and 7 scientific websites were ultimately included. A detailed analysis was conducted on 20 articles that were based on empirical scientific studies, while the remaining 26 articles and one medical publication [33] presented general knowledge on the topic.

1. Definition of Stress and Its Types

According to the World Health Organization (WHO), stress is a natural physiological response that arises in situations involving change or challenge [9]. Three main types of stress are distinguished: inadequate stress, eustress-beneficial stress, and distress-harmful stress [10,11]. The stress response is a complex interaction among various brain centers, particularly neuronal mechanisms responsible for generating stress reactions. It manifests as a state of tension or mental anxiety triggered by a difficult situation [12,13]. Considering the duration of stress, it can be classified as acute or chronic [14]. Occasional stress is a normal mechanism for coping with everyday problems [15]. Stress may provoke numerous physical, emotional, and behavioral reactions. A small amount of stress can be advantageous, as it may motivate and support the performance of daily activities [16]. Conversely, excessive stress can lead to irritability, anxiety, concentration difficulties, sleep disturbances, chronic fatigue, depression, heightened anxiety, reduced quality of life and detrimental effects on both physical and mental health [14,17]. Researchers from the University of Michigan identified two primary sources of

occupational stress: unattainable job demands and environmental reinforcement insufficient to meet individual needs. The most widely recognized model conceptualizes stress at work as a mismatch between an individual and their environment [18]. Well-being refers to a state of satisfaction in which basic human needs can be met and healthy coping strategies can be applied, as these help mitigate everyday stressors [19].

2. Sources of Stress Among Medical Students

Medical students experience higher levels of stress than the general population, which over time may lead to both mental and physical health disorders, including burnout [20].

The demanding nature of medical and health sciences education affects the well-being of students and their academic performance in various ways [21]. Damiano et al. conducted a survey among medical students in Brazil regarding situations that caused them stress. The most common stressors identified were the large volume of study material, lack of time to study, sleep deprivation, excessive pressure to achieve good grades, and lack of free time [22]. Lavoie-Tremblay et al. demonstrated that among nursing students, stress levels were influenced by the year of study and accumulated experience. Their research showed that in the first year of nursing studies, academic coursework was the primary source of stress. In contrast, second-year students identified high academic expectations and limited personal time as major stressors. For final-year students, the prospect of graduation and transition into the professional environment was the most stressful factor [23]. Brooke et al. found that academic coursework was a clear source of stress, generating both physical and psychological strain, which partially aligns with the findings of the aforementioned authors [24]. Dutton et al., in their study on stress among physiotherapy students, emphasized the role of gender. They observed that female physiotherapy students reported higher stress levels than their male counterparts. Respondents who reported higher levels of physical activity, sufficient sleep, and strong social support experienced lower stress levels [25]. Findings from a study by Nebhinani et al. indicated that concerns related to interpersonal communication and academic difficulties were the primary sources of stress among nursing students [26]. Ahad et al. conducted a questionnaire-based study using the DASS-42 scale to determine the prevalence of stress, anxiety, and depression, as well as their predictive factors, among dental students in India. They found that students and interns participating in clinical training experienced higher stress than those in preclinical courses. Age, female gender, and living in dormitories were increasing stress levels [27].

3. Consequences of stress among medical students

Stress may have both positive and negative consequences. Eustress is motivating and can facilitate the achievement of intended goals, whereas distress has a destructive impact on the individual [28]. One of the key hormones involved in the stress response is cortisol, whose elevated levels exert antagonistic effects on the neurotransmitters dopamine and serotonin [29,30]. A common feature of both types of stress is that prolonged exposure is harmful. In disorders such as schizophrenia or bipolar disorder, the first episode may occur after an episode of severe stress [30].

In 2020, Szemik et al. conducted two independent cross-sectional studies among Polish medical students, including students of medicine and nursing. The most common mental health problems associated with chronic stress were alcohol dependence and hazardous drinking, depression, and potential suicidal behaviors [31]. Another study of medical students found that the development of chronic fatigue syndrome and burnout was associated with prolonged exposure to occupational stress [32]. Among students in medical fields, stress was observed to lead to anxiety, depression, reduced motivation to study, and physical exhaustion, all of which negatively affect academic performance and health [33]. Burnout is a symptom complex comprising emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment, resulting from repeated exposure to workplace stressors [34].

Alzahrani et al., in their review, highlighted stress among paramedic students. They noted that this group exhibits higher-than-average levels of moderate post-traumatic stress disorder (PTSD), anxiety and depression, compared with the general population [6]. In comparison, Carrieri et al. demonstrated that medical students are particularly vulnerable to stress-related mental health problems stemming from overall work organization, human resource management, workplace culture, and professional identity [35].

In a systematic review, Candido et al. examined the prevalence and type of psychoactive substances used by medical students. Alcohol and tobacco were the most commonly used substances, followed by cannabis, anxiolytics, solvents, and ether-based aerosols. Men were significantly more likely than women to use the substances identified in the study [36].

Alcohol consumption is a major public health concern. Therefore, Nasui et al. conducted an analysis to assess alcohol consumption patterns and related risk behaviors among Romanian

medical students. Their questionnaire addressed drinking frequency, as well as the type and quantity of beer, wine, and spirits consumed over a defined period of time. The second part included questions about risky behaviors. No significant differences were found between men and women engaging in hazardous drinking, although it remains unclear whether the narrowing gender gap reflects changing cultural norms or alcohol marketing targeted toward young women. Alcohol use was associated with risky health behaviors such as smoking, drug use, truancy, and driving under the influence. Low-risk drinking was defined as consumption below 14 drinks per week for women and 21 for men, with values exceeding these thresholds classified as hazardous. Most students reported high-frequency alcohol consumption, indicating a substantial scale of the problem [37].

4. Coping strategies for stress

The ability to cope with stress is an individual skill acquired through self-development, and it is a competence that must be continuously improved [38]. Folkman classified coping strategies into two categories depending on the source of stress: problem-focused strategies, which involve confronting the situation, and emotion-focused strategies. These may entail distancing oneself, avoidance, self-blame, seeking support, or reappraisal [11].

Coping strategies include, among others, relaxation techniques such as deep breathing and meditation, physical activity, and lifestyle modifications that promote sleep hygiene and a healthy diet [39]. Kaluza et al. identified three groups of coping strategies in their research. The first group consisted of instrumental strategies, which included time optimization and self-management, creating educational groups, working with various learning platforms, and implementing tailored learning strategies. The second group comprised psychological strategies such as recognizing personal limitations and values, accepting circumstances, expressing gratitude for the opportunity to study, and clarifying one's expectations. The final group comprised restorative strategies, which included rewarding oneself, regular physical exercise, and listening to music [40,41].

Szemik et al. identified active problem-solving and seeking both emotional and instrumental support as the most common coping strategies among medical students [30]. A crucial element in reducing stress is training in time-management strategies and methods [42]. These include

planning study schedules, reviewing material immediately after it is presented, prioritizing tasks, revisiting content multiple times, and avoiding procrastination [39].

Neufeld et al. conducted a cross-sectional study on coping strategies, finding that students most frequently employed adaptive strategies. Women more often demonstrated withdrawal, while men were less likely to seek emotional or instrumental support [43]. Similar findings were reported by Sattar et al. [44].

In a meta-analysis on stress-coping strategies, da Silva et al. found that students participating in mindfulness-based training reported reductions in stress symptoms, psychological distress, anxiety, and depression, along with improvements in well-being, mental health, mindfulness, resilience, and empathy [45].

Nebhinani et al. emphasized the need to develop and implement stress-management programs for nursing students. According to the authors, such interventions are essential for preparing novice healthcare personnel to work in demanding clinical environments, thereby reducing stress associated with professional responsibilities [26]. Chaabane et al. highlighted the importance of introducing mentoring, counseling, and supportive environments for clinical training. These measures are necessary to minimize perceived stress, enhance learning efficiency and productivity, and prevent burnout among nursing students [46].

5. Summary and Research Perspectives

Students in medical fields experience high levels of stress related to academic workload, pressure to achieve academic results, and lack of free time. The intensity of stress varies depending on the year of study, specific discipline, gender, social support, and lifestyle. Stress may have either motivating or destructive effects, depending on the nature of the stressor. Prolonged exposure significantly increases the risk of developing mental health disorders, burnout, and substance use. The most common consequences of stress include anxiety, depression, reduced motivation to study, and various health problems. Medical students, regardless of specialty, are frequently exposed to burnout and tend to engage in substance use, particularly alcohol and tobacco, which contributes to risky behaviors. To protect themselves from the negative effects of stress, they employ adaptive coping strategies such as active problem-solving and seeking support, although gender differences in preferred methods are evident. Mindfulness-based training programs, mentoring, and clinical counseling can effectively reduce stress, improve well-being, and better prepare students for the demanding conditions of clinical work.

Disclosure

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Conceptualisation - Sylwia Mroszczyk and Julia Surowaniec
methodology - Zuzanna Kowalczyk
software - Dawid Nowicki
check - Małgorzata Muszyńska, Zuzanna Kowalczyk and Julia Surowaniec
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data curation - Małgorzata Muszyńska
writing - rough preparation - Sylwia Mroszczyk
writing - review and editing - Katarzyna Karaś and Julia Surowaniec
visualization - Katarzyna Karaś
supervision - Małgorzata Muszyńska and Dawid Nowicki
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