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# Academic Stress as a Trigger Factor for Migraine in College Students: A Literature Review

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**ABSTRACT**

Migraine is a common primary headache disorder among college students and is strongly associated with impaired academic performance and a reduced quality of life. Students are a particularly vulnerable population owing to their sustained exposure to academic demands, irregular lifestyles, and poor sleep. Among the many reported precipitants, academic stress is one of the most frequently cited triggers of migraine attacks; however, its contribution is shaped by multiple interacting factors. This narrative literature review synthesizes the current evidence on the relationship between academic stress and migraine in college students, integrating epidemiological, pathophysiological, and psychosocial perspectives. The reviewed literature indicates that migraine is a multifactorial disorder involving neurovascular mechanisms, genetic predisposition, hormonal influences, lifestyle, and psychological factors. Academic stress arises from examinations, assignments, time pressure, and performance expectations, and higher stress levels are consistently associated with a greater frequency and severity of attacks. Prolonged stress may activate the sympathetic nervous system and hypothalamic–pituitary–adrenal axis, producing hormonal changes and heightened pain sensitization. Lifestyle factors common among students, such as poor sleep quality, irregular meals, dehydration, and limited physical activity, further amplify migraine vulnerability. However, some studies have reported inconsistent associations, indicating that academic stress is not an isolated determinant. Overall, academic stress contributes meaningfully to migraine, particularly when combined with poor sleep and unhealthy lifestyles; however, migraine ultimately results from complex biological, psychological, and environmental interactions. Therefore, preventive strategies should adopt a holistic approach encompassing stress management, lifestyle modification, and psychosocial support within academic settings.

**Keywords**

Academic Stress, Migraine, College Students

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## INTRODUCTION

Migraine is a primary neurological disorder characterized by recurrent headaches that reduce the quality of life and productivity of patients [1]. Several studies have found that migraine is more common among college students than in the general population [2]. Approximately 15% of the global population experiences migraines, with a 10–20% lifetime probability of developing the disorder, a risk that is further modified by demographic factors, such as sex and age [3]. Migraine is frequently associated with factors such as female sex, estrogen, metabolic syndrome, sleep quality, and psychological factors [4,5]. Numerous psychological factors may influence migraine, including stress, panic disorder, anxiety, phobias, obsessive–compulsive disorder, post-traumatic stress disorder, personality disorders, bipolar disorder, depression, and attention-deficit/hyperactivity disorder [6].

Stress is a principal risk factor and the most frequently reported trigger for migraine due to its direct effects on the autonomic and neuroendocrine systems, which can activate pain receptors [7]. In students, stress may arise from academic, social, family, personal, and financial factors that provoke physical and mental responses [8]. Academic stress is one of the main triggers of migraine in students because of its close relationship with academic activities [9]. This is driven by the demands of assignments, evaluations, and academic expectations [10]. Given the multifactorial nature of migraine and its impact on students, this literature review is important for understanding the role of academic stress as a triggering factor.

## DISCUSSION

Migraine is a primary headache characterized by recurrent, throbbing, unilateral pain of moderate to severe intensity, accompanied by symptoms such as nausea, photophobia, and phonophobia [11]. It arises from complex processes, including the activation of the trigeminovascular system and the release of inflammatory mediators that generate pain [12]. Migraine is considered one of the leading causes of disability in the productive age group, including students [2]. affecting their daily activities, lecture attendance, and quality of life [11]. Its pathophysiology involves several mechanisms that activate the trigeminovascular system, causing vasodilation of intracranial vessels and the release of inflammatory factors that activate nociceptors [12].

The multiple pathophysiological pathways of migraine can be triggered by lifestyle patterns—irregular meal schedules, caffeine consumption, inadequate water intake, and limited physical activity—that are frequently observed in the busy schedules of students [13]. which may worsen migraine complaints [13]. Genetic predisposition and hormonal factors also contribute to migraine, particularly in women of productive age [11]. Therefore, migraine is rarely caused by a single factor but rather by a combination of interacting determinants [4]. In students, the combination of stress, insufficient sleep, and irregular lifestyles increases the vulnerability to migraine, which peaks during periods of intense academic activity [5]. These mechanisms may be triggered by demographic factors (age and female sex), metabolic syndrome, hormonal factors (estrogen), sleep disorders, and psychological factors [14-16]. The last encompasses a broad spectrum ranging from stress to various diagnosed mental disorders [6]. Stress is a life crisis that can hinder daily activities [17]. is defined as a relationship between an individual and the environment that may exceed or burden available resources [18]. It is perceived differently by each person, provoking negative emotions, discomfort, physiological changes arising from sympathetic activation, and behavioral changes [19,20]. In students, such stress can be triggered by academic demands [9]. Stress in students may stem from academic, social, family, personal, and financial factors that elicit physical and mental responses [8]. Stress is recognized as a main risk and trigger factor for migraine because of its direct effect on nociceptor activation [7]. Prolonged psychological stress can increase stress hormone levels and alter neural pain pathways [21].

Academic stress emerges when academic demands are perceived as exceeding an individual's capacity [22]. Such demands include assignments, evaluations, grades, time pressure, and academic competition [13]. Chronic stress can produce sleep disturbance and fatigue [20]. and may give rise to somatic symptoms such as primary headaches, including migraine. Increased stress is associated with a higher frequency of migraine attacks and reduced quality of life. Stress is thought to influence migraine through activation of the sympathetic nervous system, alterations in stress-related hormones, and heightened pain sensitization. Other mechanisms, such as genetic variation affecting vascular tone, ion balance, and neuronal excitability, may also play a role [23]. Stress responses involving activation of the hypothalamic–pituitary–adrenal (HPA) axis, which increases stress hormones, together with dysfunction of pain-inhibitory pathways, raise the likelihood of migraine [24]. However, some studies report no significant association, indicating that stress is an important but not the sole determinant of migraine. The daily life of students is filled with academic activity, tight schedules, and demanding academic standards. Academic stress occurs when students perceive these demands and standards as a burden that produces negative emotions and discomfort [25]. Several studies examining academic stress and migraine in students have found that stress levels are associated with primary headache (migraine), with moderate stress being more prevalent than other levels [20]. Notably, exposure to academic stress is also influenced by the year of study and field of study, across which academic demands vary [26,27]. The

combination of academic stress, poor sleep quality, and irregular lifestyles can heighten students' vulnerability to migraine [21].

These findings show that migraine is common among students and affects their daily and academic activities [1]. It can reduce concentration, affect attendance, and disrupt learning [2]. It is a multifactorial disorder involving neurovascular mechanisms, pain nerve sensitivity, and psychological and environmental factors [12]. This aligns with research identifying stress as an important factor in migraines [5]. Among student stressors, academic stress is closely related to daily academic activities [25]. In college students, it arises from assignments, examinations, and performance expectations [21]. Studies have reported that increased stress is associated with more frequent and severe migraine attacks, although confounders such as lifestyle and sleep quality often influence the results [10]. Therefore, preventive approaches must consider biological, psychological, and environmental dimensions [5].

## CONCLUSION

Migraine is common among college students and affects their academics and quality of life. It is a multifactorial condition shaped by biological and psychological factors, sleep quality, and learning environment. Stress contributes to migraine. In students, academic stress is associated with migraine occurrence and, in studies, with increased attack frequency and severity, although it interacts with other factors. Preventive measures include stress management, lifestyle adjustment, and psychosocial support.

## DECLARATIONS

None

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All authors have read, critically revised, and approved the final manuscript and have agreed to be accountable for all aspects of the work.

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