

The Role of Ashwagandha (*Withania somnifera*) in Stress and Anxiety Management Among Medical Students: A Literature Review

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Abstract

High levels of stress and anxiety resulting from academic demands, time pressures, and psychological burdens during the educational process experienced by medical students were highlighted by researchers in a literature review. One widely researched non-pharmacological approach to reducing stress and anxiety involves the use of adaptogenic herbs, including Ashwagandha (*Withania somnifera*). This literature review aims to examine scientific literature on the effectiveness and mechanisms of action of Ashwagandha (*Withania somnifera*) in the management of stress and anxiety among medical students. This narrative review was conducted by searching indexed international journals on PubMed, ScienceDirect, and Google Scholar using the keywords Ashwagandha, *Withania somnifera*, stress, anxiety, and medical students, covering publications from 2011 to 2025; some sources meeting the inclusion criteria were retained for synthesis. The results indicate that Ashwagandha has a significant effect in reducing cortisol levels and balancing the autonomic nervous system. It improves sleep quality and calms the mind. Its mechanism of action involves modulation of the Hypothalamic-Pituitary-Adrenal (HPA) axis through its influence on the neurotransmitters GABA and serotonin. Therefore, Ashwagandha is highly effective for reducing and managing stress and anxiety in medical students; however, further clinical trials are required to confirm its long-term efficacy and safety.

Keywords: Ashwagandha, Anxiety, Medical Students, Stress.

1. Introduction

A heavy academic workload, the pressures of clinical duties and practical examinations cause significant emotional strain, leading to stress and anxiety amongst medical students, who generally have a high level of motivation to learn, thereby increasing their cortisol levels. According to Brazeau et al. (2014), this stress and anxiety consequently have an impact on the psychological well-being of medical students. Furthermore, Ishak et al. (2013) state that if not managed properly, stress and anxiety can develop into chronic stress, which disrupts the learning process, reduces academic performance and leads to mental exhaustion; therefore, alternatives are needed to address these issues. Kuśmierska et al. (2024) further found that recurrent and prolonged stress and anxiety can precipitate depression and cognitive decline, and may even eventuate in other neurological impairments. In light of these findings, the issues raised warrant further examination, underscoring the need for stress management strategies that are effective, safe, and readily implementable.

Among the non-pharmacological strategies explored for this purpose is the use of adaptogens, botanical substances thought to help the body resist and recover from



physiological and psychological stress. One such adaptogen, Ashwagandha (*Withania somnifera*), has attracted particular research interest owing to its long history of traditional use and its accumulating evidence base in modern clinical research. Figure 1 illustrates the physical appearance of the Ashwagandha plant, as depicted below.

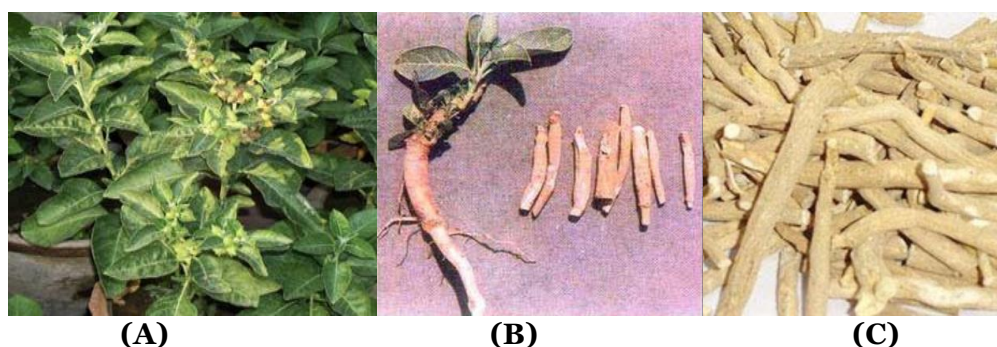


Figure 1. Appearance of the Ashwagandha plant
(A) Ashwagandha Plant (*Withania somnifera*) (B) Dried Ashwagandha
Roots (*Withania somnifera*) (C) Dried Ashwagandha Rhizomes

Source: Verma and Kumar (2011)

Ashwagandha (*Withania somnifera*) possesses, in its various compounds, the neuroprotective, anti-inflammatory, and adaptogenic properties requisite for a stress management strategy. A number of studies have shown that consumption of ashwagandha root extract can diminish cortisol levels, the principal stress hormone in adults, whilst likewise ameliorating anxiety and sleep quality, per the results of tests conducted (Chandrasekhar et al., 2012; Lopresti et al., 2019). Li (2020) further detail that ashwagandha is a supplement possessed of the potential to reduce stress and anxiety through the stabilization of blood pressure.

Existing reviews, such as Pratte et al. (2014) and Er et al. (2025), have examined Ashwagandha's effects on stress and anxiety in general adult populations, but neither addresses the medical-student population specifically, despite the distinct nature and intensity of academic and clinical stressors this group faces. Predicated upon the journal articles amassed, this literature review is intended to scrutinize the evolution of antecedent research to date pertaining to ashwagandha, and to ascertain, upon a scientific footing, the role discharged by ashwagandha in the management of stress and anxiety, with the aim of consolidating and situating this evidence within the medical-student context specifically. Particular focus is trained upon medical students as the target research cohort, a population beset by exacting academic demands and a formidable workload, yet possessed, withal, of a keen desire to learn so as to redress matters of public health concern.

2. Methods

This article was compiled using a narrative literature review methodology, rather than a systematic review; accordingly, it does not report a PRISMA-style count of records identified and screened, but instead synthesizes literature selected purposively to address the review's stated objectives. The literature search was conducted via electronic databases such as PubMed, ScienceDirect, and Google Scholar, using the following keywords: Ashwagandha, *Withania somnifera*, stress, anxiety, and medical student, covering the period from 2011 to 2025. The inclusion criteria encompassed experimental research articles and systematic reviews published within the last 10 years, involving adult human subjects and discussing the

effects of ashwagandha on stress and anxiety; non-experimental articles, animal studies, and non-scientific publications were excluded, so as to ensure that the literature review remained aligned with the research objectives. Some sources meeting these criteria were ultimately retained and are cited throughout this review.

3. Results and Discussion

A review of sundry studies discloses that ashwagandha renders a salutary effect in attenuating stress and anxiety. Pratte et al. (2014), within their systematic review, concluded that ashwagandha proves efficacious in diminishing symptoms of generalized anxiety absent serious untoward effects. Smith et al. (2023), in an experimental study encompassing adult men and women administered a 200 mg ashwagandha extract supplement twice daily, found a statistically significant diminution in fatigue symptoms ($p = 0.016$); predicated upon this secondary outcome measure, ashwagandha was found to possess an anti-fatigue effect. Kuśmierska et al. (2024) reported that ashwagandha is innocuous and occasions no untoward effects, and that, by dint of its adaptogenic properties, it may alleviate stress and stress-related disorders whilst ameliorating overall health.

Majeed et al. (2024) randomised seventy individuals, all of whom, whilst taking ashwagandha, completed the study in its entirety. Assessments employing the Hamilton Depression Rating Scale (HDRS), the Hamilton Anxiety Rating Scale (HARS), and the Generalised Sleep Quality Scale (GSQS) were administered on days 30, 60, and 90. Scores on the HARS, HDRS, GSQS, and QOL measures were markedly improved, at a significance level of $p < 0.001$, with anxiety and depression exhibiting particularly pronounced amelioration. Er et al. (2025), in a brief review of ashwagandha trials, reported that enhanced GABAergic function provides a neuroprotective effect against cognitive impairment, thereby modulating neurotransmitter balance and neuroplasticity in a manner that aids the management of stress-related neurological disorders. As illustrated in Figure 2 (Pratte et al., 2014), Ashwagandha's mechanism of action involves regulation of the hypothalamic-pituitary-adrenal (HPA) axis, the primary system governing the body's response to stress; Ashwagandha stabilises HPA activity and reduces excessive cortisol secretion, whilst the withanolides it contains modulate the neurotransmitter system, primarily GABA and serotonin, contributing to its anxiolytic effects and mood-enhancing properties (Singh et al., 2011).

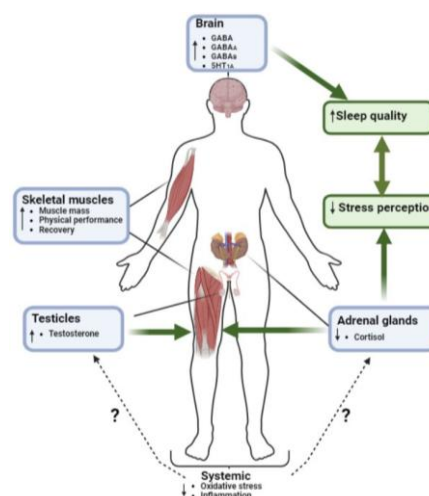


Figure 2. Potential Mechanisms of Action and Their Interrelationships Following Ashwagandha Supplementation

Source: Pratte et al. (2014)

3.1. Discussion

Taken together, the studies reviewed above draw upon markedly heterogeneous populations, none specific to medical students, dosing regimens ranging from 200 mg to upward of 600 mg daily, and intervention durations spanning weeks to months, limitations that caution against directly extrapolating pooled effect sizes to the academically stressed medical-student cohort that is this review's particular focus. Sample sizes likewise range considerably, from around sixty to seventy participants in the larger trials (Majeed et al., 2024; Lopresti et al., 2019) to smaller cohorts elsewhere, limiting statistical power in the latter. Critically, none of the trials cited here were conducted specifically in medical student populations; most enrolled general stressed adults, so their findings on stress and anxiety reduction are extrapolated to the medical-student context rather than demonstrated within it.

A further source initially considered for this review, Sadhiya et al. (2022), was excluded from the evidentiary synthesis above upon closer scrutiny of its methodology. The study describes disk-diffusion zones of inhibition ranging from 8 mm to 26 mm and a lowest MIC (minimum inhibitory concentration) of 8 mm, a methodology characteristic of an antimicrobial susceptibility assay rather than a stress or anxiety trial; moreover, MIC is conventionally expressed as a concentration (e.g., $\mu\text{g/mL}$) rather than a millimeter measurement, suggesting the two assay types may have been conflated in reporting. As Sadhiya et al. (2022) does not appear to assess anxiety or stress outcomes, its findings pertain to a different domain of Ashwagandha's activity and were not drawn upon in the results above.

Based on the findings synthesised in the preceding section, in the context of medical students with high academic demands and a strong desire to learn, which can lead to sleep disturbances, fatigue, anxiety, depression, burnout, and a decline in motivation to study, the use of ashwagandha may help manage academic stress, improve concentration whilst studying, and enhance sleep quality. Nonetheless, given the population and dosing heterogeneity noted above, further studies encompassing a more capacious sample of medical students specifically remain requisite to yield more specific and generalisable data.

4. Conclusion

Drawing on a decade's worth of scientific literature, Ashwagandha (*Withania somnifera*) emerges as a genuinely efficacious adaptogen for alleviating stress and anxiety. Studies consistently reveal that Ashwagandha extract attenuates cortisol levels, ameliorates sleep quality, and fosters emotional equilibrium. These benefits appear to operate chiefly through the herb's modulation of the hypothalamic-pituitary-adrenal (HPA) axis, alongside heightened activity of GABA and serotonin, neurotransmitters instrumental in tempering the nervous system and buttressing mood. However, as discussed above, the bulk of this evidence derives from general adult populations rather than medical students specifically, and studies vary considerably in dosage, formulation, and duration; consequently, its efficacy for the academically stressed medical-student cohort that is this review's focus remains an extrapolation rather than a directly demonstrated finding.

Therefore, for medical students who are vulnerable to academic stress, Ashwagandha may be considered a promising, safe, and easily accessible supportive therapy, though it should not be regarded as a substitute for professional psychological or medical care where such stress or anxiety becomes severe or persistent. Further research is required, involving well-designed clinical trials with large sample sizes and long durations, conducted specifically amongst medical students, so as to ascertain the long-term safety, appropriate dosage, and effectiveness of Ashwagandha as a non-pharmacological supportive therapy in the

management of stress and anxiety. Institutions and researchers are further encouraged to investigate Ashwagandha's effects alongside other academic-stress interventions, such as counselling services, time-management support, and curricular reform, so as to situate its potential role within a broader, multimodal approach to safeguarding medical students' mental health.

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