Exploring the therapeutic potential of Ashwagandha (Withania somnifera) supplementation in alleviating stress and stress-related disorders

Martyna Kuśmierska
E-mail: lek.martynakusmierska@gmail.com
ORCID: https://orcid.org/0009-0005-5895-2471
Independent Public Health Care Facility, Municipal Hospital Complex in Chorzów, 11 Strzleców Bytomskich Street, 41-500 Chorzów, Poland

Jakub Kuśmierski
E-mail: j.kusmierski@outlook.com
ORCID: https://orcid.org/0009-0003-2031-3071
Medical University of Silesia in Katowice, Faculty of Medical Sciences in Zabrze, Poland, 15 Poniatowskiego Street, 40-055 Katowice, Poland
ABSTRACT

Withania somnifera, also known as Ashwagandha, is a key herb in Ayurvedic medicine, celebrated for its ability to rejuvenate and promote longevity. It is believed to support overall wellness, offering neuroprotective, anti-inflammatory, and adaptogenic benefits. This study aims to evaluate how Ashwagandha (Withania somnifera) supplementation impacts stress levels, psychological well-being, and resilience, assessing its overall effectiveness as an adaptogen. Stress, be it physical or psychological, activates a response involving the nervous, endocrine, and immune systems through various mechanisms, initially aiding in handling challenges but becoming detrimental when perceived as intense, repetitive, or prolonged, contributing to conditions like depression, anxiety and cognitive decline. Ashwagandha reduces morning cortisol and DHEA-S levels and increases heart rate variability. It improves sleep quality, alleviates anxiety symptoms, and may help with depression due to its components, such as alkaloids and withanolides. Additionally, it reduces fatigue and enhances overall well-being and happiness. It is important that Ashwagandha supplementation is safe and does not cause side effects, making it an attractive alternative for supporting health and well-being. Ashwagandha supplementation, due to adaptogenic qualities, appears promising in addressing stress and stress-related disorders, as well as enhancing overall well-being. Further research is warranted to fully explore its potential role in conventional health strategies.
Keywords: ashwagandha, *Withania somnifera*, adaptogen, stress, insomnia, anxiety, depression

I. Introduction

The plant *Withania somnifera* (L.) Dunal, belonging to the Solanaceae family, is commonly referred to as "Ashwagandha," a name originating from Sanskrit due to its historical use in Indian traditional medicine [1]. *Withania somnifera* (WS) is held in high esteem within Ayurvedic medicine, where it is classified as a Rasayana herb. This designation is reserved for herbs that are believed to have revitalizing effects on the body and to enhance the health of various tissues. Ashwagandha is celebrated for its broad therapeutic properties and is used extensively to promote overall wellness and longevity [2, 3]. Current research on Ashwagandha spans a wide array of human health areas, encompassing neuroprotection, sedative qualities, adaptogenic benefits, and improvements in sleep quality. Additionally, studies have documented its anti-inflammatory, antimicrobial, cardioprotective, and anti-diabetic properties. There are also findings related to its effects on reproductive health and thyroid hormone activity. This expanding scope of research underscores Ashwagandha's potential as a significant natural treatment option for various health issues. The global popularity of *Withania somnifera* (WS) has surged, largely due to its esteemed status as an adaptogen [4].

Stress represents a condition of disrupted balance within the body, arising from internal or external adverse factors (known as stressors). In response, the body employs a complex array of physiological and behavioral reactions aimed at preserving or restoring its optimal equilibrium, known as eustasis [5].

Adaptogens, which include synthetic substances like bromantane, levamisole, aphobazole, and bemethyl, as well as plant extracts, are agents known to improve the body's resistance to physical stress without elevating oxygen consumption [6]. They are crucial in protecting organisms from various environmental stressors such as harmful bacteria, diseases transmitted by insects, excessive exposure to ultraviolet light, and pollutants, as well as extreme temperatures and low oxygen levels. Adaptogens are essential for fostering and maintaining
adaptive homeostasis, boosting the body's natural ability to withstand assorted stressors -
physical, chemical, biological, or psychological. These substances are known for energizing
the body’s defenses and metabolic processes to mitigate the adverse effects of stress and
restore balance and health [7].

II. Objective
The objective of this study is to evaluate the effectiveness of Ashwagandha (*Withania
somnifera*) supplementation in reducing stress levels among adults. Specifically, the study
aims to assess the impact of Ashwagandha on various stress-related parameters, including
physiological stress markers, psychological well-being, and overall quality of life, to
determine whether regular supplementation can significantly alleviate symptoms of stress.
Additionally, this research seeks to explore the role of Ashwagandha as an adaptogen in
enhancing the body's resilience to stress.

III. Materials and Methodology
Literature was collected through searches on PubMed and Google Scholar, along with
references from initially retrieved articles. The search incorporated various combinations of
the following terms: ashwagandha, *Withania somnifera*, stress, adaptogen, insomnia, anxiety,
depression. Only papers published after 2017 were considered for inclusion in the review.
This approach ensured that the review focused exclusively on the most recent knowledge
available.

IV. Description of the State of Knowledge
Stress
Stressors, whether physical or psychological, trigger a response that involves nervous,
endocrine, and immune systems. This response, mediated by various axes like the
sympathetic-adreno-medullary (SAM) axis, the hypothalamus-pituitary-adrenal (HPA) axis,
initially prepares the body to handle challenges, such as trauma or surgery, minimizing further
damage. However, when stressors are perceived as intense, repetitive, or prolonged, the stress
response becomes harmful. For instance, chronic stress exposure can lead to maladaptive
reactions like depression, anxiety, cognitive decline, and heart disease [8].
**Physiological stress markers**

When stress occurs, the HPA axis releases various hormones from the adrenal glands. With repetitive activation, this pressure on bodily systems, including the HPA axis, can lead to tissue damage and future health issues. Cortisol serves as the primary hormone in the stress response system of the HPA axis and is an effective biomarker for stress levels [9, 10]. Another hormone released is dehydroepiandrosterone (DHEA), which later transforms into dehydroepiandrosterone sulfate (DHEA-S) [11]. In stressed yet healthy adults, consuming Ashwagandha even for 60 days is linked to significant decreases in morning cortisol and DHEA-S levels [12].

Recent neurobiological findings indicate that stress affects heart rate variability (HRV) [13]. Abnormal alterations in HRV, such as reduced vagal function, are noted in a range of neurological and psychological disorders, including anxiety, stress, and schizophrenia [14]. Interestingly, Ashwagandha supplementation is associated with a notable rise in heart rate variability [15].

**Stress-related disorders: insomnia, anxiety and depression**

Excessive stress, whether cognitive or physiological, adversely affects multiple systems, including sleep. This phenomenon, known as sleep reactivity, is considered a significant predisposing factor for insomnia and potentially other sleep and stress-related disorders [16]. Long-term stress induces lasting immunological alterations in the central and peripheral nervous system. Major depressive disorder (MDD) and anxiety are among the most frequent psychiatric outcomes associated with chronic stress [17].

Research indicates that Ashwagandha supplementation leads to notable enhancements in various sleep parameters, including mental alertness, sleep quality, reduced sleep onset latency, and improved sleep efficiency. Interestingly, these improvements were found to be more pronounced in individuals with insomnia compared to those without sleep disturbances [18]. *Withania somnifera* demonstrates effectiveness in alleviating anxiety symptoms and holds promise as a potential anxiolytic, as indicated by Hamilton Anxiety Rating Scale scores. However, the trials are constrained by their small sample sizes [19]. Ashwagandha shows potential efficacy in depression, attributed to its key components: 12 alkaloids and 35 withanolides. These compounds have demonstrated benefits in anxiety and stress management.
across several studies. While research suggests that withanolides and alkaloids act as antidepressants, the precise mechanism of action remains unclear [20].

Quality of life

Administering a moderate dose of ashwagandha to college students over a 30-day period enhanced their perceived well-being by promoting sustained energy, improved mental clarity, and better sleep quality [21]. Comparable results are evident in the elderly population. Supplementation with Ashwagandha root extract is associated with significant enhancements in sleep quality, mental alertness, and overall quality of life (QoL) among elderly participants [22]. Furthermore, supplementation of ashwagandha leads to a notable reduction in symptoms of fatigue [15] and leads to improved indicators of well-being and happiness [23].

Optimal effects of supplementation

It is crucial to emphasize the significance of consistency and the utilization of standardized supplements as essential factors for achieving discernible outcomes. While even a 30-day intervention of Ashwagandha supplementation yields positive effects on the body, studies suggest that a longer duration may be necessary to observe more significant differences in stress relief [24]. It is important to recognize that the consumption of Ashwagandha root extract is not only safe but also devoid of any negative side effects. This acknowledgment is imperative as it underscores the importance of considering Ashwagandha as a viable option for various health and wellness purposes without concerns about potential adverse reactions [25].

V. Conclusion

In conclusion, stress exerts profound effects on physiological and psychological well-being, impacting various bodily systems and contributing to the development of stress-related disorders such as insomnia, anxiety, and depression. Ashwagandha supplementation emerges as a promising intervention, demonstrating significant improvements in stress markers, sleep quality, anxiety symptoms, and overall quality of life across different age groups. Its adaptogenic properties, characterized by enhancing the body's resilience to stress, underscore its potential as a valuable tool for promoting health and well-being. Consistency and the use
of standardized supplements are crucial for achieving optimal outcomes with Ashwagandha supplementation, emphasizing its role as a safe and effective option in supporting overall health and wellness. Although the potential of *Withania somnifera* (Ashwagandha) is noteworthy, it is essential to emphasize the necessity for additional evidence from well-designed, large-scale clinical trials to formulate comprehensive recommendations for integrating this adaptogen into standard practice.

**References:**


