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Systematic Review on Ashwagandha (*Withania somnifera*) in Stress and Anxiety Management

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Abstract

Anxiety and stress are two of the most prevalent psychological conditions that negatively impact people's quality of life globally. Traditional therapies work well, but they might have negative side effects and cause reliance. The adaptogenic, anxiolytic, and anti-stress qualities of ashwagandha (*Withania somnifera*), a traditional Ayurvedic medicinal herb, have drawn attention. This systematic review assesses the safety and efficacy of ashwagandha in treating anxiety and stress. Relevant research was examined from scientific databases, including meta-analyses and randomized controlled trials. Results show that ashwagandha improves general wellbeing and sleep quality while dramatically lowering cortisol levels, stress scores, and anxiety symptoms. Good tolerance and few adverse effects were reported in the majority of investigations. Larger long-term clinical trials are still need to determine long-term safety and standardized dosing, though.

Keywords: *Withania somnifera*, Adaptogens, Cortisol reduction, Anxiolytic effects, HPA axis regulation.

Introduction

Ashwagandha (*Withania somnifera*), a mainstay of Ayurvedic therapy, is praised for its adaptogenic qualities, which aid the body in coping with physical, chemical, and biological stress. Ashwagandha has long been used to promote general wellbeing by addressing problems like anxiety, exhaustion, and sleep disorders. It is native to North Africa and India and is prized for treating a variety of illnesses as well as for prevention [1].



Fig 1: Ashwagandha Plant (*Withania somnifera*)

Ashwagandha is especially useful for fostering mental and physical resilience because it contains bioactive chemicals that affect a number of physiological pathways, such as those connected to stress response and neurotransmitter modulation [2]. It also has a wide range of therapeutic uses, from neuroprotection to the treatment of long-term illnesses. Ashwagandha's safety and effectiveness have made it a vital part of both traditional and modern herbal therapies, connecting traditional knowledge with current medical techniques [3].

For more than 3,000 years, ashwagandha (*Withania somnifera*), sometimes referred to as "Indian ginseng" or "winter cherry," has been a mainstay of Ayurvedic treatment. It has long been regarded as a Rasayana in Ayurveda, a class of herbs with longevity-promoting and rejuvenating qualities [6]. Ashwagandha is highly prized for treating stress, aging, and chronic illnesses since ancient scriptures describe it as a tonic for boosting energy, physical power, and general health [4]. Ashwagandha can considerably enhance learning capacity, lessen memory loss, and ease cognitive dysfunction, according to studies. Furthermore, it has been discovered that by regulating the hypothalamic-pituitary-adrenal axis, lowering cortisol levels, and reestablishing normal adrenal

function, it increases the body's resistance to stress [5]. The adaptogenic herb ashwagandha (*Withania somnifera*) has long been used for its health advantages, especially in lowering stress and anxiety (Abdel-Magied *et al.*, 2001) [7]. Ashwagandha (family *Withania somnifera*). Solanaceae) is frequently referred to as "Indian Ginseng" or "Indian Winter Cherry." Due to its numerous health advantages, it is one of the most significant herbs in Ayurveda and has been used for millennia as a Rasayana (Singh, 1983) [8]. Because it lowers cortisol levels, the stress hormone, ashwagandha is well known for its capacity to alleviate stress. It fosters relaxation and aids the body in adjusting to stress (Archana & Namasivayam, 1999) [9].

Aims and Objectives

- The purpose of this study was to evaluate the safety and effectiveness of ashwagandha root extract in treating anxiety, insomnia, and stress [10].
- "Our study material consisted of publications, which were found in PubMed, ResearchGate, and Google Scholar databases." [10]
- "A combination of key words like 'Ashawagandha', 'insomnia', 'anxiety', and 'stress' was used to find the

proper publications." [10]

Methodology

"Published scientific literature about the effects of ashwagandha (*Withania somnifera*) on stress reduction and sleep quality was used in this review." Systematic reviews, meta-analyses, narrative reviews, and previously published clinical trials were the sources of pertinent studies. Studies assessing ashwagandha supplementation in various groups, with doses ranging from 150 mg to 600 mg daily and durations varying from 4 to 12 weeks, were included in the literature. Using validated instruments like the Pittsburgh Sleep Quality Index (PSQI), Insomnia Severity Index (ISI), sleep diaries, Perceived Stress Scale (PSS), Hamilton Anxiety Rating Scale (HAM-A), actigraphy, polysomnography, and serum cortisol measurements, the chosen studies evaluated stress, anxiety, and related parameters. The goal of the review was to compile and evaluate the information that is currently available about the safety, effectiveness, and mode of action of ashwagandha in enhancing sleep quality and lowering stress. [1, 2, 3, 11, 12, 13]

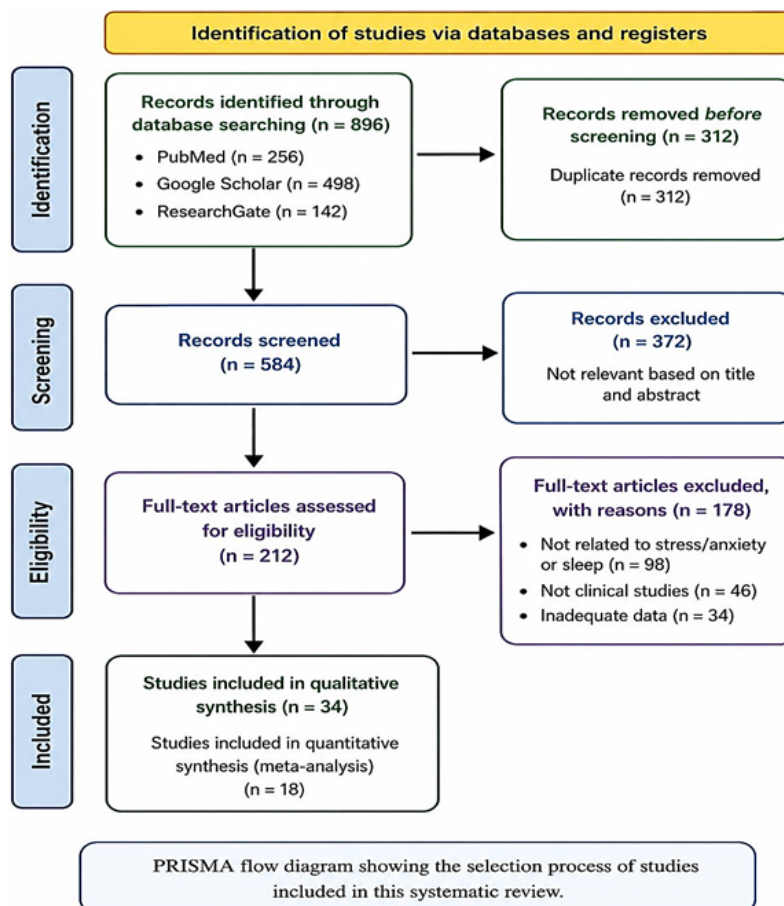


Fig 2: PRISMA Flow Diagram of Study Selection

Pharmacological Action of Ashwagandha

Adaptogenic Activity: By controlling the hypothalamic-pituitary-adrenal (HPA) axis, ashwagandha enhances the body's capacity to manage both physical and psychological stress [15].

Cortisol Reduction: It lowers serum cortisol levels, which are raised in situations of long-term stress [14].

Neuroprotective Effect: Ashwagandha protects brain cells from oxidative stress and neuroinflammation while improving

neuronal transmission [15].

Anxiety Reduction: By acting on GABA-mimetic pathways, the plant has soothing and anxiety-reducing properties [16].

Sleep Enhancement: Stress and anxiety-related insomnia is lessened and sleep quality is enhanced by ashwagandha [17].

Activity that Reduces Inflammation: Ashwagandha's withanolides control inflammatory cytokines like TNF-α and IL-6, which lowers inflammation [5].

Antioxidant Capabilities: Phytochemicals such as

flavonoids shield cells from oxidative damage brought on by free radicals [18].

Impact of Immunomodulation: By boosting white blood cell activity and strengthening resistance to infections, ashwagandha strengthens the immunological response [19].

Impact on Cardioprotection: By enhancing blood flow and

lowering blood pressure, it promotes cardiovascular health [20].

Support for Reproductive Health

Ashwagandha enhances hormone balance, testosterone levels, and sperm quality [5].

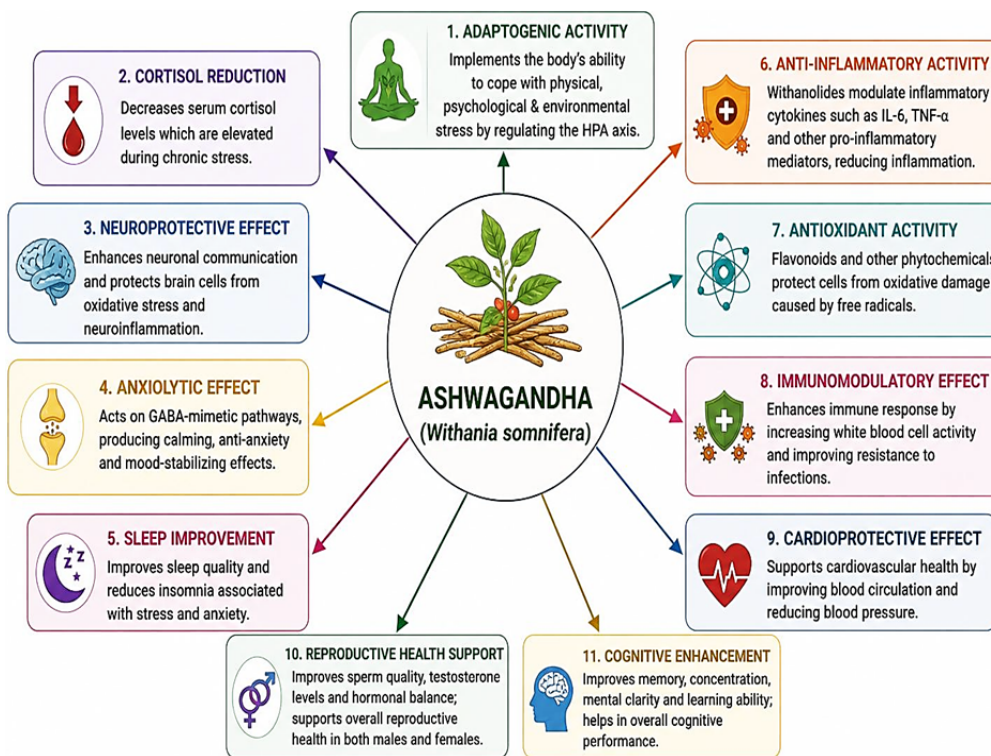


Fig 3: Pharmacological Flowchart of Ashwagandha Actions

Mechanism of action of Ashwagandha

The way that ashwagandha works

As an adaptogen, ashwagandha aids in the body's ability to adjust to stress and preserve equilibrium, or homeostasis. It is thought to have medicinal properties because it contains

bioactive substances called withanolides. Alkaloids (isopelletierine, anafierine, cuseohygrine, anahygrine, etc.), steroidal lactones (withanolides, withaferins), and saponins are among the biologically active chemical components of *Withania somnifera* [21, 22].

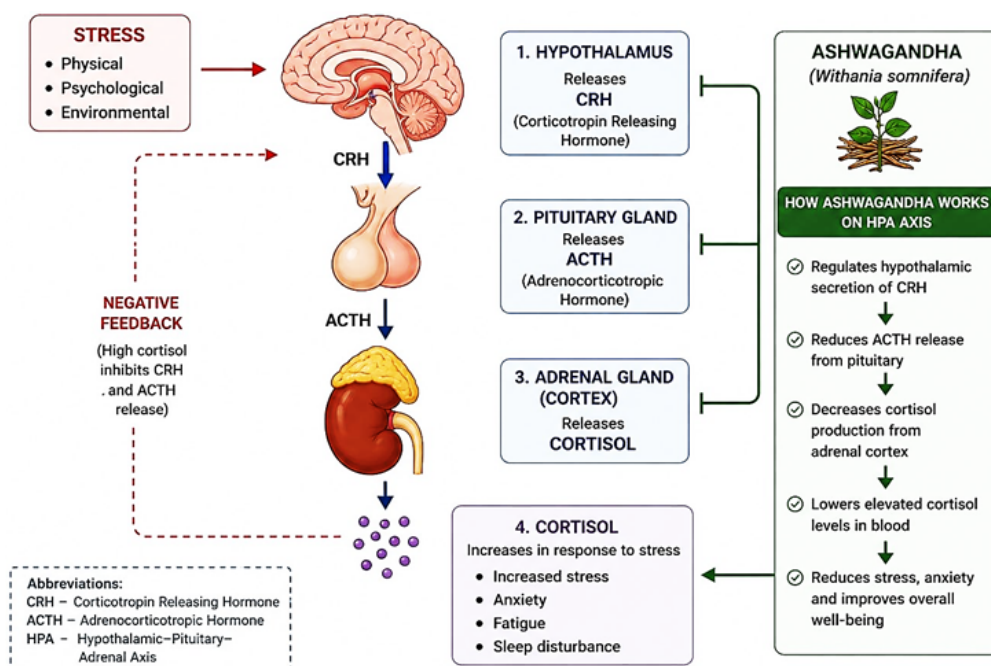


Fig 4: HPA Axis Mechanism of Stress Regulation

Ashwagandha contains anti-stress compounds called acylsterylglucosides and sitoindosides. Ashwagandha's active

ingredients, such as the sitoindosides VII-X and withaferin-A, have been demonstrated to exhibit strong anti-stress effects against acute experimental stress models^[23].

"A large number of its components promote immunomodulatory effects"^[24].

Advantages of Ashwagandha in Stress and Anxiety Management

- i). Ashwagandha improves the body's capacity to handle stressful situations by lowering cortisol levels.
- ii). It has anxiolytic and relaxing properties that lessen nervousness, anxiety, and restlessness.
- iii). Ashwagandha helps treat insomnia and sleep disturbances brought on by stress and anxiety. It also enhances the quality of sleep.
- iv). It improves general psychological well-being by strengthening focus, memory, mental clarity, and cognitive function.
- v). The herb lowers fatigue brought on by long-term stress and mental tiredness and boosts energy and endurance.
- vi). As an adaptogen, ashwagandha helps the body stay balanced both physically and emotionally when under stress.
- vii). It also aids in mood stabilization and fosters emotional health and relaxation.

Limitations of Ashwagandha in Stress and Anxiety Management

- i). Limited long-term safety data: The long-term effects and

safety of continuous ashwagandha use are not fully established because the majority of studies assess short-term use.

- ii). Variation in formulation and dosage: It is challenging to standardize the precise effective dose because different research employ different amounts (root extract, leaf extract, capsules).
- iii). Not appropriate for everyone: It may not be appropriate for certain medical problems without supervision, and some people may have minor side effects like headaches, drowsiness, or upset stomach.
- iv). Limited large-scale clinical trials: Despite encouraging findings, many studies have small sample sizes; therefore, more extensive, carefully monitored clinical trials are required.
- v). Potential drug interactions: Ashwagandha may interfere with immunosuppressive, thyroid, or sedative medications, which may have an impact on the course of treatment.

Discussion

An essential adaptogenic herb in Ayurveda, ashwagandha (*Withania somnifera*) is used to reduce anxiety and stress. By controlling the HPA axis, it lowers cortisol levels and enhances the body's reaction to stress, according to research that is currently available. Additionally, via affecting neurotransmitter activity, it has anxiolytic effects that improve mood and lessen anxiety.

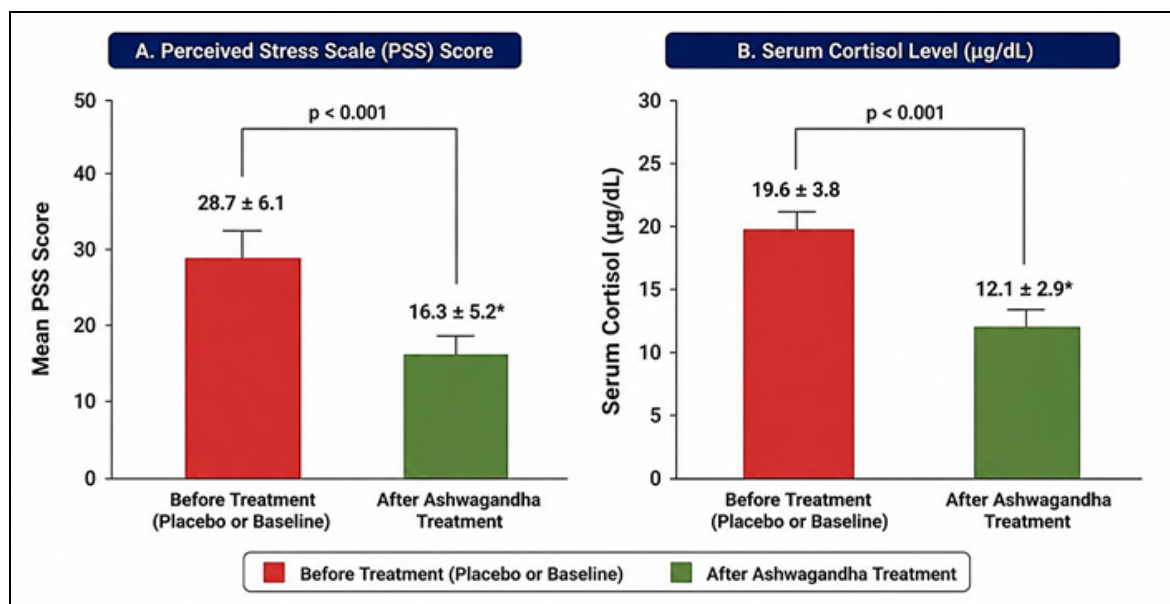


Fig 5: Cortisol Level vs Stress Reduction Graph

According to clinical research, ashwagandha improves the quality of sleep, lessens exhaustion, and increases focus and mental clarity. Its neuroprotective and stress-relieving qualities are influenced by bioactive substances such withanolides.

Although there is evidence that ashwagandha can effectively control stress and anxiety, more extensive and long-term research is still required to prove the plant's safety and effectiveness^[25].

Conclusion

In Ayurveda, ashwagandha (*Withania somnifera*) is a useful adaptogenic plant that helps control anxiety and stress.

According to the reviewed research, it aids in regulating the HPA axis, reducing cortisol levels, and reestablishing normal physiological balance under stressful circumstances. Significant anxiolytic, mood-enhancing, and neuroprotective benefits are also demonstrated by it, all of which support better mental and emotional stability. Ashwagandha has also been shown to improve the quality of sleep, lessen exhaustion, and promote cognitive abilities including focus and memory. All things considered, ashwagandha exhibits great promise as a natural remedy for anxiety and stress. To establish its safety, ideal dosage, and wider clinical efficacy, however, further extensive and long-term clinical research is required.

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