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MENTAL AND EMOTIONAL WELL-BEING: HERBAL SOLUTIONS FOR STRESS, ANXIETY, DEPRESSION AND SLEEP SUPPORT

Reetu Kumari
School of Pharmacy, YBN University, Ranchi, Jharkhand, 834010, India

Afrin Alam
School of Pharmacy, YBN University, Ranchi, Jharkhand, 834010, India

Dr. Ashish Sarkar
School of Pharmacy, YBN University, Ranchi, Jharkhand, 834010, India

Corresponding author:
Reetu Kumari
Email:
reetukumari0809@gmail.com

ABSTRACT

Humans run on the energy of mental and emotional well-being, this is what creates balance in overall health. Due to a constant state of stress, anxiety, depression, and sleep disorders that most people experience today because of their recent lifestyles, they get imbalanced in their general well-being. From ancient culture, herbs have been found to serve as natural healers to promote better health. This chapter presents a comprehensive review of herbal solutions for reducing stress, anxiety, and depression, and inducing sleep ensuring improved mental and emotional well-being that leads to good health. Included are adaptogenic herbs such as Ashwagandha and Tulsi; anxiolytic herbs such as Passionflower and Lemon Balm; antidepressant herbs including St. John's Wart and Saffron; and natural sleep support solutions like Valerian root and Chamomile. This chapter further discusses how these herbs work in promoting mental and emotional health, describing how they may be integrated into daily life to achieve better health. Herbal remedies are accompanied in this chapter by a holistic approach to overall well-being that includes diet, exercise, and mindfulness.

Keywords: Herbs; Stress; Anxiety; Depression; Sleep; Well-Being

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1. Introduction

Mental well-being is not just about the absence of mental disorders, instead it is a complete state of emotionally comfortable feeling, having positive feelings inside and leading a productive life[1]. The theory of mental well-being is majorly based on the phenomenon that extreme work pressure, stress, or any other conflicts leads to mental health issues and a state of balance between mental emotions is necessary to achieve mental well-being[2].

Emotional well-being is not just about the absence of diseases in a person's body, instead it is a umbrella term which composes overall health, positive mental health, quality and productivity of life, positive emotions, positive moods, absence of any kind of negative emotions, mood or feelings[3]. Various studies have stated that good emotional well-being is kind of associated with overall health and reduction in disability[4] As per a systematic review, a state of emotional well-being in a healthy person's life is associated with reduction in any kind of mortality by 20%[5].

Stress is a natural phenomenon that is associated with threats or challenges, but if left as such can lead to various serious illness. Stress is the major cause of cardiovascular diseases such as coronary heart disease and respiratory disorders[6]. Stress can negatively impact biological functions of body as it has the capability to alter homeostasis as well as can cause life threatening events and even lead to death[7].

Anxiety is basically a response from predictable threats, and can have a major impact on cognition behaviour[8]. Anxiety and related disorders are one of the most prevalent mental health disorders worldwide. Anxiety is mainly characterized by constant fear and nervousness which impacts the overall personal and social productivity of an individual .

Depression is associated with constant feeling of loneliness, sadness and a deep loss of interest in everything around a person[9]. Major symptoms of depression and disorders associated with it includes sadness, constant irritable mood and cognition impairment. Depression also affects the individual's capability to take decision and function properly[10].

Sleep is very important to regulate the normal physiological function of brain as well as body. Sleep disturbances are one of the major cause of health related problems because sleep impacts human health directly. Lack of proper sleep or any kind of sleep disturbance leads to diminished alertness, restlessness, impaired performance and many more[11]. It impacts the productivity and how an individual lives a quality life[12]. Short term health related problems in individual can include cognition and mood disorders while long term health related problems include cardiovascular, hypertension and diabetes related issues[13].

The base of total health is mental and emotional well-being, however modern lifestyles make people continuously face such stress, anxiety, depression and sleep disorders thereby throwing the total state off balance. Pharmacological treatments have been used to manage these conditions, but focus is now shifting towards herbal remedies as these are not associated with side effects as seen with conventional pharmacological treatments. This chapter helps in geeting a detailed overview of herbal remedies for mental and emotional well-being to manage stress, anxiety, depression, and sleep

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disturbances, along with their mechanism of action and how integration of herbal remedies with lifestyle changes in daily life can help in managing these systems and achieving a quality life.

2. Understanding mental and emotional imbalance

A. Physiological Impact of Stress (Cortisol, Adrenal Fatigue)

Stress is a normal condition that aids the human body to control threats and such situations[14]. When stress encounters a person, cortisol, a hormone is released which is also known as stress hormone[15]. This stress hormone is mainly associated with the body to prepare for flight and fight response[16]. Though cortisol is vital for human body, elevated levels of cortisol for prolonged time can have negative impact on the body which includes impairment in cognition, immune suppression, elevated blood sugar level and blood pressure, and also mood disturbances[17]. Adrenal fatigue is the condition in the body which is associated with the excessive release of cortisol from adrenal glands for a long period of time, leading to mood swings, irritated mood, and disturbed sleep, etc[18].

B. How Neurotransmitter Imbalances play important role in Anxiety and Depression

Neurotransmitters play important role in the brain and any kind of their imbalance can lead to severe conditions. Depression and anxiety are mostly associated with imbalance of neurotransmitters namely serotonin, GABA, and dopamine in the brain.

There are many kind of serotonin (5-HT) receptors, the most commonly associated with neurotransmitter anxiety disorder being 5-HT subtype 5-HT1A[19]. Any disturbance in the synthesis, storage, or release of 5-HT leads to depression[20]. Serotonin is the mood regulator neurotransmitter and its deficiency is related to anxiety and depression disorders due to aggravation of sadness, irritation and fatigue[21]. GABA is another major inhibitory neurotransmitter in the brain an various studies have shown that decrease in GABA levels is associated with high anxiety levels and thus regimens which improve GABA are preferred to reduce anxiety levels. Increased GABA levels has demonstrated effectiveness in treating mental health disorders effectively[22]. Dopamine is another major neurotransmitter that is linked with depression. Various studies have demonstrated that low amount of dopamine binding and release is associated with people with depression[23].

C. The Importance of Sleep for Mental Health

Sleep is associated with mental health, any disturbance in sleep pattern or regularity can lead to the occurrence of mental disorders[24]. Sleep disturbances may often lead to disrupted mental health, addressing these issues is associated with better mental health and thus improved quality of life[25]. Both hypothesis can be assumed, poor sleep disturbance leading to mental health problems and opposite[26]. The results of a meta-analysis showed that sleep quality affects mental health and has a dose response relationship which means improved sleep quality can be equalised with improved mental health[27]. Various studies have documented the relationship of sleep and mental health. According to a study, people with

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insomnia had higher chances of clinical impact of depression and anxiety[28]. As per the observation of another study, people with insomnia had higher tendency of developing insomnia than people not suffering from insomnia[29]. Thus, according to these observations, it can be assumed that sleep and mental health are interlinked.

3. The growing interest in herbal solutions

Generally pharmacological treatments for anxiety and depression are associated with severe side effects and hence patient compliance decreases, therefore there is growing interest towards herbal solutions[30] for managing stress, anxiety, depression and sleep disturbances as these herbal solutions are less associated with side effects and also can be incorporated in daily life along with diet to manage the conditions. Major side effects associated with conventional pharmacological treatments include sexual dysfunction, weight gain, blunting etc. Also these pharmacological treatments are such class of drugs that may produce reliability and dependence and hence people are opting for herbal remedies to manage these conditions[31]. Over past decades, people are exploring herbal remedies for managing psychological conditions. [32]conducted a study in order to assess the choice of patients between conventional and herbal treatments for managing their psychological conditions. This study was conducted on 591 adult patients suffering from anxiety and depression. From the results, it was found that patients supported herbal treatment for managing their conditions instead of conventional medicine. The major factor behind this was found to be adverse effects as according to the patients, they had suffered from serious adverse effects with conventional treatments. Also, during pregnancy herbal regimens are often considered to be safe. In another study, conducted by[33], pregnant women with or without mild mental symptoms were studied on how they choose herbal treatments over conventional psychoactive medicine. The results obtained from the study, it was observed that pregnant females chose herbal treatment over synthetic psychoactive medicine because of good effectiveness and tolerability during pregnancy. Thus, all these studies indicates towards positive aspect of using herbal medicine over conventional treatments due to less association with side effects and better tolerability.

4. Herbal remedies for stress, anxiety, depression and sleep disorders

Numerous herbal therapies have been investigated for the treatment of stress, anxiety, depression, and sleep disorders. Table 1 lists the main plants used to treat these conditions, along with their phytoconstituents and mode of action.

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Table 1: Herbal remedies for stress, anxiety, depression and sleep disorders

Major action	Name of the plant	Botanical name	Major phytoconstituent responsible for action	Mechanism of action	Reference
Adaptogens for stress relief	Ashwagandha	Withania *somnifera*	Withanolides	Reduce corticosterone level	34
	Holy basil	Ocimum *sanctum*	Eugenol and ocimumosides	Regulates HPA axis and decrease corticosterone levels	35
	Guduchi	Tinospora *cordifolia*	Berberine	Helps in modulation of stress hormone levels	36
	Shankhapushpi	Convolvulus *pluricaulis*	Convolvine,	Reduction in stress induced oxidative damage	37
Anxiolytic herbs for anxiety	Ashwagandha	Withania *somnifera*	Withanolides	Increase in GABA content in brain	38
	Passionflower	Passiflora *incarnata*	Vitexin	Increase GABA levels and reduced neuronal excitability	39
	Chamomile	Matricaria *recutita*	Apigenin	Enhanced inhibitory signaling	40
	Lemon Balm	Melissa *officinalis*	Rosmarinic acid	Increase GABA by blocking GABA transaminase	41
	Brahmi	Bacopa *monnieri*	Bacosides	Modulation of GABA and serotonin pathways	42
Herbal support for depression	St. John's Wort	Hypericum *perforatum*	Hyperforin	Inhibition of serotonin and norepinephrine	43
	Saffron	Crocus *sativus*	Safranal	Modulation of serotonin and dopamine	44
	Rose root	Rhodiola *rosea*	Salidroside	Enhance serotonin and dopamine levels	45
Natural solutions for sleep support	Valerian root	Valeriana *officinalis*	Valerenic acid	Increase GABA levels by blocking GABA breakdown	46
	Chamomile	Matricaria *recutita*	Apigenin	Binding to Benzodiazepine receptors	47
	Passionflower	Passiflora *incarnata*	Vitexin, chrysin	Increase in GABA levels	48

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5. **Mechanisms of herbal action on the nervous system**
   There are various mechanisms by which herbal remedies exert their action on the nervous system mainly in stress, anxiety, depression and sleep disorders.

- **Modulation of neurotransmitters**
  According to[49], neurotransmitter modulation remains the major pathway by which herbs can produce action. The modulation of neurotransmitters such as dopamine, serotonin, GABA, and others play important role in managing brain related conditions. A variety of plants, including ashwagandha, passionflower, guduchi, shankhapushpi and others, work by modulating brain neurotransmitters and helps in reducing stress, anxiety, and depression.

- **Regulation of Hypothalamic-Pituitary-Adrenal (HPA) axis**
  Maintenance of cortisol level and regulation of HPA axis has been found to be crucial for proper nervous system function. Herbs such as tulsi, rhodiola, ashwagandha etc. exert their action in the brain via this mechanism[50].
- **Neuroreceptor binding**
  Some plants exert their action by binding to the neuroreceptors such as GABA or benzodiazepine receptors. Example includes chamomile and kava.

- **Enzyme inhibition**
  An essential enzyme in the nervous system, GABA transaminase degrades GABA, causing anxiety and depression. Therefore, GABA transaminase inhibition, which raises GABA concentration, is another way that plants affect anxiety and sadness

- **Promotion of neuroplasticity**
  Upregulation of brain-derived neurotrophic factor (BDNF) helps in supporting neurogenesis and thus promotes neuroplasticity and prevents brain from stress related damage[51].

6. **Preclinical studies**
   Plants have shown effectiveness in managing stress, anxiety, depression and sleep disturbances, various animal models have explored to study the effect of herbal plants and their components in managing stress, anxiety, depression and sleep disturbances. Table 2 summarizes preclinical studies conducted for assessing efficacy.
7. **Clinical trials**
   Several clinical trials have been done over years to assess the safety and efficacy of herbal plants in managing these conditions. This table contains information regarding various clinical trials conducted using different herbal plants in the management of conditions such as stress, anxiety, depression and sleep disturbances. Following information has been obtained from clinicaltrials.gov/
   Table 3 summarizes clinical trials conducted for assessing efficacy of herbs.

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Table 2: Preclinical studies conducted for assessing efficacy of herbs

Herb/intervention	Target condition	Animal model	Dose	Result and Conclusion	References
Fameyes	Stress	Rats	200 mg for four weeks	Reduction in levels of ACTH, corticosterone and serotonin leading to significant anti-stress activity	52
Valerian root	Insomnia and anxiety	Rats	valerian root extract (3 ml/kg), valerenic acid (3 mg/kg), or a solution of valerenic acid	Reduction in anxious behaviour	53
	Sleep problem	BALB/c mice	Valerian extract (100 or 300 mg/kg)	Reduced sleep onset time and enhanced sleep quality	45
Ashwagandha	Sleep disturbance	Swiss albino mice	10, 25 or 50 mg (w/v) of ashwagandha extract	Decrease in sleep onset time and increase in sleep duration	53
	Stress	Kathiawari horses	2,5 and 10 gm/animal	Decrease in cortisol and epinephrine levels leading to potent antistress activity	54
	Depression-like behaviour	Mice	100 and 200 µg/mL	Significant neuroprotective and antidepressant activity	55
	Stress	Mice	3.3, 10, 33.3, or 100 mg/kg Withania extract	Antidepressant and anxiolytic effects were observed	56
Holy basil	Anxiety	Wistar rats	100 mg/kg for six days	Significant anti-anxiety activity	57
	Depression	Albino mice	4 and 8 mg/kg	Significant anti-depressant activity	58
	Stress	Sprague-dawley rats	40 mg/kg body weight	Ocimarin was able to normalise the stress parameters	59
Chamomile	Depressive like behaviour	Wistar kyoto rats	Inhalation therapy	Increased expression of proteins leading to reduction in depressive like behaviour	60
Chamomile and lemon balm	Anxiety and stress related problems	Zebra fish	NA	Significant reduction in anxiety and stress problems	61
Lemon balm	Anxiety	BALB/c mice	25 mg/kg	Significant reduction in motor impairment	62

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Saffron	Sleep disturbance	Female rats	25, 50, and 75 mg/kg	REM study showed decreased anxiety and depression like behaviour	63
	Depression	Rats	20 and 40 mg/kg	Significant improvement in depression symptoms	64
	Sleep disorders	Adult male wistar rats	150 mg/kg for 7 days	Reduction in kynurenine levels and promotion in melatonin levels leading to improved mood and sleep disorders	65
Guduchi	Sleep disturbances	Adult female wistar rats	50% ethanolic extract	Modulation of stress induced biomarkers and improvement in sleep	66
	Stress	Mice	100 and 200 mg/kg	Reduction in stress related behavioural symptoms	67
Brahmi	Stress induced depression	Male sprague-dawley rats	40-120 mg/kg	Alleviation of depression symptoms	68
St. John's wort	Sleep disturbance and anxiety	Mice	200 and 400 mg/kg	Improved locomotor action and anti-stress activity	69
Rose root	Anxiety and stress	Female C57BL/6 mice	3% salidroside	Reduction in corticosterone levels and improvement in locomotion	70
Passion flower	Anxiety	Male wistar albino glaxo rats	300 mg/kg b.w	Increase in GABAergic and dopamine levels	71
Kava	Anxiety	Mice	300 mg/kg b.w	Reduction in corticosterone levels	72
Rosemary	Depression and anxiety	Male ICR mice	10 mg/kg and 100 mg/kg	Attenuation of brain neurotransmitters leading to reduced stress	73
Turmeric	Sleep disturbance	Mice	NA	Reduction in sleep latency and increase in sleep duration	74

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Table 3: Clinical Trial Summary

Herb/intervention	Target condition	Study design	Sample size/population	Dose and duration	Main findings	Clinical trial identifier
Ashwagandha	Stress and sleep	Double-blinded Randomized Control Trial	60 healthy students	700 mg/day for 30 days	It was found to be helpful in managing stress and sleep problems associated with it	NCT05430685
Ashwaganha	Generalized anxiety disorder	Double-Blind, Parallel Group, Randomized, Placebo Controlled	120	250 mg for 7 weeks	Reduction in anxiety level	NCT01311180
Holy basil	Stress and anxiety	Randomised placebo-controlled clinical trial.	30	Capsules containing leaves of tulsi for 6 weeks	Significant reduction in stress and anxiety levels	NCT03184909
Lavender	Sleep quality and mood	Interventional	60	50% lavender oil diluted in fractionated coconut oil	Improved sleep quality and mood	NCT03093454
Lavender	Post traumatic stress disorder	Double-blinded Randomized Control Trial	224	Two 80 mg silexan daily for 12 weeks	Reduction in stress levels	NCT06412757
Passion flower	Mild and moderate anxiety	Double blind and randomized	150	1 tablet PO twice a day for 6 weeks	Reduction in HMA score	NCT00794456
Passion flower	Acute stressful situations	Randomised placebo-controlled clinical trial.	60	425 mg 3 X1 tablet per day for 3 days	Reduced stress and improved well-being	NCT01665170
Chamomile	Chronic primary insomnia	Randomized, double-blind placebo controlled	34	3 tablets each (equivalent to 7.5 g of dried herb) p.o. twice daily for 28 days	Improved sleep efficiency and total sleep time	NCT01286324
Chamomile	Anxiety	Double blind placebo controlled	180 patients with moderate to severe Generalised Anxiety Disorder	500 mg 3 times daily for 26 weeks	Symptomatic improvement associated with decreased cortisol	NCT01072344
Lemon balm	Stress, depression, anxiety and sleep	Randomized, double-blind placebo controlled	102	200 mg tablet twice a day for 3 weeks	Reduction in stress, anxiety and depression levels and improvement in sleep	NCT05602688
Lemon balm	Cognition and mood	Randomized, parallel assignment	123	300 mg capsules	Improvement of cognition and mood	NCT06183372
Brahmi	Anxiety	Randomized, double-blind placebo	84	225 mg capsules twice a day for 12 weeks	Reduction in anxiety levels	NCT02462642

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		controlled				
Rhodiola and saffron	Mild to moderate major depression	Observational	52	Dose not available, duration: 42 days	Reduction of values in depression scale	NCT02981225
Rhodiola	Major depressive disorder	Interventional	58	340-1,360 mg daily for 12 weeks	Reduction of values in depression scale	NCT01098318
St. John's wort	Depression	Observational	55	Daily intake of tinctures for 6 weeks	Reduction of values in depression scale	NCT05477472
St. John's wort and kava	Major depressive disorder with comorbid anxiety	Interventional	50	NA	Reduction in depression symptoms	NCT00451516
Valerian	Sleep disturbance	Interventional	18	100 mg softgels, 3 softgels each night for 2 weeks, 30 minutes before bedtime	Improvement in sleep quality	NCT00097604
Valerian and lavender	Sleep problem	Randomized, parallel assignment	114	1 tablet/day	Improvement in sleep quality	NCT05194618
Eschscholtzia and valerian	Anxiety related sleep disorders	Randomized	109	3 tablets every day for 28 days	Reduction in Insomnia Severity Index (ISI) score	NCT04812418

8. Integrating lifestyle approach (Diet, Exercise and mindfulness) into daily life for better health

This approach is mainly based on the observation that health is not just associated with physical aspects of a person instead it also involves lifestyle aspects such as diet, exercise, and social habits that majorly affects the health of an individual[75]. Lifestyle choices such as diet, exercise, and mindfulness is associated with better health outcomes, hence it becomes necessary to integrate lifestyle approach along with herbal remedies in daily life in order to achieve better health. According to the results obtained from a systematic review and meta-analysis[76] ,it was found that lifestyle intervention such as change in diet, exercise patterns, and sleep hygiene can help in reducing symptoms of anxiety, depression, and sleep disturbances. This outcome was observed by thoroughly studying 96 randomised clinical trial studies. Physical activity has been shown to reduce symptoms of mental illness and can be as effective as conventional pharmacological treatments. Physical activity has been associated with improved quality of life in patients with mental illness[77]. In another systematic review, the impact of healthy lifestyle approaches on mental health and well-being was assessed. A total of 29 scientific papers were assessed and it was observed that healthy lifestyle approaches serves as indicator of improved mental health and well-being[78]. In another systematic review, 23 review articles were assessed on how lifestyle interventions improves quality of life of adults with serious mental illness. It was observed from various studies that exercise and dietary counselling can help in improving

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mental health and well-being of patients with serious mental illness and can enhance their recovery and may also help in reducing premature mortality.

9. Challenges with herbal remedies

Although there is boom in the herbal remedies industry for managing various diseases and conditions, still there are many challenges that are regularly encountered.

The major challenges associated with herbal remedies are-

- **Improper standardization and quality control**

  Plants are harvested in various temperature, soil conditions and many other things, due to which, concentration of active ingredients vary in different plants, and makes the dosing and efficacy unpredictable. Due to improper standardization, there is difficulty in measuring therapeutic outcome[79].

- **Lack of high quality clinical trials**

  Although preclinical research has been done for herbal remedies, still there is lack of high quality clinical trials. Some trials which are available are poorly designed, do not have sufficient population[80], hence outcome measures can not be compared. To ensure robust results, there is need to design proper clinical trials, and standardized research protocols.

- **Interactions**

  Most of the herbal remedies have been associated with drugs for possible interactions such as kava can cause liver toxicity if combined with other drugs, similarly St. John's wort can reduce the efficacy of other drugs and can cause possible side effects as well[81].

- **Complexity of herbal medicines**

  Herbal remedies are not like conventional pharmacological treatments do not contain single active compound, instead they contain numerous active compounds and hence are complex in nature which may be responsible for synergistic or antagonistic actions. Understanding the complex mechanism of action and isolation of particular active compound from variety of components is complex[82].

- **Potential for adulteration and contamination**

  Unlike pharmacological treatments, herbal remedies have high chances of adulteration and contamination as they are derived from natural source. Herbal preparations can be adulterated with heavy metals and pesticides and can pose risk for human life.

- **Insufficient information about mechanism of action**

  Although some literature regarding mechanism of action or mechanistic pathways is known, yet there is need of more studies to understand the exact mechanistic pathways.

10. Future directions in herbal research

In order to ensure reproducible outcomes, there is need of advanced standardization methods and proper quality control

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techniques[83]. Also, research on humans in the form of clinical trials is required to ensure the safety and efficacy of herbal remedies[84]. There are limited delivery systems for delivering active constituents like phytosomes but these do have their own limitations, so research should be directed towards searching for more delivery systems. In order to clarify the mechanistic pathways, there is need of advanced technologies like genomics and proteomics to understand the mechanistic pathways from a better perspective[85]. Only herbal remedies may not be that effective in managing conditions, hence the are often combined with lifestyle and integrative approaches to make them more effective, hence such models should be established so that efficacy can be increased. Also, there is need of ethnobotanical preservation and sustainability.

11. Conclusion

Stress, anxiety, depression, and sleep disturbances are the major causes that impact health of an individual in a negative way and is also associated with many health related problems. Mental and emotional well-being is a multifaceted journey and herbal remedies can offer support for these challenges. Conventional pharmacological treatments for these conditions are associated with severe side effects and dependence, hence preference is shifting towards herbal remedies for managing these conditions as they do not possess side effects and also can be integrated in daily life along with lifestyle changes. Various herbs such as Ashwagandha, Passion flower, Holy Basil, St. John's Wort etc. have been found to be useful in managing these conditions, however, more clinical studies and standardization methods are required to ensure complete effectiveness.

Abbreviations

COPD: Chronic Obstructive Pulmonary Disease**; HPA:** Hypothalamic-Pituitary-Adrenal; **HMA:** Hamilton Anxiety Rating; **GABA:** Gamma aminobutyric acid; **5-HT:** 5-hydroxy tryptophan; **BDNF:** brain-derived neurotrophic factor; **ACTH:** Adrenocorticotrophic hormone; **REM:** Rapid eye movement

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