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EFFICACY OF YOGA INTERVENTION FOR THE IMPROVEMENT OF THE QUALITY OF SLEEP: A REVIEW

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Abstract

Sleep is an essential part of life as essential as diet. Good sleep is a representation of better emotional well-being, cognitive function and physical as well as mental health. In children and teenagers sleep is an essential factor for developing healthy development and overall growth. Sleep also influences the cardiovascular system, digestion, breathing system and immunological system. Insufficient sleep might increase the vulnerability to chronic health issues over time such as heart attack and brain stroke. The goal of one of the most spiritual practices such as yoga is to achieve a state of complete physical and mental equilibrium via the application of an exceedingly subtle science. With its origins in Indian philosophy, yoga is both a modern and traditional discipline to achieve physical, mental as well as spiritual health. Some practical aspects of yoga have shown a significant role in dealing with sleep disorders and improving the quality of sleep. By controlling breath yoga may help to reduce fluctuation of mind tenancies of overthinking and provide sound sleep. This review article emphasises the efficacy of yoga intervention for improving sleep quality.

Keywords: *Insomnia, Meditation, Pranayama, Quality of sleep, Stress, Yoga*

INTRODUCTION

Health is the most essential part of life. A person is considered to be healthy when they are free from illness and have optimal mental, social, and physical health as per the World Health Organization. It is also said that When people's minds are healthy, they are better equipped to deal with life's challenges, develop their full potential, succeed academically and professionally, and positively contribute to their communities. (*Mental Health*, n.d.).

Sleep is a very important aspect of physical as well as mental well-being. People dedicate around one-third of their waking hours to sleeping, making it an integral component of the daily regimen. A good night's sleep, in sufficient quantity and at regular intervals, is just as necessary for life as food and drink. The capacity to acquire and remember new information, along with focus and reaction time, are all negatively impacted by a lack of sleep. (*Brain Basics: Understanding Sleep | National Institute of Neurological Disorders and Stroke*, n.d.) During sleep, the brain and muscles slow down, awareness changes and some of the senses become less active. Muscle activity and environmental connections both drastically diminish while individuals sleep. Sleep is more responsive than coma or disorders of consciousness because it still includes active brain processes, even though it varies from consciousness in terms of responsiveness to stimulus. The majority of the body's systems enter an anabolic state during one's sleep, assisting with the restoration of the immunological, neurological, skeletal and muscular systems. These processes are crucial for maintaining mood, memory and cognitive function, as well as for the immune and endocrine systems. Every night, the internal body clock signals about the sleep timing. ("Sleep," 2024)Sleep influences nearly every bodily tissue and system, including the central nervous system, cardiovascular system, pulmonary system, metabolism, immunological function, mood and resistance to illness. Several health problems, including hypertension, heart disease, diabetes, depression and weight gain are aggravated by persistent absence of sleep or poor quality sleep. (*Brain Basics: Understanding Sleep | National Institute of Neurological Disorders and Stroke*, n.d.)

Sleep quality refers to an individual's overall contentment with every element of their sleep. There are four dimensions of sleep quality such as sleep efficiency, sleep latency, sleep length and waking after sleep start. (Nelson et al., 2022) Feeling drowsy or exhausted even after obtaining an adequate amount of sleep, waking up many times during the night, or experiencing symptoms of a sleep disorder are all indications of poor sleep quality. (CDC, 2022)Causes of sleep deprivation such as depression, stress, anxiety and discomfort. Certain health conditions like heartburn, bronchial asthma, caffeine (usually from coffee, soda, and tea), alcohol and other drugs untreated sleep disorders such as sleep

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apnea or insomnia(*Get Enough Sleep - MyHealthfinder | Health.Gov*, n.d.) walking during nighttime, increased screen time and surrounding environment etc. (*Sleep Deprivation*, 2020)Individuals can experience a range of sleep problems, such as dyssomnias like insomnia, hypersomnia, narcolepsy, parasomnias like sleepwalking and rapid eye movement sleep behaviour disorder; bruxism; and circadian rhythm sleep disorders. ("Sleep," 2024)The majority of individuals require a minimum of seven hours of consistent, high-quality sleep nightly. A sufficient amount of sleep is defined in other ways as well. To feel refreshed upon waking, it is essential to have regular, high-quality sleep. A good quality of sleep boosts the immune system, maintains an optimum weight, and reduces the susceptibility to severe health issues such as diabetes and heart disease., alleviates tension and enhances positive mood, enhances cognitive abilities for improved academic and professional performance and also improves interpersonal relationships. (*Get Enough Sleep - My Health finder | Health.Gov*, n.d.)

Yoga is an ancient practice that combines mental and physical elements to enhance strength and flexibility. It can also aid in pain management and stress reduction. (*Yoga*, 2018) Yoga is a discipline that combines mild physical activity, pranayama and meditation. Engaging in yoga training enhances physical strength, flexibility, promoting relaxation of the nerves and mental tranquillity. (Services, n.d.)

Yoga techniques entail stretching and relaxing muscles, which may lead to notable physical and mental effort, which can reduce the time it takes to fall asleep, increase the amount of deep sleep, decrease sleep disruptions and improve sleep quality.(Turmel et al., 2022)Various studies show that Yoga can elevate thalamic GABA(Gamma Amino Butyric Acid) levels, regulate serotoninergic and noradrenergic systems and induce the release of opioids. Yoga practices affect the hypothalamic-pituitary-adrenal system and reduce cortisol levels. Breathing regulation may result in the recalibration of the sympathetic nervous system by vagal activation. Yoga has been demonstrated to elevate melatonin levels, improve sleep quality, give sound sleep, reduce stress levels and help to deal with insomnia and other sleep disorders.(Turmel et al., 2022)

ROLE OF YOGA FOR IMPROVEMENT OF SLEEP QUALITY

Many studies suggest that yoga may help to improve the quality of sleep.

A study conducted by Halpern et al. (2014), in their study on the efficacy of yoga on sleep quality among adult people, they found that after twelve weeks of yoga practice, the sleep efficiency (P<0.01), sleep duration (P<0.001)and sleep quality(P<0.01) were significantly improved, while the stress (P<0.01), anxiety (P<0.01) and depression (p<0.001)were significantly decreased and the overall mood was also significantly improved(P<0.01) among fifty-nine adult patients with insomnia in the yoga intervention group than a control group. (Halpern et al., 2014) In another study conducted by Chen et al.(2010) on the research impact of Yoga on Sleep Quality and Depression in Elderly Residents in Assisted Living facilities, they concluded that after twenty-four weeks of yoga practice sleep disturbance, depression and daytime function significantly decreased(P<0.05) while the quality of sleep was significantly improved(P<0.05) among fifty-five elder people those who performed yoga. (Chen et al., 2010)A study conducted by Bankar et. al(2013) on the research Efficacy of prolonged Yoga practice on sleep quality and overall quality of life in older individuals resulted that after two years of yoga exercise Physical Function(P<0.0001), Self-care (P<0.0001), Cognitive Function(P<0.01), Social Function(P<0.0001), sleep efficiency(P<0.05)were significantly improved while sleep disturbance(P<0.0001), sleep medication(P<0.05), sleep latency (P<0.0001) were significantly decreased among thirty-five yoga group than non-yoga group practionior adults.(Bankar et al., 2013)

As per the research carried out by Fang and Li(2015), in their randomised controlled trial, they found that after six months of yoga practice, the sleep quality(p<0.05), sleep duration(P<0.01), sleep efficiency (P<0.001) and overall sleep quality(P<0.05) were significantly improved while sleep disturbances(P<0.001), use of sleep medication(P<0.001) and daytime dysfunction (P<0.001)were significantly decreased among fifty-four yoga practitioner staff nurses than non-yoga practitioner nurses. (Fang & Li, 2015).

A randomised controlled trial by Mustain et. al(2013) yogic practices to improve sleep quality among patients with cancer. A total of 206 cancer patients, participated in the yoga programme for completing four weeks of yoga, seventy-five-minute sessions per week, showed notable enhancements in various aspects of sleep quality, such as overall sleep quality (P< .01), the time it takes to fall asleep (P <0.01), the duration of sleep (P <0.05), the effectiveness of sleep (P<0.01), disruptions during sleep (P<0.05), the subjective perception of sleep quality (P< 0.01), and daytime impairment (P<0 .01). However, there was no change in the use of sleep medication during the 4-week intervention period. A total of 204 patients in the standard care group also exhibited notable enhancements in overall sleep quality (P < 0.01), sleep efficiency (P <0 .05), sleep disturbance (P ≤0 .01), and subjective sleep quality (P <0 .01). However, there were no significant improvements in sleep latency, sleep duration, daytime dysfunction and the use of sleep medication.(Mustian et al., 2013)

A preliminary randomised controlled trial by Innes and Selfe(2012) the impact of a mild yoga regimen on sleep quality, mood and blood pressure in elderly women suffering from Restless Legs Syndrome (RLS). A total of seventy-five women

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were randomly assigned to either an 8-week yoga programme (n = 38) or an educational video programme (n = 37). A total of 75 individuals successfully filled out a Restless Leg Syndrome (RLS) screening questionnaire. The Pittsburgh Sleep Quality Index was used to assess sleep quality, stress was measured through the perceived stress scale, and state and trait anxiety were used to assess the stress level. The study concluded that the yoga group showed significant($p<0.05$) improvements compared to the control group in several aspects of sleep quality and mood. Additionally, the yoga group saw significant decreases($P<0.05$) in the level of prevalence of insomnia, anxiety, perceived stress and blood pressure. (Innes & Selfe, 2012)A randomised controlled trial by Ebrahimi et.al(2017) The impact of yoga and aerobics exercise on the quality of sleep in women diagnosed with Type 2 diabetes. A total of 39 women with diabetes were selected and randomly assigned to the yoga group and control group. Among them, 15 were assigned to the yoga group, 13 to the aerobic exercise group while the remaining 11 were divided into to control group. The intervention programme was conducted over 12 weeks, with three sessions each week. The Pittsburgh Sleep Quality Index (PSQI) was used for the assessment of the quality of sleep. After the intervention, the sleep quality score significantly improved after six ($p<0.001$) and 12 ($p<0.001$) weeks of practising yoga. Furthermore, a notable impact was seen after 6 weeks of aerobic activity ($p<0.039$). However, the beneficial impact was reduced to insignificant levels after 12 weeks of aerobic activity ($p=0.154$). However, no statistically significant difference was noted in the control group in all the parameters.(Ebrahimi et al., 2017)

Bakoulti et al.(2023) in their randomised controlled trial on The impact of online Hatha yoga on mental distress and sleep quality in elderly individuals. Two hundred participants of both genders were randomly divided into two groups: the experimental group (YG) and the control group (CG). Among them, 160 participants completed the study. Depression Anxiety Stress Scale (DASS-21) and Pittsburgh Sleep Quality Index (PSQI) were used to measure depression, anxiety, stress and quality of sleep. All participants were administered the Depression, Anxiety and Stress Scales and the Pittsburgh Sleep Quality Index (PSQI). The yoga group was given an 80-minute hatha yoga session twice a week hatha yoga session for eight weeks. After eight weeks of yoga sessions, a significant reduction was seen in the level of depression, anxiety and stress($p<0.01$), while a significant improvement was observed in the level of total sleep quality ($p<0.05$)life among the yoga group than the control group. While the participants in the control group had a significant increase in their level of depression. (Baklouti et al., 2023) So, these all studies support that yoga plays an essential role in improving sleep quality, and sleep efficiency and reducing sleep disturbances, sleep latency and frequency of medication intake.

DISCUSSION

Yoga practice promotes physical healing and strength, mental acuity and emotional tranquillity. The patient undergoes stretching and relaxation during yogic practices, which challenge and calm down their bodies and brains simultaneously. This might happen to improve sleep quality and efficiency. (Chen et al., 2010) The practice of yoga involves stretching, which stimulates blood vessels and meditation, which promotes a state of calm This leads to reduced sleep latency and fewer sleep disorders.(Baklouti et al., 2023)Individuals who do yoga postures often report increased energy levels, vitality and a greater sense of emotional equilibrium. Physical activities can influence hormone levels such as Growth Hormone Receptor (GHR), melatonin, interleukin-1, prolactin, and prostaglandin D2, which in turn can positively impact sleep quality. Research has shown that yoga can quickly reduce the activity of the sympathetic nervous system (SNS) and the hypothalamic-pituitary-adrenal (HPA) axis in response to stress. Yoga can lead to a noticeable rise in GABA(Gamma Amino Butyric Acid) levels in a relatively short period, resulting in quantifiable effects. The yoga intervention may impact GABA(Gamma Amino Butyric Acid) levels by enhancing parasympathetic nervous system (PNS) activity through yoga practices. Yoga enhances attention, elevates melatonin levels and mitigates sleep disruption. The deep breathing method is very effective in promoting relaxation and facilitating the onset of sleep. (*Sleep and Yoga*, 2022) Disrupted sleep results in decreased psychomotor alertness, which may result in a decrease in cognitive ability that is linked to the prefrontal cortex. As individuals become older, there is a reduction in the circulation of blood to the brain. Consistent engagement in Yoga might potentially reduce excessive autonomic activity and enhance parasympathetic activity, resulting in decreased oxygen consumption and metabolic rate of prefrontal cortex cells. Therefore, avoiding the death of neurons yoga may have a positive impact in halting the deterioration in cognitive performance. (Bankar et al., 2013)Yoga boosts endorphin production, enhancing daytime enjoyment and improving nighttime sleep quality.(Ebrahimi et al., 2017) Research on the effects of Yoga has demonstrated that short-term Yoga practice leads to a notable rise in vagal tone, a reduction in sympathetic discharge resulting in a considerably lowered heart rate response while standing and lower levels of catecholamines in the blood. Yoga's ability to reduce physiological arousal has been identified as a contributing factor to decreased sleep disruptions. (Bankar et al., 2013)

CONCLUSION

Snoring doubles the likelihood of sleep disruptions due to weakening upper airway muscles and constriction of the respiratory route. Regular Yogic breathing exercises may strengthen upper airway muscles, leading to fewer sleep disruptions. Practising yogic breathing techniques enhances the respiratory muscles' strength, leading to enhanced tissue perfusion and increased oxygen saturation. Improved oxygen saturation from Yoga exercises might potentially reduce sleep disruptions associated with sleep apnea. (Bankar et al., 2013) Yoga Nidra induces deep relaxation by alleviating tension in the body's muscles and nerves, promoting improved sleep. Yoga Nidra has been shown to enhance both physiological and psychological well-being. Clinical research showed that Yoga Nidra has also a favourable impact on physiological alterations including neurochemicals such as Dopamine and hormones.(Kumar & Pandey,2023)So, yoga helps to calm down the mind, relax the body, increase the level of melatonin, elevate the parasympathetic activity, decrease the level of stress, anxiety depression, prevent sleep disorders and thus improve sleep efficiency, better sleep quality and overall well-being.

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