



Effect of Yoga on Sleep Quality

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Abstract

To investigate the role of yoga practices in improving sleep quality. Experimental group and Control of group with self reported Pre and Post Data. Participants in the experimental group reported significant improvement in the onset of sleep and also with regard to continuity in sleep. Effectiveness of yoga practice as a means to overall well being is well established. In this study, its role in improving sleep quality has provided a positive indicator. However, to establish its credentials as a simple lifestyle mechanism producing profound impact, it opens up the arena to study a much wider sample comprising of persons in productive age group, working in shifts, doing highly stressful jobs etc.

Keywords: Sleep Quality, Freshness on Waking, Yoga.

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Introduction

According to Merriam-Webster dictionary, Sleep is defined as "the natural periodic suspension of consciousness during which the powers of the body are restored". Sleep is an integral part of health. It is responsible for rejuvenation of body, mind and spirit. It is a familiar experience that a spell of good sleep enhances the holistic wellness. Normally, immediately on waking we feel refreshed and energetic at body level. For example, one may sense a feeling of exhaustion or non-specific vague pains after a tiring day but after a night's sleep symptoms like weariness and fatigue simply vanish. According to the Division of Sleep Medicine at Harvard Medical School, research consistently shows that sleep plays a vital role in promoting physical health, longevity and emotional well-being. Studies show that people who get the appropriate amount of sleep on a regular basis tend to live longer and healthier than those who sleep too few or even too many hours each night.

Also at a deeper level, one may notice that the ability to focus our thought process is at its peak after a period of rest. Sleep helps mind to function with better clarity thus improving decision making capability. At times after good sleep, we can observe that we are able to solve certain long standing problems owing to better insight. In a study involving 37,508 adults, researchers at Department of Public Health, University of Copenhagen found that those with better sleep habits were more likely to quit smoking (if they were a smoker initially), had lower incidence of high-risk alcohol

consumption, were more physically active and had a lower chance of becoming overweight or obese.

When quality of sleep is not good, it impinges upon ability to perform to our potentials apart from affecting our metabolic processes. Over a period of time, this may possibly manifest in the form of reduction in stress handling capacity, decline in cognitive ability, shortness in breath, lack of appetite, grumpy looks, irritable temperament etc. ultimately leading to disease. As per Philips-AC Nielsen study of sleep habits around the world in 2009 revealed that 61 per cent of Indians get less than seven hours of sleep, with 46 per cent getting less than six hours of sleep. In 2011, Centres for Disease Control and Prevention declared insufficient sleep a public health epidemic. In India sleep deprivation is awaiting to be promoted as a health hazard. "We are far behind given the enormity of the problem especially with the explosion of call centres and graveyard shifts", says Dr Amit Mandal, Head, Pulmonology and sleep medicine, Fortis Hospital, Mohali, Punjab. While governmental intervention is anticipated in this issue, it would be prudent to tackle the matter at a personal level. Insufficient sleep has been linked to hypertension, diabetes, depression and mortality. "Get less than six hours of sleep on most nights and you are three times more likely to have elevated blood sugar levels", says Dr Ambrish Mithal, Chairman and HoD, Endocrinology division, Medanta-The Medicity, Gurgaon.

Sleep duration has been linked to Type-2 Diabetes. This impact is observed even in individuals who are not clinically suffering from Type-2 Diabetes - both short sleepers (less than five hours of sleep per night) and long sleepers (more than nine hours of sleep per night) had impaired glucose tolerance with low insulin sensitivity index", says Dr Preeti Devnani,

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From the public safety angle, we notice that poor sleep is causing most road accidents or mishaps at work place. As per AIIMS study in 2009 involving 380 victims of RTA, it was found that the majority were commercial drivers suffering from sleep deprivation. The lack of sleep impairs a person's trouble-shooting capacity and cognitive functions - so you may not use the brake at the right time or take a crucial turn", says Dr M S Kanwar, Senior Consultant, Respiratory medicine, Critical care and sleep disorders, Indraprastha Apollo Hospital, New Delhi.

Poor sleep could be due to reasons such as pain, irregular work patterns, inappropriate food, substance abuse, improper lifestyle, psychiatric illness etc. It could also result due to interplay of myriad of many other factors. Like most of the health issues this could be dealt with much success with minimal lifestyle intervention in the nascent stage. Left unresolved, the problem becomes chronic and one needs to avail the services of medical specialists. A renowned diabetologist states that, "Too little sleep can affect hormones and metabolism in a way that promotes diabetes. Sleep reduces levels of the hormone leptin, an appetite suppressant, while boosting levels of ghrelin, an appetite stimulant. That is a poor combination that may prompt sleep deprived people to eat more" (Dr Vijay Kumar Agarwal, Consultant Physician & Diabetologist).

In 2012, researchers at the University of Colorado found that losing just a few hours of sleep for a few nights in a row can lead to extra pounds. Experts state that body interprets sleep deficit as a constant stressor making such people vulnerable to a host of lifestyle disorders.

Characteristics of Sleep

Interestingly, sleep mechanism consists of three essential ingredients viz., Onset, Continuity and Freshness on waking. Onset is the time lag between slipping into sleep mode from the moment one hits the bed. Continuity is the duration of sleep mode without interruptions. Freshness is the 'refreshing feeling' experienced by a person on waking. In the public health domain, often we find people reporting sleep problems pertaining to one or more of the above areas. The presence of dreams and other discomfort can lead to dissatisfaction, lack of freshness and energy in the morning. This is principally dependent upon the state of mind while in sleep.

Indian thought on Sleep

Yoga & Sleep

Patanjali has categorically stated that sleep is one among five *vrittis* (activities) of mind (Yoga Sutra 1:5). At this juncture, one may recall that the ultimate goal of yoga is cessation of these activities or stilling the mind. Further, he defines the characteristics of mind in sleep activity as a state where there is complete absence of thought waves as if in void (Yoga Sutra 1:10). It is an

inert state of consciousness. Sensory perception is completely inactive. Thus, the characteristic attribute of mind is Tamas (which indicates lethargy, heaviness and inertia, as opposed to alertness or arousal). This is a state where there is freedom from reflective continuity of ideas. However, in the waking state the mind is constantly active and continuously one thought leads to another. It is this constant chatting or noise that goes on in the mind, which interferes with the onset and continuity of sleep.

Lord Krishna has explained the importance of proper sleep in Bhagavad Gita. He categorically states that the ultimate goal of yoga cannot be attained by a person who eats too much or too little or one who sleeps too much or too little (BG 6 : 16). He further reiterates that, one who is regulated in day to day activities, including sleeping and wakefulness is able to mitigate all misery (BG 6 : 17).

Ayurveda & Sleep

According to Ayurveda, Ahara (appropriate food), Nidra (sleep) and Brahmacharya (celibacy) are the three '*Upastambhas*' or secondary supports of life (Caraka Sutra 11/35). As we are all well aware, Ayurveda, the science of life, enlists the various support systems necessary for a healthy living. In the event of ill-health, the path to restoration is by the way of correction of Ahara (food) and Vihara (lifestyle), thereafter comes Oushada (herbs) if necessary, in that order. Incidentally, sleep falls into the category of one's lifestyle. Proper and undisturbed sleep is one of the important factors of healthy life.

Ayurveda goes on to emphasise the importance of sleep as a lifestyle activity. It categorically states that happiness, misery, nourishment, emaciation, strength, weakness, virility, sterility, knowledge, ignorance, life and death - all these occur depending upon, proper or improper sleep (Caraka Sutra 21/36). In view of the above statement, one can envisage the tremendous influence sleep can have over our well-being.

Yogarajnanakara says that a person who is enjoying sleep does not easily become a victim of diseases. His life will be filled with health, vigour and longevity. Sushruta states that if one happens to stay in a locality that contributes to the aggravated dosha, the person need not fear, provided his diet, sleep and regimen are of such nature as are necessary for the pacification of doshas concerned.

Modern science on Sleep

Scientists defined, sleep is a naturally recurring state of mind characterised by altered consciousness, relatively inhibited sensory activity, inhibition of all voluntary muscles, and reduced interactions with surroundings. They classified sleep as Rapid eye movement (REM) sleep and Non-rapid eye movement (Non-REM) sleep with distinct set of physiological and neurological features associated with it. They observed that sleep improves sensory threshold and memory

among other benefits. Typically 7 to 8 hours of sleep is prescribed for adults. Quality of sleep is one of the markers for assessment of one's health status. Sleep issues one may face, becomes a pre-disposing factor to a host of lifestyle ailments.

Socially, it becomes one of the reasons for people resorting to substance abuse or falling prey to alcoholism. It is well recognised that sleep has a vital role to play in soothing us and restoring our well-being.

Role of Yoga

Practice of Yoga is advocated as a form of physical and mental relaxation to achieve good sleep pattern. Yoga is not merely a physical activity, which promotes alertness; it has practices which induces relaxation and addresses issues associated with sleeplessness. Practice of postures and deep breathing provide an opportunity to reduce muscle tension, stiffness and induce relaxation. The components of Sleep Quality are not merely related to onset or continuity of sleep but also the content of mental states, which can be a major source of disturbance. Yoga training objective is to apply the various principles of individualized practice with focus mainly on sleep induction, continuity of sleep states and also to provide a satisfaction of the sleep experienced.

Objectives of Study

The present study is to investigate the role of yoga practices in improving sleep quality.

Experimental design

Experimental group and Control of group with self reported Pre and Post Data.

Materials and Method

This study was conducted by obtaining information relating to sleep quality from consenting male participants through a self reported questionnaire. Baseline assessment of sleep quality of participants in Experimental as well as Control groups was made at the time of commencement of study. The study was spread over a period of three months. Final assessment was made at the end of the study. A total of 114 participants were enrolled on expressing consent for the study. 57 were allocated each to Experimental and Control groups. The dropout rate is in consonance with normal trends incidental to similar such studies. However, the eventual outcome of measure of participation depicted as under provides scope for significant revelations in the study.

The final position of participants is -

Experimental Group : 36 participants (21 dropped out of 57)

Control Group : 39 participants (18 dropped out of 57)

Results

The data collected on a sample of 36 subjects from experimental group and 39 subjects from control group were analysed for the sleep quality before and after the yoga intervention and no intervention status. Excluding the dropouts from the analysis, the SPSS version 20 was used for the statistical analysis of the data. The independent group t statistics was used to compare the experimental and control group subjects on the sleep quality during pre test and during post test period. The paired t test was applied to understand the within group differences in the mean scores on sleep parameters. The following table presents the summary of the analysis:

Table I. Showing the mean age of the sample

	Mean age	Standard deviation	t value
Experimental group	41.78	10.54	1.68
Control group	37.95	9.10	

The mean age of the two group indicate that the sample represents middle aged adults. Even though the mean age of the experimental group is slightly higher, the t value indicates that there are no significant

differences in the distribution. Thus the group can be taken as homogenous with respect to their age related influences.

Table II. Represents the Mean and SD of the two groups at pre test on sleep quality

	Group I		Group II		t value
	Mean	SD	Mean	SD	
Sleep onset	1.00	.79	.77	.84	1.22
Sleep continuity	.44	.50	.26	.44	1.71
Freshness on waking	.50	.50	.28	.45	1.96*
Sleep quality	1.94	1.45	1.31	1.55	1.83

The two groups are identical on all aspects of sleep quality, however on experience of freshness in the control group was found to be significantly better (t value 1.96 is significant at .05 level). The SD values are

higher in all dimensions indicating that there are greater variability within the groups. A lower SD indicates that the scores are less dispersed.

Table III. Presents the Mean and SD on sleep quality post test for two groups

	Group I		Group II		t value
	Mean	SD	Mean	SD	
Sleep onset	.33	.53	.82	.79	3.14**
Sleep continuity	.00	.00	.28	.45	3.86**
Freshness	.00	.00	.28	.45	3.86**
Sleep quality	.33	.53	1.38	1.53	4.02**

The yoga trained subjects have completely free from the difficulties of continuous sleep and also report complete feeling of freshness. A few respondents may have slight difficulty in the onset. Still the mean score of .33 is lower than the baseline mean of 1. The overall sleep quality has also been found to be better in yoga intervened group. On the other hand the control group who had no interventions still have problems on onset, continuity and lack of refreshed feelings.

There overall score of 1.38 and a higher SD value (1.53) shows that many in the group have persistent sleep related problems during the post measurement. The obtained t values indicate a significant differences in the mean scores of the two group indicating that there is actual differences in sleep experiences, more beneficial in yoga practicing group compared to non practicing group. The marked changes in yoga group is further substantiated with the within group comparisons.

Table IV. Representing the Mean and SD of experimental group on pre and post test

	Pre (before yoga)		Post (after Yoga)		Mean Diff	t value
	Mean	SD	Mean	SD		
Sleep onset	1.00	.79	.33	.53	.66	6.83**
Sleep continuity	.44	.50	.00	.00	.44	5.29**
Freshness	.50	.50	.00	.00	.50	.591**
Sleep quality	1.94	1.45	.33	.53	1.61	8.20**

The Yoga trained group have shown a significant improvement in all aspects of the sleep quality. Post training the group is more homogenous in their improvement. Showing that almost all have responded to the treatment confirming that yoga is

effective in reducing sleep related disturbance and helps in promoting good sleep. The same effect is not observed in the control group as is evident from the following tabulated results.

Table V. Representing the Mean and SD of control group on pre and post test

	Pre test		Post test		Mean Diff	t value
	Mean	SD	Mean	SD		
Sleep onset	.77	.84	.82	.79	.05	1.00
Sleep continuity	.26	.44	.28	.45	.02	1.00
Freshness	.28	.45	.28	.45	-	-
Sleep quality	1.31	1.55	1.38	1.53	.07	1.35

Within the control group there is no significant changes in the sleep related status there is also high variability within the group (as all SD values are higher than the mean scores). Thus, no intervention is least effective in altering the sleep quality.

Discussion

Hariprasad VR et al examined the effects of yoga intervention on sleep quality and found that, the subjects in yoga group had significant improvement in total sleep quality score. Manjunath and Telles² observed that yogic intervention with techniques like physical postures and regulated breathing brought about improvement in sleep latency, sleep duration and feeling of being rested. Karen M. Mustian et al in their study "Multicenter, Randomized Controlled Trial of Yoga for Sleep Quality Among Cancer Survivors", (Journal of Clinical Oncology, September 2013) found that Yoga participants demonstrated greater improvements in global sleep quality and, secondarily, subjective sleep quality, daytime dysfunction, wake after sleep onset, sleep efficiency, and medication use at post intervention (all $P \leq .05$) compared with standard care participants. As observed in earlier studies, Chen KM et al³ found that yoga-intervention had improved the total sleep quality in elderly living in old age home. Bankar et al⁴ observed that regular Yoga exercises in the daily routine of elderly people can help to achieve good sleep quality thereby improving the quality of life.

Amy E. Beddoe et al discovered in a pilot study among pregnant women that Mindful yoga shows promise for women in their second trimester of pregnancy to diminish total number of awakenings at night and improve sleep efficiency. Murali Doraiswamy¹⁰ observed that seven weeks of yoga improved sleep quality and reduced the need for sleep aids in 39 adults who were experiencing insomnia while undergoing chemotherapy. Michael J Breus¹¹, Harvard Medical School investigated how a daily yoga practice might affect sleep for people with insomnia and found broad improvements to measurements of sleep quality and quantity. Experts opine that quality of sleep will improve because of the stimulatory effect yoga has on the nervous system and in particular the brain. The practice of certain yoga postures will increase the blood circulation to the sleep center in the brain, which has the effect of normalizing the sleep cycle.(Yoga.org.nz).

Conclusion

As evidenced from the studies above cited, yoga practices enhance the sleep quality. Similarly, in this study it is observed that the experimental group have reported noteworthy improvement in onset of sleep, continuity of sleep and freshness on waking. The overall sleep experience shows significant improvement with yoga intervention. The control group bereft of intervention report no change in the sleep quality. The subjects in the yoga group had significant improvement

in total sleep quality score. Thus, it reveals the benefits of regular yoga practice in enhancing sleep experience and contributing to overall well being.

However, there is great scope to take up study with a wider spectrum of sample involving persons who are in jobs with shift rotation, handling stressful jobs, persons on verge of retirement etc., It would go a long way in providing a scientific and more reliable validation to the above conclusion.

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