



# Meditation as a Preventive Sleep Medicine

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## ABSTRACT

Our failure in devising effective clinical measures for different sleep disorders results from the fact that we don't really understand the role and functioning of sleep in maintaining the body to its extent. Within this context, we share a possible connection between meditation and sleep and discuss how the study of one may help in understanding the other better. Such a correlation and connection can give us novel insights in knowing the fundamental nature and purpose of sleep in one's life. The possible influence of the practice of meditation on sleep quality also gives a promising hope for different sleep problems. From this viewpoint, meditation may serve as a non-invasive and preventive sleep medicine.

**Key Words:** Sleep, Meditation, Sleep Medicine, Neural Noise

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## Introduction

While we don't have a precise definition and understanding of what being a life means, still there are few aspects that we usually relate to a living experience. The subjective experience of one's existence is what we typically consider as the essence of life (Hodgson, 1898; Reddy and Pereira, 2016, 2017b). The sense of Self being a core experiential element constitutes the so-called first-person perspective of one's living experience. Only through this awareness of the individual Self can one differentiate oneself from the other (or external surroundings) (Hodgson, 1898; Reddy, 2017a, b; Reddy and Roy, 2018a, b; Reddy *et al.*, 2018d). Apart from some transpersonal experience cases (known to involve mystical and spiritual components) and abnormal conditions (like neurological disorders) (Tsoukalas, 2010; Ananthaswamy, 2015; Reddy and Roy, 2018a), there exists only one state during which an individual doesn't retain this sense of Self - deep sleep (non-REM) state (Travis, 2011; Sharma, 2004; Reddy and Roy, 2018a,b,d). Although the former conditions are treated as the altered states of experience, the latter one is considered as a quite normal and healthy condition. Sleep is one such enigmatic phenomenon which makes an

essential and integral part of one's living experience (Sharma, 2004; Krueger *et al.*, 2016). Here, one interesting thing is that during some phases of the sleep cycle, though the fundamental sense of one's Self is not retained and the awareness of the external world is absent, we nevertheless consider it as a part of the living experience (in contradiction to the very definition of living). As part of our living process, we spend approximately one-third of our lifetime dedicated to sleep (Raven *et al.*, 2017). Although we now know a few benefits of sleep in maintaining the functions of the brain and body, the essential role of sleep is still not very clear (Krueger *et al.*, 2016). Through this work, we would like to share a possible connection between meditation and sleep and discuss how the study of one may help in understanding the other better. Such a correlation and connection can give us novel insights in knowing the fundamental nature and purpose of sleep in one's life.

## Meditation and Sleep

The fact that both meditation and sleep play a constructive part in preserving the structural plasticity and resilience of the brain, and also the

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synaptic strength, suggests a possible connection between them (Braboszcz *et al.*, 2010; Travis, 2011; Nagendra *et al.*, 2012; Dahl *et al.*, 2015; Tang *et al.*, 2015; Parrino and Vaudano, 2017; Raven *et al.*, 2017). We lack the detailed knowledge of sleep for one reason that we cannot have a conscious subject giving us a constant feedback of the experiential states of awareness. In addition to this, various aspects and stages of sleep makes it more difficult to conduct a rigorous investigation. All the knowledge that we have on sleep is based on the analysis of the data collected during sleep from different subjects (ranging from healthy individuals to those suffering from sleep disorders). Sleep again is equally personal and individual dependent as the practice of meditation. Just like various factors affect the practice and progress of meditation, there are numerous factors that affect the quality of sleep (Travis, 2011; Krueger *et al.*, 2016; Reddy and Roy, 2018b,c). While meditation has to be practiced, sleep happens naturally in a healthy condition.

In general, the presence of awareness seems to be central to any type of meditation practiced across different cultures and traditions of the globe (Schmidt, 2014; Tang *et al.*, 2015; Reddy and Roy, 2018a,b,c). The essential practice in almost all these cases involves a sustained internal awareness, and sometimes depending on the type of meditation, one may need to retain the external awareness as well (Travis, 2011; Schmidt, 2014). To an extent, one's state of awareness during the REM-sleep can be understood in comparison to the concept of internal awareness during a particular meditation (where the subject is asked to witness the flow of random thoughts without being identified with them) (Travis, 2011; Mota-Rolim and Araujo, 2013). During this sleep phase, although an individual doesn't have an external awareness of the surroundings, one is internally aware and accessing one's own contents of consciousness (as in meditation), and this is what the dreams constitute (Voss *et al.*, 2009; Mota-Rolim and Araujo, 2013). There is a subject witnessing the dream content, though one may not be spontaneously aware of these happenings to oneself (because of the absence of one's bodily Self). Some reported studies also suggest that one can retain such awareness during the conditions of lucid dreaming (Voss *et al.*, 2009; Mota-Rolim and Araujo, 2013; Voss *et al.*, 2014).

Nevertheless, in deep sleep, there is no awareness in the sense we described above. On the other hand, it is interesting to know that some ancient cultures were aware of such a connection between sleep and meditation and recommended techniques that use sleep as a tool to reach a deeper meditative state called Samadhi; which may finally result in one's inner awakening (Sharma, 2004; Saraswati, 2008; Travis, 2011; Nagendra *et al.*, 2012; Reddy and Roy, 2018b,c). Following this, some experienced meditators are known to transcend the normal states of awareness during sleep by the process called Yoga Nidra (Saraswati, 2008; Mota-Rolim and Araujo, 2013) and can consciously monitor the contents of awareness. It would be highly beneficial if one can conduct research studies on these subjects (like in the case of meditation) to create a better understanding of sleep in terms of the different levels of awareness. Thus, one can acquire the knowledge of the states of awareness during different sleep phases from meditation studies. Besides, since we are not certain as to what neural patterns corresponds to the presence of internal awareness (Braboszcz *et al.*, 2017; Reddy and Roy, 2018b,c); the comparative studies on different phases of sleep over progressive stages of meditation are needed.

Some believe that one physiological and functional role of sleep is to flush out the toxic metabolites accumulated in the brain during one's wakeful state (Xie *et al.*, 2013; Krueger *et al.*, 2016). The glymphatic system that controls the flow of cerebrospinal fluid (CSF) becomes active during sleep and it is responsible for the clearance of toxic wastes which may otherwise result in various neurodegenerative conditions. Alternatively, there are studies which report that the practice of meditation enhances the sleep quality by influencing various functional mechanisms in the brain and the body (Schulze, 2004; Winbush *et al.*, 2007; Travis, 2011; Nagendra *et al.*, 2012; Mota-Rolim and Araujo, 2013; Hubbling *et al.*, 2014; Xie *et al.*, 2013; Black *et al.*, 2015; Dentico *et al.*, 2016; Wang *et al.*, 2016). In light of these studies and an existing similarity between both meditation and sleep in terms of retaining only the internal awareness (with the absence of motor activity), it would make an interesting study as to how the glymphatic function is connected to the practice of meditation. Whether it gets active as in sleep during deeper states of meditation? Is there a change in the functional operation of the



glymphatic system in experienced meditators in comparison to a novice? Such studies would help in unveiling a deeper connection between meditation and sleep, and may alternatively suggest the practice of meditation for the efficient functioning of the glymphatic system and thereby reduce the effects caused by sleep loss or deprivation (Brower and Perron, 2010; Krause *et al.*, 2017). This may propose a new implication where meditation can serve as a preventive sleep medicine.

One can also look at both the meditation and sleep in terms of neural noise. Since we now know the role played by noise in different aspects of the brain function (McDonnell, 2011; Roy and Llinás, 2012; Dinstein *et al.*, 2015; Roy, 2016), it is obvious to ask as to what extent noise contributes to meditation and sleep. In some practices of meditation, a higher degree of brain wave coherence and reduced neural noise are observed (Travis *et al.*, 2010; Dissanayaka *et al.*, 2015). Some view that this reduction in noise and the brain wave synchronization could result from the fact that during the process of meditation one will have a reduced amount of cognitive content and thoughts (Travis *et al.*, 2010; Bærentsen, 2015). If this is the case, then healthy sleep should also result in the reduced neural noise and higher coherence. Any deviation from natural sleep rhythms may increase the noise levels which in turn result in various neural disorders. Within this context, it would be interesting to study the role of noise in sleep, and see how one can characterize meditation and sleep with respect to noise. Such studies may also shed a new light on understanding neural disorders and aid in devising new clinical methodologies.

## Conclusions

Since we lack an effective sleep medicine to reduce the functional defects caused by sleep disorders, we want to bring about the connection between sleep and meditation, and recommend the practice of meditation in these cases. Our failure in devising such clinical measures results from the fact that we don't really understand the role and functioning of sleep in maintaining the body to its extent. Even in this context, meditation research may offer helpful insights on the phenomenon of sleep both from physiological and psychological perspectives. The possible influence of the practice of meditation on sleep quality gives a promising hope for different sleep problems. There is a need to understand sleep via

meditation research because they have a close connection in terms of the physiological mechanisms influencing the functioning of the brain and body. In this connection, meditation (and also the practice of meditative movements) may serve as a non-invasive and preventive sleep medicine.

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