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## A Short Term Naturopathic Intervention to Improve the Cognitive Functions and Quality of Sleep in University Students- A Preliminary Study

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### **Abstract:**

#### *Background*

*In college students, voluntary sleep deprivation is very common as they deprive themselves from sleep during the week and compensate by sleeping over the weekends. By this habit, there is an increased feeling of sleepiness and reduction in their ability to pay attention during classes and they are not aware of the negative effects.*

#### *Objectives*

*The Present study was designed to see the efficacy of short tepid cephalic douche for a week on the cognitive functions and quality of sleep of university students.*

#### *Methods*

*10 healthy volunteers of age  $20.75 \pm 2.36$  were recruited for the study. A tepid water cephalic douche, pouring of water from the neck upwards to head was administered for 5 min daily in between 9:30 pm to 10.30 pm, for a week under the guidance of Naturopathy Physicians. The outcome measures were Epworth sleepiness scale (ESS), Trail making test (TMT), Insomnia severity index (ISI), Pittsburgh insomnia rating scale (PIRS) before and after the intervention.*

#### *Results*

*After the 7 days intervention program, the data analysis showed significant improvement in Sleep quality ( $P < 0.000$ , 70.83%), reduction in working memory ( $P < 0.033$ , 24.7%). There was also a reduction in daytime Sleepiness (55.17%), insomnia severity (44.8%).*

#### *Conclusion:*

*The result of the study suggests that (1) Tepid water cephalic douche may helpful in reducing the sleeplessness as well as daytime sleeping, (2) improves quality as well as quantity of sleep and (3) improves cognitive function in university students.*

**Keywords:** Cephalic douche, naturopathy, water pouring, hydrotherapy, insomnia

### **1. Introduction**

In college students, voluntary sleep deprivation is very common as they deprive themselves from sleep during the week and compensate by sleeping over the weekends.<sup>i</sup> By this habit, there is an increased feeling of sleepiness and reduction in their ability to pay attention during classes and they are not aware of the negative affects.<sup>ii</sup> The young adult needs at least 8 hour of sleep to maintain their homeostasis<sup>iii</sup> and Most college students are sleep deprived, as 70.6% of students report obtaining less than 8 hours of sleep.<sup>iv</sup> Daytime sleepiness is a major problem, exhibited by 50% of college students.<sup>v</sup> At least 3 days a week, 60% of students report that they are dragging, tired, or sleepy<sup>vi</sup> sleep can be improved qualitatively as well as quantitatively by many non-pharmacological interventions like diet<sup>vii, viii</sup>, yoga<sup>ix</sup>, naturopathy<sup>x</sup>, auriculotherapy<sup>xi</sup>.

Naturopathy is a system of medicine which uses body's innate capacity to cure diseases. It treats the human body as a complete unit not merely symptomatic. The ultimate aim of naturopathic medicine is to bolster the inherent power within the human body and to accelerate self-healing capacity.<sup>xii</sup> Hydrotherapy being a naturopathic intervention also has been shown to improve the sleep quality<sup>xiii</sup> and quantity<sup>xiv</sup>.

The present study was planned to observe the effectiveness of cephalic douche, a naturopathic hydrotherapy treatment modality on improvement in the cognitive functions and quality of sleep in sleep deprived university students.

## 2. Methods

10 university male students were randomly recruited for the study on the basis of the inclusion and exclusion criteria. The inclusion and exclusion criteria were: age between 18 to 25 years, males, without any acute or chronic disease followed by detailed routine systemic examinations. An informed written consent was obtained after explaining the procedure and effects of the treatment. All the participants underwent tepid water cephalic douche, which is modality involving mainly tepid water pouring from neck upward to head. The duration of the treatment was 5 minutes in between 9:30 pm to 10.30 pm daily, for a week under the guidance of an institutionally qualified naturopathy physician.

## 3. Intervention

The participants were given with a tepid water cephalic douche, the volunteer made to lie on his abdomen, the head projecting over the end of the couch and depressed slightly so that the stream of water poured upon the back of the neck runs down over the head. Tepid water of 41°C at a distance of a few inches to two or three feet above the head. This hydrotherapy treatment modality, used as a sedative treatment<sup>xv</sup>. Participants reported between 9.30 to 10.30 pm to receive the treatment for 5 minutes daily for a week under the guidance of Naturopathy Physicians.

## 4. Outcome Measures

### 4.1. Self-Assessment Scale for Evaluation of Sleep and Awakening Quality (SSA)

Self-rating scale consisting of four parts: sleep quality (seven items), awakening quality in the morning (8 items), somatic complaints (five items), subjective estimates of total sleep periods, sleep latency, etc.<sup>xvi</sup> it is filled every day morning by patients for self-assessment scale for the evaluation of sleep and awakening quality.<sup>xvii</sup>

### 4.2. Pittsburgh sleep quality index (PSQI)

The Pittsburgh Sleep Quality Index measures retrospective sleep quality and disturbances over a one week period for use in clinical practice and research. The PSQI discriminates between good and poor sleepers, and provides a brief, clinically useful assessment of multiple sleep disturbances. The instrument consists of 19 items. There are 5 additional questions rated by the bed partner/roommate that are not included in the total score, but may be useful for clinical purposes. The 19-items are grouped into 7 equally-weighted component scores: 1) Subjective Sleep Quality (1 item); 2) Sleep Latency (2 items); 3) Sleep Duration (1 item); 4) Habitual Sleep Efficiency (3 items); 5) Sleep Disturbances (9 items); 6) Use of Sleeping Medication (1 item); and 7) Daytime Dysfunction (2 items).<sup>xviii</sup>

### 4.3. Insomnia Severity Index (ISI)

The Insomnia Severity Index is a brief self-report instrument measuring the patient's perception of his or her insomnia. The ISI targets the subjective symptoms and consequences of insomnia as well as the degree of concerns or distress caused by those difficulties. The ISI comprises seven items assessing the severity of sleep-onset and sleep maintenance difficulties (both nocturnal and early morning awakenings), satisfaction with current pattern, and interference with daily functioning, notice ability of impairment attributed to the sleep problem, and degree of distress or concern caused by the sleep problem. Each item is rated on a 0±4 scale and the total score ranges from 0 to 28. A higher score suggests more severe insomnia. The ISI takes less than 5 min to complete and can be scored in less than 1 min.<sup>xix</sup>

### 4.4. Epworth Sleepiness Scale

The Epworth Sleepiness Scale (ESS) is an effective instrument used to measure average daytime sleepiness. The ESS differentiates between average sleepiness and excessive daytime sleepiness that requires intervention. Scoring of the answers is 0-3, with 0 being "would never doze" and 3 being "high chance of dozing". A sum of 10 or more from the eight individual scores reflects above normal daytime sleepiness and need for further evaluation.<sup>xx</sup>

### 4.5. Trail Making Test (TMT)

The TMT provides information on visual search, scanning, speed of processing, mental flexibility, and executive functions. The TMT consists of two parts. TMT-A requires an individual to draw lines sequentially connecting 25 encircled numbers distributed on a sheet of paper. Task requirements are similar for TMT-B except the person must alternate between numbers and letters (e.g., 1, A, 2, B, 3, C, etc.). The score on each part represents the amount of time required to complete the task.<sup>xxi</sup>, suggesting that TMT-A requires mainly visuo-perceptual abilities, TMT-B primarily reflects working memory.<sup>xxii</sup>

## 5. Results

The data analysis [Table 1, Figure 1] between the groups showed significant result as high as 70.83% of improvement in Sleep quality (P<0.000), 24.7% reduction in working memory(P<0.033). There was also a reduction in 55.17% day time Sleepiness.

## 6. Discussion

The present study shows that the participants who were under the naturopathic intervention shows significant improvement in quality of sleep, reduction in daytime sleepiness and also reduction in working memory. This suggests that Cephalic douche can be a prospective measure of naturopathy, a non-pharmacological system, to improve the cognitive functions and quality of sleep with sleep deprived students.

The improvement in cognitive functions and quality of sleep implies that effects of the intervention may be due to (1) a parasympathetic dominance, causing decrease in cortisol and acetylcholine levels, which in turn inhibits the reticular activating center of brain stem resulting in decreased activity in cerebral cortex. The increase in the serotonin levels thereby decreases the wakefulness.<sup>xxiii</sup> (2) Due to a parasympathetic dominance the orexin levels fall, so there is a decreased excitation of the parts which are heavily innervated by orexin neurons like infralimbic cortex, prelimbic cortex, lateral septum, Bed nucleus of the stria terminalis, Preoptic area (PA), Dorsomedial nucleus of the hypothalamus (DNH), Posterior hypothalamus. Especially the PA and DNH down regulation cause a decreased wakefulness.<sup>xxiv</sup> (3) and visceral sensory signals carried to pons and medulla, through vagus nerves which stimulates the some areas in the nucleus of the tractus solitaries that also a cause for initiation of sleep.<sup>xxiii</sup>

However, no imaging or biochemical assessment was made in this study and there are no previous reports on changes in imaging or biochemical assay following cephalic douche and even the sample size was very small, so the findings must be considered as preliminary. In future more cutting edge studies can be done taking a larger sample size and better study designs.

## 7. Conclusion

The result of study suggests that (1) Tepid water cephalic douche may helpful in reducing the sleeplessness as well as daytime sleeping,(2) improves quality as well as quantity of sleep and (3) improves cognitive function in university students.

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**Annexure**

Variables	Mean ± Standard deviation		% change	P value
	Before intervention (Pre)	After intervention (post)		
Sleep Quality	90.00±4.163	26.25±5.123	70.83%	0.000**
Daytime sleepiness	7.25±2.98	3.25±2.06	55.17%	0.049*
Visuoperceptual ability	21.75±6.94	16.25±1.5	52.87%	0.149
Working memory	55±12.24	41.5±8.34	24.76%	0.033*

Table 1: shows group comparison of one week intervention.

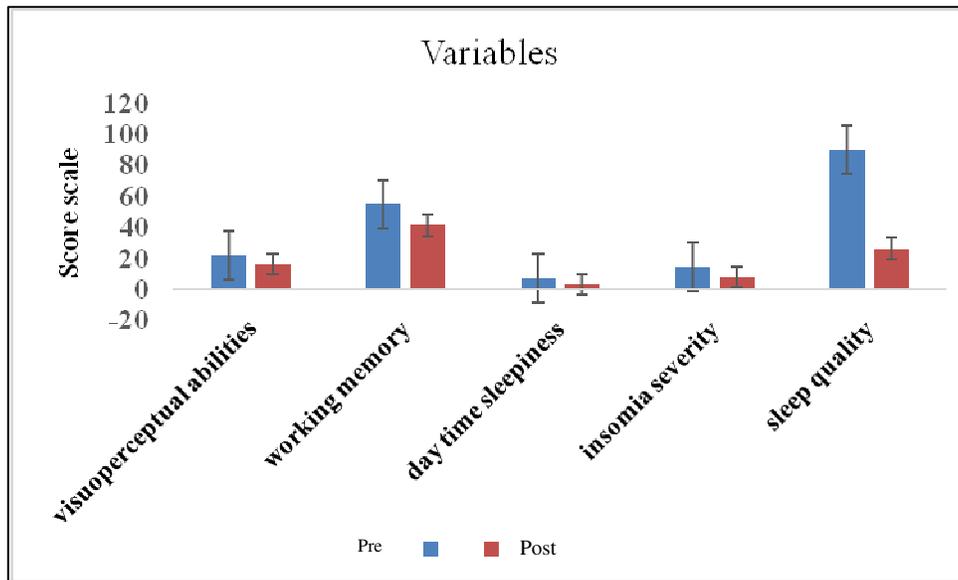


Figure 1: The changes in pre and post data