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## Determination of effect of caffeine consumption on sleep quality using Pittsburgh sleep quality index

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### Abstract

Caffeine belongs to a class of substances known as Methylxanthines. It is naturally found in coffee, cocoa beans, tea leaves etc., and it acts as a stimulant and has arousal effect. A descriptive and interventional study was taken to determine the effect of caffeine on sleep quality in students of Manipal University. A total of 343 students were taken in to the study and were asked to fill the Pittsburgh Sleep Quality Index to measure their sleep patterns, they were also asked to fill a questionnaire about the intake of caffeinated products. Among 343 students, 94.8% of students had a good sleep while remaining 5.2% had a bad sleep which states that there was no significant relationship between Caffeine consumption and sleep patterns.

**Keywords:** Caffeine, sleep, Pittsburgh sleep quality index

### 1. Introduction

Caffeine is a naturally occurring substance found in the leaves, seeds and/or fruits of at least 63 plant species worldwide and is part of a group of compounds known as methylxanthines. The most commonly known sources of caffeine are coffee, cocoa beans, kola nuts and tea leaves [Barone and Roberts, 1996; Frary *et al.*, 2005]. The amount of caffeine in food products varies depending upon the serving size, the type of product, and preparation method. With teas and coffees, the plant variety also affects the caffeine content. Other sources of caffeine include over-the-counter pain relievers. Caffeine is an adjuvant it increases the rate at which the medication is absorbed into the body. It is also present in some stimulant tablets and cold medications. Caffeine can be present in these products ranging from 16-200 mg. [Clevel and Clinic, 2006] (Caffeine & Health: Clarifying the Controversies 2008) [2]. Caffeine is an ingredient in a variety of commonly ingested foods and beverages and is the most widely used psychoactive drug, with >80% of the world's population consuming caffeine daily. As a stimulant, one of caffeine's primary effects is to increase arousal. This arousal effect helps explain why people report using caffeine for reasons such as increasing energy, staying awake and concentrating better. Some researchers have concluded that caffeine can also enhance mood, decrease feelings of fatigue and improve cognitive functioning. However, these conclusions have been recently called into question, as they generally stem from studies in which caffeine is withheld for a period of time prior to testing for effects (Norton, *et al.* 2011) [6]. (Caffeine & Health: Clarifying the Controversies 2008) [2]

### 2. Methodology

It is an experimental study with a sample size of 343 students from Manipal University, Manipal, Karnataka. Students of the age above 18 years and below 25 years of both the genders were included and students who had the habits of alcohol and smoking, sleep disorder, neurological and psychological problems were excluded. Pittsburgh Sleep Quality Index (PSQI) which was developed by Daniel J. Buysse in 1988 has been used as standard tool for assessment of affect of caffeine consumption on sleep quality of the students. Food frequency questionnaire of caffeinated products and Structured Interview schedule were framed and used to collect the data.

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### 3. Results and Discussion

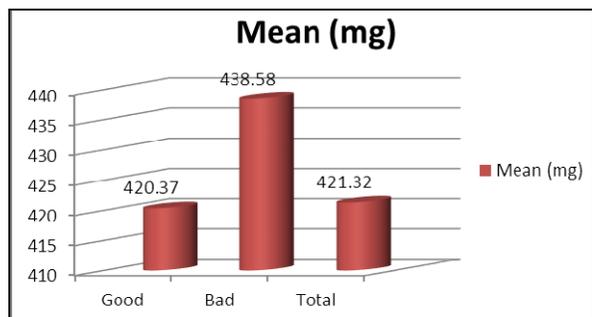
The below table depicts that among the total 343 students 94.7% had good sleep quality and only 5.2% had bad sleep quality. The mean and standard deviation of all the students were 421.32mg and 252.53mg. The mean and standard deviation of caffeine consumption of good sleep quality and bad sleep quality students were 420.37mg; 257.25mg and 438.58mg; 146.24mg respectively. The minimum and

maximum caffeine intakes in all the students were 0mg and 1157mg. The minimum and maximum caffeine intakes in good sleep quality and bad sleep quality students were 0mg; 1157mg and 31.2mg; 727.9mg respectively. This table showing association between Caffeine intake and Sleep Quality states that there was no significant association as p value was 0.76 which was again more than 0.05, this depicts that caffeine consumption does not affect sleep quality.

**Table 1:** Effect of Caffeine consumption on Sleep Quality using Pittsburgh Sleep Quality Index (PSQI)

Sleep Quality	No. of students	Mean Caffeine (mg)	Standard Deviation Caffeine (mg)	Minimum intake of caffeine(mg)	Maximum intake of caffeine(mg)	F value	Significance value
Good	325	420.37	257.25	0	1157	0.088	0.76 <sup>NS</sup>
Bad	18	438.58	146.24	31.2	727.9		
Total	343	421.32	252.53	0	1157		

NS indicates no significance.



**Fig 1:** Effect of Caffeine consumption on Sleep Quality

### 4. Conclusion

From the study it can be concluded that sleep patterns will not be dependent on the caffeine consumption. According to the Pittsburgh Sleep Quality Index Questionnaire majority of the students (94.8%) had a good sleep and by this it is obvious that caffeine does not have any significant role to play with sleep patterns. It was seen that students mainly use caffeinated products for sleep deprivation in accordance to focus on studies. It was clear from the study that the Indians consume less caffeinated products when compared to western population.

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