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A STUDY ON CAFFEINE INTAKE AND ITS EFFECT ON WITHDRAWAL, STUDY AND SLEEP PATTERN IN MEDICAL STUDENTS OF THE UNITED ARAB EMIRATES (UAE).

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ABSTRACT

Aim: To assess caffeine intake and determine its effect on withdrawal, study and sleep pattern in medical students across the UAE. **Material Methods:** A cross sectional study, by means of a detailed online survey, was conducted for four months between December 2015 and April 2016 in all the four medical colleges of UAE. **Results**: The total number of medical students included in the study was 275 of which 208 were consumers and 67 non-consumers of caffeine. The consumption was in the form of coffee (44.2%), tea (41.3%) and other drinks (coke, Pepsi and red bull – 14.5%). The mean caffeine intake was 210.62 mg, 86.13 mg and 78.63 mg in coffee, tea and other drinks respectively. Headache, drowsiness and lack of concentration were the chief withdrawal symptoms noted by the medical students. The concentration level (with coffee 75%, tea 62.8% and carbonated drinks 10%) was observed to be enhanced in a majority of caffeine consumers. There was no significant effect of caffeine on the sleep pattern of consumers. **Conclusion**: There was not much variation noticed in the sleep pattern of the caffeine consumers in this study. However diverse results were observed in its effect on the study pattern, Withdrawal effects were mild in the form of headache, drowsiness and lack of concentration.

KEYWORDS: Caffeine, withdrawal effects, psychoactive drug, dependence.

INTRODUCTION

Caffeine is a bitter alkaloid present in coffee, tea, cocoa, chocolate, soft drinks and numerous drugs. It causes stimulation of the central nervous system and is the most widely used psychoactive drug in the world. An average cup of tea or coffee contains 50 and 75 mg of caffeine respectively. The daily average consumption of caffeine from tea or coffee is about 200 mg. When taken orally caffeine produces wakefulness, alertness and increased capacity to do intellectual work. It also improves performance in fatigued subjects without improving accuracy. However, tolerance can develop to the stimulating effects of caffeine.

AIM

To assess caffeine intake and determine its effect on withdrawal, study and sleep pattern in medical students across the UAE.

MATERIAL METHODS

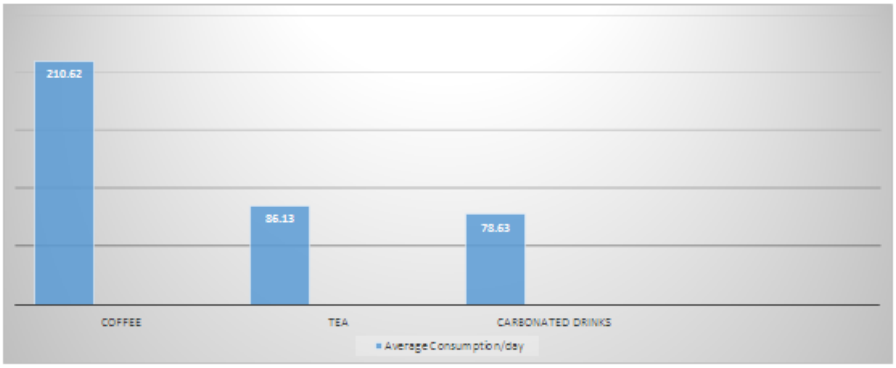
A cross sectional study was undertaken for four months between December 2015 and April 2016. A few variables for analysis were selected to assess caffeine intake as well as to note its effect on the sleep and study pattern of medical students in the UAE. A detailed online survey was designed for the study and distributed to the medical students in all the four medical colleges in the UAE.

RESULTS

Medical students n= 275	
Caffeine Consumers	**Caffeine Non-consumers**
75% (208)	25% (67)

CaffeineConsumers n=208		
Coffee	**Tea**	**Carbonated drinks**
41%	41.3%	14.5%

Mean daily caffeine consumption in medical students in the UAE	
Drink	**Average Consumption/day**
Coffee	210.62 mg
Tea	86.13 mg
Soft Drinks	78.63 mg

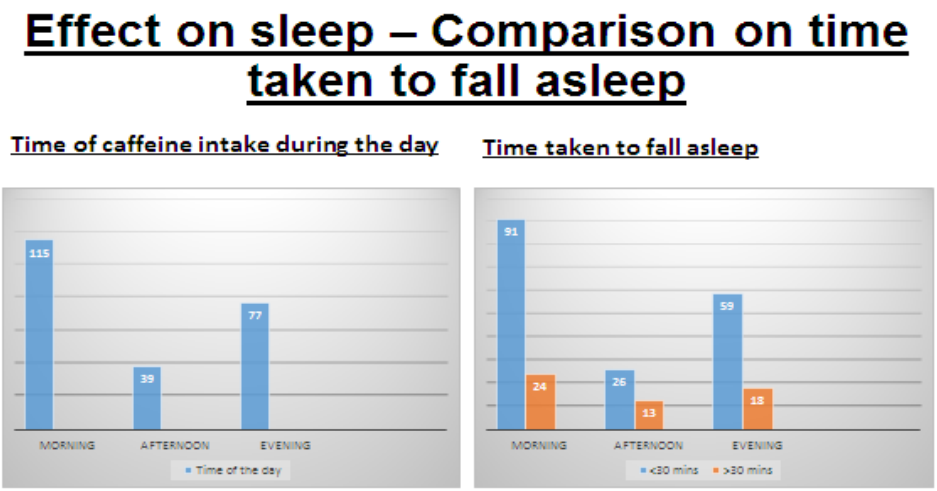


Effect of caffeine on the concentration level in the medical students			
Concentration Level	**Coffee**	**Tea**	**Carbonated drinks**
Improved	75% (69)	62.8% (54)	43.3% (13)
Declined	3.3% (3)	1.2% (1)	6.7% (2)
No effect	21.7% (20)	36.0% (31)	50.0% (15)

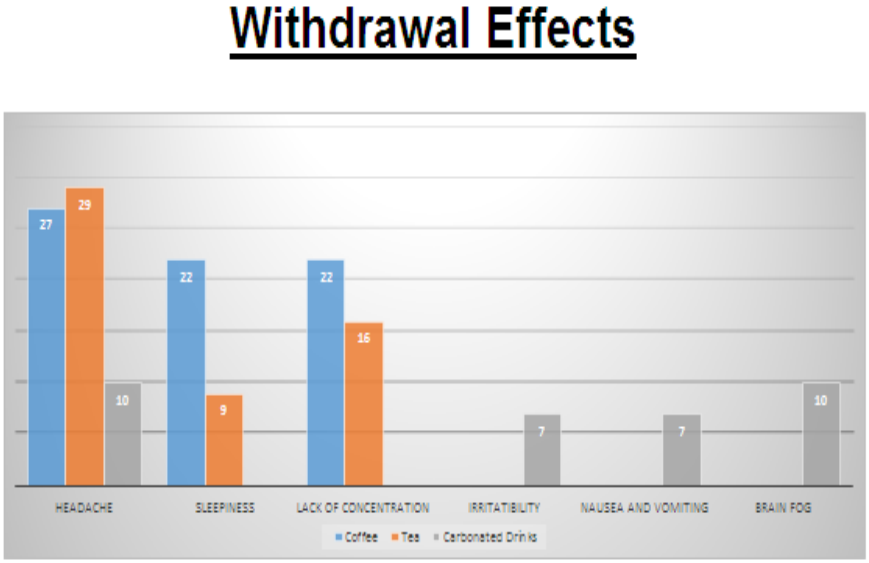
Caffeine consumers n=208		
Time of caffeine intake	**Time taken to fall asleep**	
	< 30 min	**> 30 min**
Morning (55.2%)	79%	21%
Afternoon (18.75%)	66%	33%
Evening (37%)	76%	23%

Comparison on quality of sleep (caffeine content and sleep quality)		
Drink	**1 cup/day**	**1 mug/day**
Coffee	120.5mg 60% Tired	170mg 78% Tired
Tea	49.6mg 52% Tired	70mg 69% Tired
Carbonated Drinks	1 can (60mg) 80% Tired	2 cans (120mg) 77% Tired

(Factors considered - Quality and duration of sleep, feeling after waking up in the morning, time taken to fall asleep- main focus on feeling in the morning)



Withdrawal symptoms observed in the in the medical students			
Withdrawal Effects	**Coffee**	**Tea**	**Carbonated Drinks**
Headache	27%	29%	10%
Drowsiness	22%	9%	*NA*
Lack of Concentration	22%	16%	*NA*
Irritability	*NA*	*NA*	7%
Nausea & Vomiting	*NA*	*NA*	7%
Brain Fog	*NA*	*NA*	10%



DISCUSSION

Caffeine is the most commonly consumed central nervous system (CNS) stimulant worldwide in the form of tea and coffee. The basis for widespread use of caffeine may be due to the fact that its habitual consumption has been significantly known to increase self-reported alertness, improve performance of vigilance tasks with fewer lapses of attention and also improve long-term memory and locomotor speed.[1,2] It was observed in this study that 75% of the medical students of UAE were consumers of caffeine either in the form of tea (41.3%), coffee (41%) or carbonated drinks (14.5%). Comparatively, the consumption of caffeine in medical students in UAE is lesser than students in South Africa observed in a similar study which demonstrated caffeine consumption to an extent of ninety four percent.[3] A cup of coffee or strong tea contains 50-70 mg of caffeine, while filter coffee contains double the amount. Among adults in tea and coffee drinking countries the average daily consumption is about 200. Likewise the mean daily consumption in our study was observed to be in the acceptable range of 210.62 mg in the form of coffee, 86.13 mg as tea and 78.63 mg as carbonated drinks. These results are comparable to a similar study done on caffeine intake in school children.[4] Caffeine when taken orally produces mild CNS stimulation causing wakefulness, alertness and increased capacity to do intellectual work. In fatigued subjects the performance of motor tasks is improved without improvement in accuracy.[5]

Consumption of coffee or other beverages containing caffeine usually can increase the heart rate, the cardiac output and also increase the peripheral resistance, raising blood pressure slightly. In sensitive individuals consumption of a few cups of coffee may result in arrhythmias.[6]

Caffeine acts mainly by antagonizing the adenosine receptors (A2) and partly by inhibiting phosphodiesterase enzyme. Two or three cups of strong coffee produce a plasma and brain concentration of about one hundred micromole per liter. This is sufficient to produce appreciable adenosine receptor blockade. This study demonstrated the improvement in concentration in 75%, 62.8% and 43.3% of coffee, tea and carbonated drink consumers respectively.

The withdrawal symptoms of caffeine that have been reported include headaches, fatigue, decreased energy/physical activity, decreased alertness, drowsiness, depressed mood, difficulty in concentrating, irritability and clouded mentality. These symptoms may last for two to nine days. Typically, the onset of withdrawal symptoms occurs 12 to 24 hours after abstinence, with peak intensity at 20 to 51 hours.[7] Headache and fatigue are the most common symptoms associated with caffeine

abstinence. Likewise our study manifested headache, drowsiness and irritability as the main symptoms on caffeine abstinence.

This study substantiated a considerable effect of caffeine on the quality of sleep without indicating any appreciable difference in the time taken to fall asleep. Irrespective of the time of caffeine intake during the day up to 70% of the consumers could fall asleep in less than thirty minutes at bedtime. These results are comparable to an earlier study which demonstrated that habitual coffee drinkers become rather immune to the effects of caffeine on sleep.[8]

Conversely the quality of sleep in the caffeine consumers was observed to have a direct relation to the amount of caffeine consumed. The higher the caffeine intake the higher the percentage of consumers (60-70%) was noted to be affected with a poor quality of sleep. Sleeping problems are a major reason for people to refrain from caffeine consumption as caffeine concentrations as low as 3μM can influence sleep. On the contrary studies also indicate that some people seem to have no sleep problems despite taking a regular evening dose of caffeine. This clearly emphasizes that caffeine interferes with a modulatory mechanism in sleep regulation, not with a fundamental sleep regulatory brain circuit. It probably also reflects on the fact that regular sleeping habits are of fundamental importance in ensuring satisfactory sleep.[9]

CONCLUSION

The caffeine consumption by the medical students of UAE was determined to be in a moderate range. It was not just as tea and coffee but also in the form of other aerated drinks in addition to energy drinks. The health hazards of energy drinks include risky medical problems like cardiac arrest and also innumerable psychiatric disorders. Consumption of energy drinks should be regulated and strongly discouraged by parent and student counseling before it becomes an addiction. There was not much variation noticed in the sleep pattern in the caffeine consumers in this study. However diverse results were observed in its effect on the study pattern. Withdrawal effects were mild in the form of headache, drowsiness and lack of concentration.

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