Original Research Article

Caffeine consumption among medical students: an exploratory study in a medical school in a sub–Himalayan state of India

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ABSTRACT

Background: Among the psychostimulants, caffeine is the most commonly used compound with beneficial effects in low to moderate intake. Medical students due to extended scholastic work do indulge in caffeine intake. The present study aimed to explore the prevalence, determinants and its positive and negative effects among medical students in a tertiary care teaching hospital in Jammu, India.
Methods: The present cross sectional study was conducted in the month of December, 2023. Online questionnaire was shared with all the undergraduate MBBS students of the medical school and were directed to submit their responses. Data thus collected was entered into Excel spread sheet and analysed.
Results: Prevalence of caffeine intake among the respondents was 85.7%. The most common caffeinated beverage consumed was tea followed by coffee while energy drinks were least consumed. Among the reasons for consumption, feeling refreshed and combating drowsiness were cited as two main reasons. Respondents reported gastritis (41%), insomnia (30%), anxiety (18%) and palpitation (18%) as major side effects post consumption.
Conclusions: The frequency of caffeine use among the respondents was more on the regular days in contrast to stress related exam days as reported in other studies. Intake of caffeinated beverages favourable time was morning. More studies are recommended to study long term results of consumption of caffeinated beverages.

Keywords: Caffeine, Prevalence, Medical students

INTRODUCTION

The most commonly consumed psychoactive chemical in the world is caffeine (1, 3, 7-trimethylxanthine), which is a naturally occurring alkaloid that stimulates the central nervous system (CNS) and belongs to the methylxanthine class. Its ability to lessen adenosine transmission in the brain determines its stimulating qualities. That is broadly why researchers all over the globe have extensively researched about caffeine, its sources, the consumer base for the same as well as about the quantity it is actively ingested in. It has gained popularity among its consumers owing to its low cost and instantaneous action. It is found in various common beverages like coffee, tea, sodas, energy drinks and other caffeinated beverages.

Caffeine has gained popularity among its consumers because it keeps them stay awake and active throughout the day helping them get through with their everyday tasks and activities. Age-related increases in caffeine intake have been documented, with adults between the ages of 35 and 64 consuming the most of the drug.[1] In India, people drink roughly thirty cups of coffee a year on average. By contrast, the average worldwide is approximately 200 cups.[2]

It has been observed that college students have more prediction for coffee. According to research, the typical college student consumes roughly one cup (or 70 mg) of caffeine per day.[3] Medical schools are demanding, take up a lot of time and energy, and is one of the most demanding fields of education. Students have to put up with incessant labour hours during the five years of medical schooling and exams always tend to raise the stress levels even further.

To sustain an exceptional grade point average (GPA), students frequently need to exert more mental and physical effort than they are accustomed to. As a result, among college students, medical students are among the most vulnerable for coffee addiction. The need to increase arousal leads individuals to overconsume it which can lead to symptoms like anxiety, palpitations, or even panic attacks. In case of consumptions of caffeine over 300 mg even leads to hallucinations.

Review of literature revealed that though many studies have been conducted abroad about caffeine consumption and the side effects of over consumption on human health, there is paucity of studies in our country in general and north India in particular. It was in this context that the present study was planned to determine the prevalence and pattern of caffeine consumption among the medical students as well as side effects associated with it.

METHODS

Study design and setting

The present cross sectional study was carried out among the medical students in Government Medical College (GMC), Jammu.

Study population and study duration

Both male and female medical students from all the academic years were included in the study and data collection was done for a period of one month in the month of December 2023.

Sample size and sampling method

Using a convenient sampling method, an online questionnaire was shared with the students and a total of 329 respondents were finally enrolled.

Data collection

Data collection was done using a self-designed, pre tested questionnaire. All the information was collected using a Google form structured questionnaire in three parts- the first part elicited information about socio-demographic details, second part was about caffeine consumption habits and the type of caffeinated beverages they consumed commonly and the third part enquired about awareness of side effects of caffeine on different body systems.

Participants were briefly informed about the purpose of the study before sharing the online questionnaire with them. Before starting the actual data collection process, a small pilot study was conducted on 10 medical students to assess the feasibility of online form, time taken to fill the questionnaire and refining the questions. The feedback obtained from this pilot study was duly incorporated in the questionnaire before the final study was conducted and the results of pilot study were not part of the final analysis.

Statistical analysis

All the data was compiled, entered into excel sheet, tabulated and then analysed using Epi Info Version 3.01.

RESULTS

A total of 329 medical students participated in the study in which 49 students did not consume caffeinated beverages hence they were excluded from the study.

The remaining 282 medical students were included in the final analysis. Majority (61%) of the participants were female and 39% were males.

Table 1: Distribution of participants on the basis of type of caffeinated beverage consumed.

Type of caffeinated beverage	Total (n=282) N (%)	MBBS professional year							
		1st PROFF (n=66) N (%)		2nd PROFF (n=78) N (%)		3rd PROFF part 1 (n=77) N (%)		3rd PROFF part 2 (n=61) N (%)	
		Male	Female	Male	Female	Male	Female	Male	Female
Tea	207 (73)	26 (39)	22 (33)	23 (29)	39 (50)	17 (22)	35 (45)	18 (29)	27 (44)
Coffee	169 (60)	15 (22)	18 (27)	21 (26)	25 (32)	20 (25)	31 (40)	15 (24)	24 (35)
Carbonated beverages	76 (30)	15 (22)	7 (10)	12 (15)	10 (12)	9 (11)	11 (14)	7 (11)	5 (8)
Energy drinks	26 (7)	10 (15)	0 (0)	6 (7)	3 (3)	4 (5)	1 (1)	2 (3)	0 (0)
Total		66	47	62	77	50	78	42	56
χ^2		21		15.03		8.571		11.13	
P value		0.056		0.285		0.805		0.600	

*out of 329 participants, 47 were non consumers of caffeinated beverages and they were excluded from the study.

Table 2: Distribution of participants on the basis of days when they usually consume these caffeinated beverages.

Preferred days	Total (n=282) N (%)	Male (n=110) N (%)	Female (n=172) N (%)
Regular days	158 (56)	60 (54)	98 (56)
Sundays/holidays	62 (22)	34 (30)	28 (16)
Study holidays	22 (8)	15 (13)	17 (9)
Exam holidays	106 (38)	36 (32)	70 (40)
χ^2	18.030		
P value	0.115		

144 (51%) participants belonged to the first and second year MBBS while 138 (49%) belonged to the final academic years (part 1 and 2). Prevalence of caffeine intake among the medical students was found to be 86%. The most common (73%) caffeinated beverage consumed was tea followed by coffee (60%) while carbonated beverages and energy drinks were least consumed (30% and 7% respectively). It was seen that although the caffeine consumption was almost similar in both genders, its consumption was high during the senior years of medical school (Table 1).

It was found that about half of the medical students (56%) preferred to consume these beverages on regular days followed by exam holidays (38%). However, the frequency of consumption was least (8%) on study holidays (Table 2).

Most of the study participants preferred to consume these beverages in the morning and only few participants reported to consume these beverages at night (Figure 1).
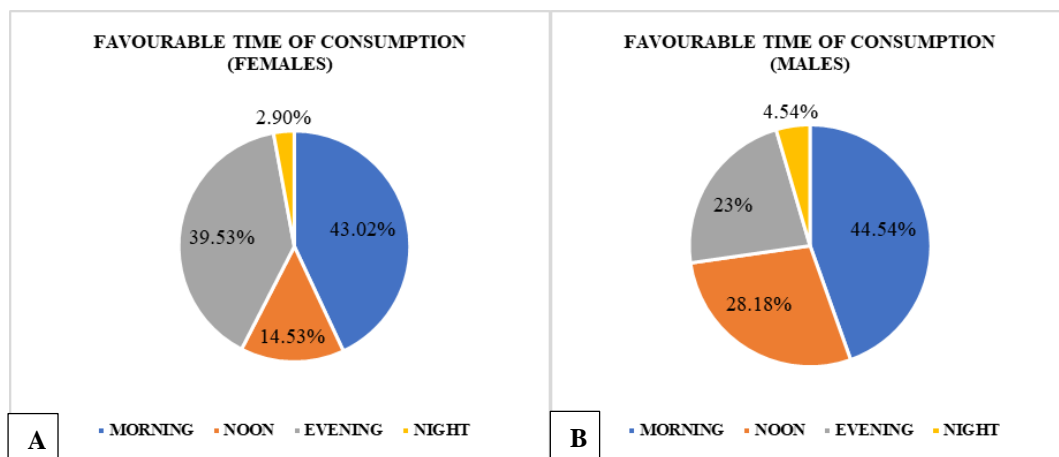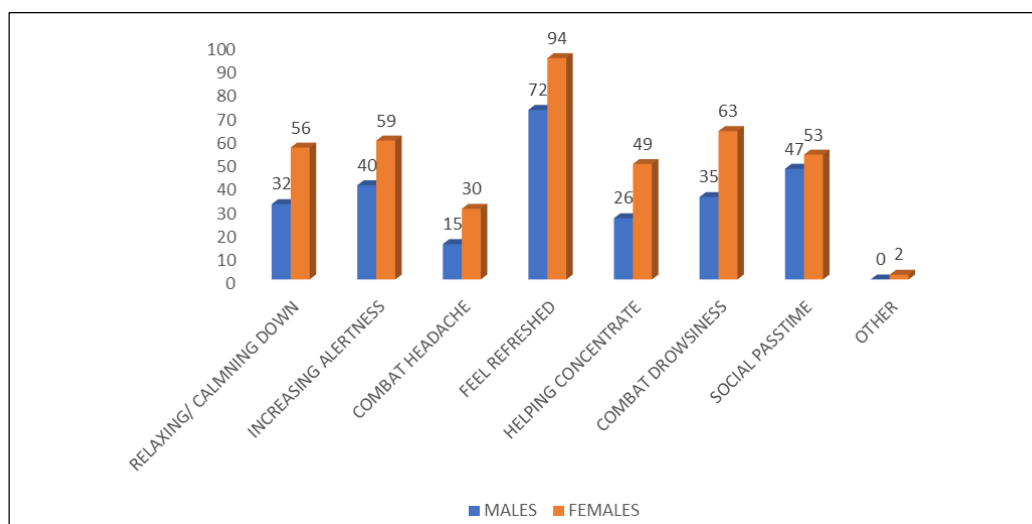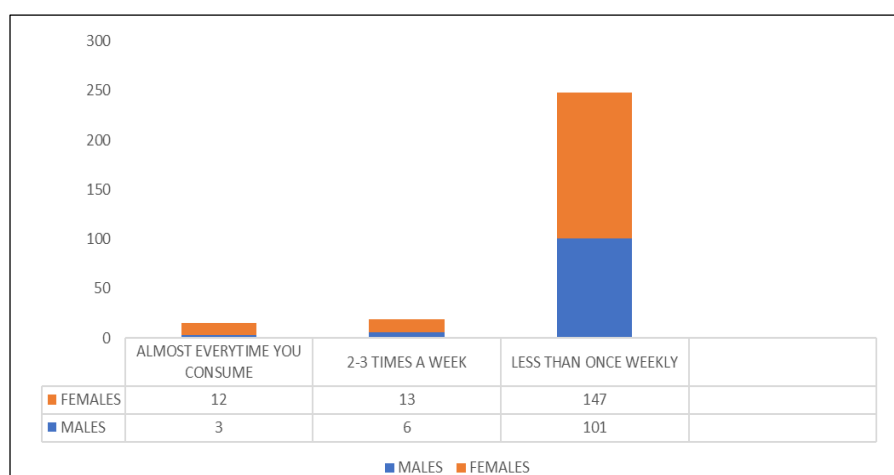

Figure 1: Distribution of participants on the basis of favourable time of consumption of caffeinated beverage.

Figure 2: Distribution of participants on the basis of reasons for consumption of caffeinated beverage.

Table 3: Distribution of participants on the basis of symptoms experienced after consumption of caffeinated beverages.

Side effect	Total (n=282) N (%)	Male (n=110) N (%)	Female (n=172) N (%)
Palpitations	52 (18)	15 (13)	37 (20)
Gastritis	116 (41)	50 (47)	66 (38)
Shortness of breath	16 (6)	5 (4)	11 (6)
Nervousness/ feeling jittery	35 (12)	14 (12)	21 (12)
Insomnia	84 (30)	31 (28)	53 (30)
Aggression	21 (7)	10 (9)	11 (6)
Nausea	28 (10)	13 (11)	15 (8)
Anxiety	52 (18)	23 (20)	29 (16)
χ^2	43.376		
P value	0.455		

Figure 3: Distribution of participants on the basis of frequency of side effects.

Among the reasons for consumption, most of the participants responded that they consumed these caffeinated beverages to feel refreshed and combat drowsiness. Other reasons reported from the students were to increase alertness, for social pastime, to relax and calm down as it helped them to concentrate better and helped them to combat headache (Figure 2).

As seen from Table 3, most common symptoms experienced by the study participants were found to be gastritis (41%), insomnia (30%), anxiety (18%) and palpitation (18%). Other symptoms reported by the study participants were nervousness/feeling jittery, nausea, shortness of breath and aggression. However, these symptoms mostly occurred once a week in majority of the study participants, as seen from Figure 3.

DISCUSSION

Neuroenhancement is a topic of interest both in the general public as well as research fraternity. For neuroenhancement, caffeine is among the most common substance used. It was found that no statistical significant association (p>0.05) was found between type of caffeinated beverage consumed and sex of the respondents.

These results are in consonance with the results of SA Amer et al, though the authors reported that caffeine use was slightly more prevalent among females.[4] The results revealed that 86% of the medical undergraduate students were caffeine consumers. The results of the present study are in agreement with those reported from United Arab Emirates.[5] A study conducted among medical students in Kingdom of Saudi Arabia (KSA), it was found that 97.5% were caffeine consumers.[6] In another study among health care providers in KSA, caffeine consumption was reported at 94.4%.[4] Rodwan et al, in a study among medical students in Jordan also reported that 98.4% respondents were consuming caffeinated beverages.[7] On analysis regarding intake of beverages, it was found that 68.9% of the respondents were tea consumers, 49.5% preferred coffee, 23.1% preferred carbonated beverages while 8.2% had used energy drinks. The results of the present study have revealed that majority of the medical students partake both tea and coffee as part of caffeinated beverages implying that it is uncommon to find medical students who drink only a single caffeinated beverage. These results are in accordance with those noted by Yousif Al-Turki et al.[6] In a study by Rajaseharan et al, most preferred caffeinated product was coffee (56.45%) followed by tea (25.80%).[8]

The results of the present study elucidated that only about 7% of the respondents used energy drinks which is similar to what Amer et al, reported.[4] Alateeq et al, reported only 5.1% intake of energy drinks while Reid et al, from Canada reported this rate at 15%.[9,10]

The results revealed that among majority of the respondents, the caffeine consumption occurred on a daily basis which is in consonance with the results reported by Amer.[4] Daily consumption among the majority of the respondents is likely to be due to its beneficial effects on physical, mental, emotional and spiritual wellbeing. Only one third of the respondents reported higher consumption during exam days which could probably be due to higher levels of perceived stress. In our research, most of the participants responded that they consumed these caffeinated beverages to feel refreshed and combat drowsiness. These findings are in agreement with findings of Edward S et al, who in his study reported that respondents used caffeine to combat drowsiness (59.4%) and to feel progressively caution (51.4%).[11] Literature review elucidates coping of stress and performance enhancement with caffeine consumption.[5,10,12,13]

The present work has reported that consumption of coffee causes following negative effects in descending order: gastritis (41%), insomnia (30%), anxiety (18%), palpitation (18%), nervousness (12%), nausea (10%) and aggression (7%). This constellation of symptoms is usually referred to as "caffeinism" and typically occurs with high daily intake. Similar results were reported by Amer et al and Alfawaz et al.[4,14]

This is the first of its kind study in Jammu region of UT of J&K. Authors recommend more such studies among medical students in other medical schools of Jammu division and UT of J and K as a whole and data thus generated would help the policy makers to formulate strategies to raise awareness about addiction and side effects of caffeinated beverages among college going students.

Limitations

The exclusive online nature of the presents study and inclusion of only one medical school restricts its generalizability. The small sample size and cross-sectional nature of the present study are other limitations. Also the authors have not analysed mean intake of caffeine per day.

CONCLUSION

The prevalence of consumption of caffeinated beverage was found to be 86% with tea being the first choice. Majority of the medical students were taking it on regular days with no major surge during examination days. Feeling refreshed and combating drowsiness were the two key drivers of caffeine intake while gastritis and insomnia were the main side effects found after consumption. It would be apt to conclude that more research is the need of hour on adverse effects of caffeine on health by using epidemiological, clinical as well as experimental studies.

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