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RESEARCH ARTICLE

Caffeine Consumption: Habits and Knowledge of Medical Students Al- Mustansiriyah University

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Abstract

Background: owing to the psychoactive nature of caffeine, medical students have a tendency to consume big amount of caffeine products in order to overwhelm the stress and tiredness, and to give them the alertness they need in their academic performance.

Objectives: to determine the rate, type, and reasons for caffeine consumption. As well as to assess the general knowledge of medical students about the benefits and side effects of caffeine.

Methodology: a cross sectional on line survey conducted by means of Google Form among students from the third, fourth, and fifth grades Mustansiriyah University, College of Medicine .The questionnaire was published on academic online groups for the period from first to 21st of May 2021, to outline the rate and reasons for caffeine consumption and general knowledge assessment.

Results: 356 students were enrolled in the study, the results showed that 305 (85.7%) of them stated they were caffeine consumers in any form, with predominance of female students (66%). Tea was the most consumed caffeine product (78.4%), followed by coffee (60.7%). Most of the students (69%) consume caffeine 1-2 times a day, while only (6%) consume it more than 4 times. The pivotal reason for caffeine consumption was to feel alert (50.5%).

Out of 70% of caffeine consumers stated that their consumption of caffeine products increased upon enrollment to medical school. Overall, general knowledge was inadequate. Better knowledge was reported for side effects and with drawl symptoms.

Conclusion: High proportions of medical students were found to be consuming caffeine mainly in form of tea. However, their use is still in the safe side. Most Students consume more caffeine during exams.

Keywords: Caffeine, Consumption, Habits, knowledge, medical students, AL- Mustansiriyah University.

1. Introduction

Caffeine (1,3,7-trimethylxanthine) is a natural alkaloid that stimulates the central nervous system[(1,2)]

Caffeine is the most widely consumed drug in human history and is used by more than 80% of the world's population.[(3)] The major source of the caffeine consumption are beverages like coffee, decaffeinated coffee, tea, carbonated soft drinks and energy drinks, while chocolate and other cocoa-containing foods contribute fewer amounts of caffeine to the diet, and medications.[(4,5)]

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There are several favorable effects of caffeine consumption, and one of it, is to remain active throughout exercise by delaying fatigue and increasing time to exhaustion with the intake of energy drinks.[6]

The studies documented a positive correlation between habitual caffeine consumption and performance on verbal memory, cognitive and reaction time tasks, and such effects be stronger with increasing age.[7] Furthermore,Caffeine frequently used to enhance alertness and improves performance on tasks that requisite sustain level of attention.[8]

Although, Caffeine is safe, however the benefits and health effects are dose dependent, it should not consumed at high dose, as consumption of caffeine products beyond the upper limit is accompanying with an increased risk of adverse effects on an individual's health.[9]

Caffeine consumption is widespread among students at medical schools; Students generally prefer caffeine to other commonly available psychoactive drugs. The very competitive nature of the medical field and the hard work may prerequisite an increase in the uptake of caffeine by medical students in order to be capable to work for additional hours, increases wakefulness and overall concentration. More over a higher proportion of students becoming more dependent on their daily intake of caffeine to fight stress as indicated in many studies. Furthermore, the upsurge in consumption of Caffeine beverages may also increase the financial demands of the medical students.[2,10-12]

The high consumption of caffeine among students is of utmost importance due to its serious health consequences. By determining, the reasons of its high consumption and trends will help in implementing measures to limit the use among students.[2]

The objectives of the study was to determine the rate, type, and reasons for caffeine consumption, and to evaluate knowledge of Caffeine consumption among medical students.

2. Subjects and Method

2.1 Study Setting

A cross section online survey was conducted among third, fourth and fifth grades students from AL-Mustansiriyah University, College of Medicine for the academic year 2020-2021 from the 1st to 21st of May 2021.

2.2 Study Tool and Data Collection

A Google -form structured questionnaire was utilized for data collection. Questionnaire designed for the study after reviewing the related studies dealing with the same issue.

The questionnaire form disseminated electronically over academic online groups according to their academic year. Brief introduction elucidated the objectives of the study and procedure of filling the questionnaire was attached to the questionnaire. Filling out and sub mission of the questionnaire by the students was considered as a statement of willingness to joined in the study.

The questionnaire consist of three sections

First section covers basic demographic characteristics of the study participants: grade and gender.

The second section-enclosed questions to explore the caffeine consumption habits such as consumption of caffeinated beverages, preference form of caffeine, number of times, and time of caffeine consumption and reasons for consumption of caffeine. In addition, the students were asked about the consumption of caffeine in relation to entry to college of medicine and exams. To end, each study participant was asked to define him or herself as caffeine addict or not from personal view.

The third section of the questionnaire comprised (16) statements intended to define students' knowledge about some of benefits, side effects and withdrawal symptoms of caffeine.

Ethical Approval

Ethical consent was obtaining from AL-Mustansiriyah University, College of Medicine. To ensure anonymity, the questionnaire form was without name, confidentiality of all data acquired from the study contributors were maintained.

2.3 Data Analysis

Microsoft excel was used for data entry and analysis. Data was presented in forms of frequencies and percentages in tables and figures.

3. Results

The total number of students enrolled in the study was 356. Their distribution according to grade and gender presented in table one&2. Female students were predominant, as (63.8%) of study group were females.

Table 1. *The distribution of study group according to grade (n=356).*

Grade	No.	%
Third stage	120	33.7
Forth stage	120	33.7
Fifth stage	116	32.6
Total	356	100

Table 2. *The distribution of study group according to gender*

Gender	No.	%
Male	129	36.2
Female	227	63.8
Total	356	100

Figure 1. illustrated that 305 (85.7%) of study participants were caffeine consumers.

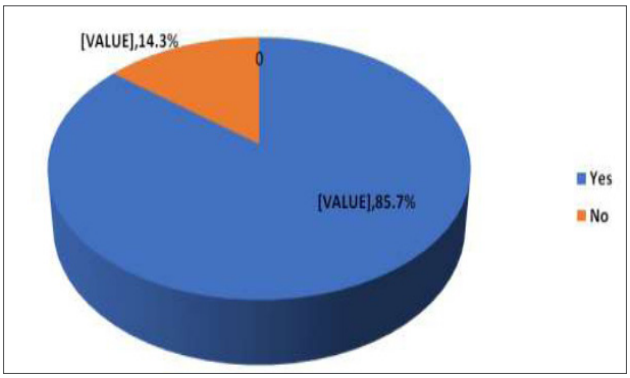

Figure 1. *The distribution of study group according to caffeine consumption*

Results in figure-2 display the reasons stated by 51 students who were not consume caffeine in any form. Do not like caffeine was the foremost reason specified by 30(59%) of them.

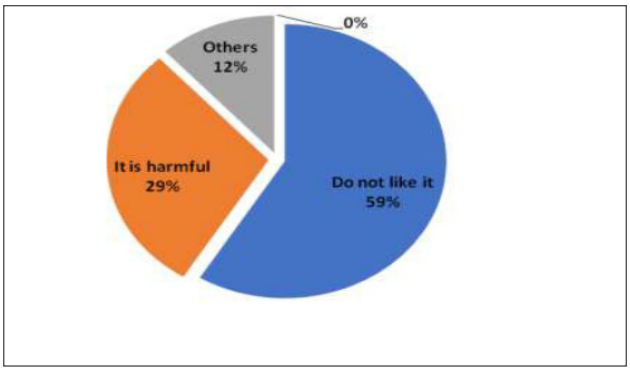

Figure 2. *The reasons for not consuming caffeine products.*

Figure-3 illuminates that 36% of caffeine consumers were from third grade, identical proportions (32%) of consumers reported among fourth and fifth grade students.

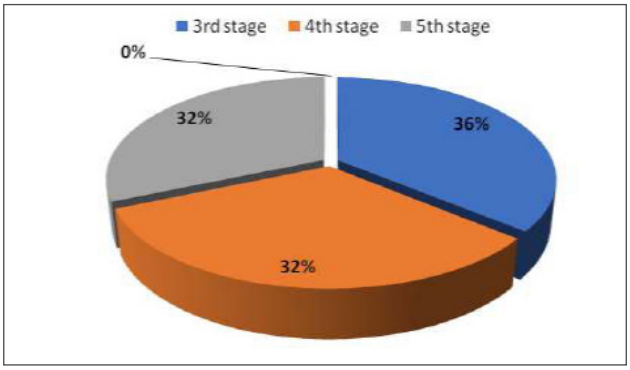

Figure 3. *The Distribution of caffeine consumers according to grade.*

When the gender was considered, the result revealed that two third of consumers (66%) were females. Figure-4.

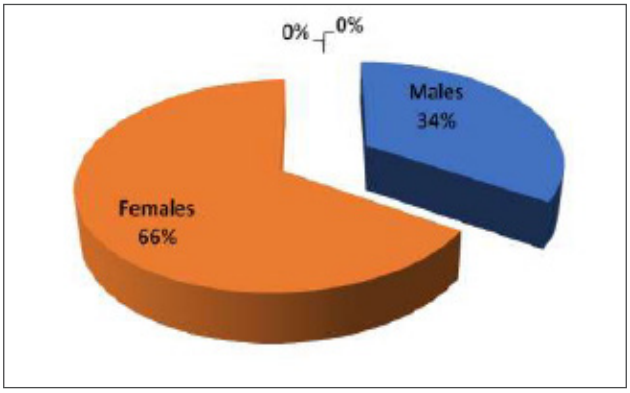

Figure 4. *The Distribution of caffeine consumers according to gender.*

Table-3 display the types of caffeine products consumed by students. Tea was the most common type of caffeine products consumed by students, as it is consumed by (78.4%) of them, followed by coffee (60.7%).

Table 3. *The caffeine products consumed by students (n=305)*

Caffeine Products	No.	%
Tea	239	78.4
Coffee	185	60.7
Soft drinks	132	43.3
Energy drinks	38	12.5
Coffee tablets	32	10.5

*Some students consume more than one type of caffeine products.

According to the results in table-4, tea and coffee were the most frequent caffeine products consumed by students from the three grades.

Table 4. *The caffeine products consumed by students according to grade*

Grade	Caffeine products	No.	%
Third stage	Tea	78	70.9
	Coffee	68	61.8
	Soft drinks	49	44.5
	Energy drinks	15	13.6
	Coffee tablets	6	5.5
Fourth stage	Tea	89	89.9
	Coffee	62	62.6
	Soft drinks	47	47.5
	Energy drinks	14	14.1
	Coffee tablets	10	10.1
Fifth stage	Tea	72	75
	Coffee	55	57.3
	Soft drinks	36	37.5
	Energy drinks	9	9.4
	Coffee tablets	13	13.5

The result in table-5 indicates that higher proportions (96.1%) of males' students consume caffeine in form of tea, in comparison to 66.1% of females. Only 5% of female students consumed caffeine in form of energy drinks.

Table 5. *The types of caffeine products consumed according to gender of students*

Caffeine products	Males		Females	
	No.	%	No.	%
Tea	100	96.1	139	66.1
Coffee	67	64.4	118	58.7
Soft drinks	59	56.7	73	36.3
Energy drinks	28	26.9	10	5
Coffee tablets	17	16.3	15	7.5

*some of students consume more than one type.

The results in figure-5 show that 222 (69%) of students consumes caffeine products 1-2 times per day, and only19 (6%) of them consume it more than four times a day.

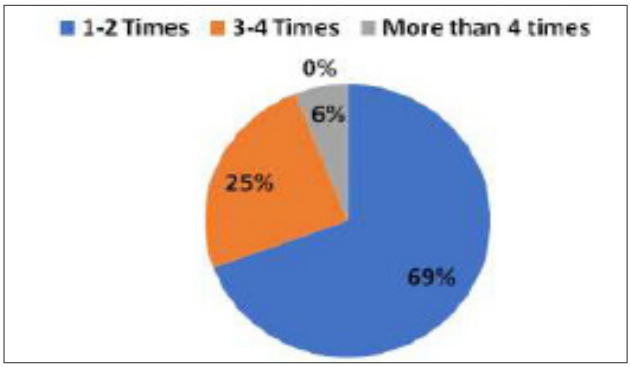

Figure 5. *The distribution of caffeine consumers according to number of times consumes caffeine products per day.*

The habit of caffeine consumption in relation to time of day and exam presents in figure-6. Out of 305 students enrolled in the study and drink caffeine beverages, 145 (43%) of them consume caffeine at morning, and 30(9%) of them drink caffeine products during exams only

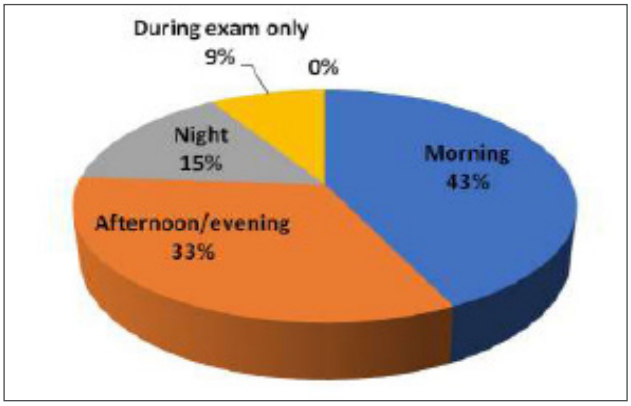

Figure 6. *The distribution of caffeine consumers according to time of caffeine consumption.*

When students were inquired about the habit of caffeine consumption and entry to college of medicine. The result in figure-7 revealed that 224(70%) of them stated that their caffeine intake was increased after college entry.

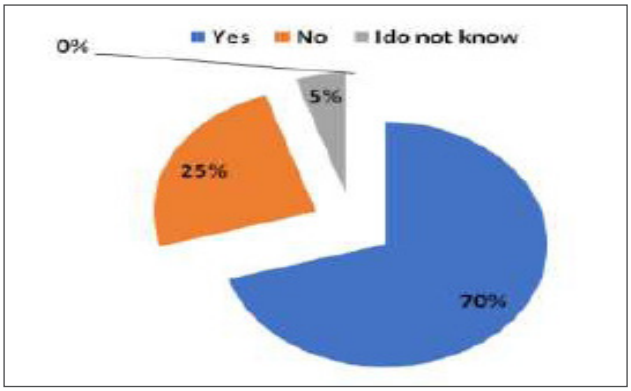

Figure 7. *The distribution of students according to habit of caffeine intake and entry to college of medicine.*

The reasons for caffeine consumption listed in table-6.To feel alert was the topmost reason mention by 50.5% of caffeine consumer students.

Table 6. *Reasons for caffeine consumptions listed by the students*

Reasons	No.	%
Don't fall asleep	113	37
Give energy boost	69	22.6
To feel alert	2154	50.5
When have headache	84	27.5
To control weight	17	5.6
Concentrate at study	90	29.5
taste and flavor	113	37
Gathering with friends	43	14.1

*Some of the students stated more than one reason.

Among 305 students who consume caffeine products, 213(67%) remarked that their caffeine consumption tend to increase during examination time, while 107(33%) of them did not increase their caffeine consumption during examination. Figure- 8.

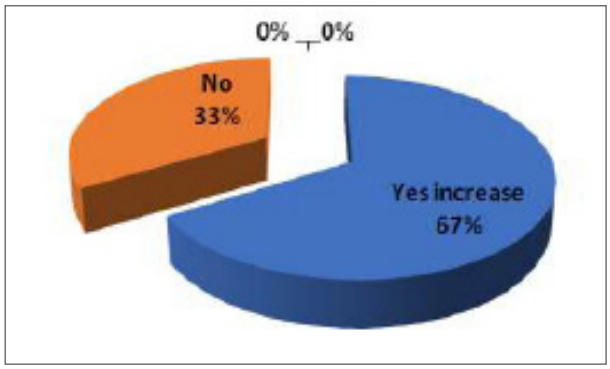

Figure 8. *The pattern of caffeine consumption in relation to examination*

Table -7 exhibits the reasons for increasing caffeine consumption during examination. Increase study time and improve concentration were the main reasons acknowledged by (45.6%) and (36.9%) of the students respectively.

Table 7. *Reasons for increasing caffeine consumption during examination*

Reasons	No.	%
To increase study time	99	45.6
To memorize text	18	8.3
Improve concentration time	80	36.9
Others	20	9.2

*Some students mention more than one reason.

Out of 305 caffeine users, only 86(28%) of them considered themselves as caffeine addict; Figure -9.

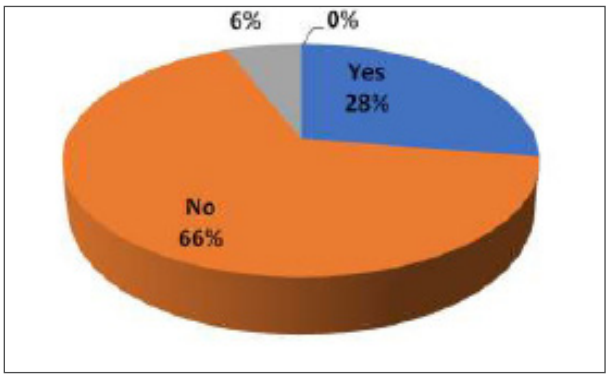

Figure 9. *The distribution of caffeine consumers according to their perception of being caffeine addict.*

Figure-10 exhibits that nearly three quarter of caffeine users (71%) stated that they could stay without caffeine for 24-72 hours.

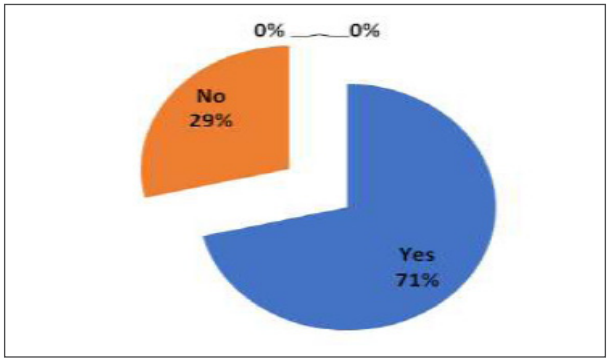

Figure 10. *The distribution of caffeine consumers according to their ability to go without caffeine for 24-72h*

Table-8 demonstrates the knowledge of the participated students about benefits, side effects and withdrawal symptoms of caffeine. Concerning the benefits of caffeine, the majority of the students enrolled in the study were correctly identified the role of caffeine in increase attention and 231(64.9%) of them properly recognized that caffeine is not substitute for sleep. It is noteworthy that only 21.3% of study participants had correct knowledge that caffeine prevent type 2 DM. When the side effects of caffeine was determined, only (51.4%) of students were accurately identified that caffeine increase respiratory rate. Furthermore (75%) and (58.4%) of the participants were able to recognize that headache and drowsiness among the withdrawal symptoms of caffeine.

Table 8. *knowledge responses of the study group*

Benefits	**Correct response**	
	No.	%
Increase attention	328	92.1
Substitute for sleep	231	64.9
Long term memory	106	29.8
Short term memory	183	51.1
Prevent Parkinson Disease	136	38.2
Slow metabolism	152	42.7
Prevent Alzheimer Disease	140	39.3
Prevent type 2 DM	76	21.3
Side effects	No.	%
Increase heart rate	326	91.6
Cause acne	112	31.5
Increase respiratory rate	183	51.4
Increase gastric secretion	196	55.1
Withdrawal symptoms	No.	%
Headache	267	75
Drowsiness	208	58.4
Difficulty in concentration	180	50.6

3. Discussion

There is increasing popularity for caffeinated beverages that consumed at all ages owed to their obtainability, popularity and stimulating effect. It is relished worldwide even by the young people.

The results obtained from the present study revealed that consumption of caffeinated beverages was a prevalent practice among the students from the three grades and by both genders. This finding is comparable to the findings of studies from Lebanon[13], Pakistan[14], and Jorden [15].

This could fall back to the fact that medical students lead added demanding academic life, they have to attend clinical sessions and lectures, and their curriculum requisite that they stay active all times and receptive so they resort to taking caffeine to provide themselves a boost[16].

The higher rate of consumers of caffeine products was recounted among third year students in comparisons with students from fourth and fifth grades.This finding was in keeping with result reached by previous study conducted in South Africa among medical students, which demonstrated that caffeine consumption was dominant among third year students; this could be ascribed to that, the syllabus and studying hours were more during third year in comparison with other two grades.[4]

The results of current study exhibited that tea was the most common caffeinated beverage consumed by the study group followed by coffee.These findings were in keeping with results reached by earlier studies from Malaysia[11] and Pakistan[17,18]were the top sources of caffeine intake by medical students were tea and coffee.

These findings can be explained by the fact that tea is part of daily habits and tradition of most of families in Iraq and other countries as it is part of their culture as well as owing to easy availability and inexpensiveness of tea in comparisons with other caffeine beverages.

Furthermore, it was rarely to find student consumed only one type of caffeine products. These findings was also identified by former studies conducted in Pakistan [16] and Saudi Arabia [19] .

Among 222 (69%) of caffeine users enrolled in present study were consumed caffeine products 1-2 times per day. This result coincided with what reported in studies conducted in Jordan [5] and Pakistan [16]. The current study demonstrated that145 (43%) of students habitually consumed caffeine drinks at morning. Such finding could clarified by the study result where tea was the main type of caffeine drink, which customarily drinks in morning as part of usual breakfast meal in our community.

Upon entering medical school, students faced a different environs and experience high academic stress. This assumption supported the results from the study which showed that 224(70 %) of the students stated that their caffeine consumption had increased since they entered college.

This finding was similar to the results of previous researches from UAE [10] and Pakistan [16] where the students said that their caffeine consumption has increased since they entered the college.

Medical student's academic life involve systematic tests, internal exam preparation, all the way through medical courses, the students are exposed to extreme pressure, mainly due to sleepless working hours. Medical students have to set forth extra effort beyond their mental threshold and physical stress to display progress in their assessments. The intake of caffeinated beverages is one of the coping strategies take up by medial students to deal with their academic stress[20].

In the current study, 50.5% and 37% of caffeine consumers respectively itemized to feel more alert and to not fall asleep during daytime as their leading reasons for caffeine consumption. Consistent with previous studies carried out in Malaysia [18] and Saudi Arabia [19], which reported that being more alert, was the most common reason for caffeine consumption.

This possibly because caffeine does have some beneficial CNS stimulatory properties, increasing the neurotransmission of mesopontine cholinergic neurons thus increasing alertness and reducing fatigue, and some students use it as sleep substitute. It should kept in mind, however, that its continuous use, if not properly monitored, could lead to probable dependence accompanied by unfavorable and even harmful withdrawal symptoms and side effects[21,22].

The results obtained from current study found that 67% of students have a tendency to increased caffeine consumption during examinations. In addition to that, the main reasons of such practice were to increase study time and improve concentration. Findings replicated in other studies, which reported that medical students said they consume more caffeine while studying for exam [15,19,23].

This link could be attributed to that Caffeine is well recognized to increase vigilance and improves performance on tasks that need continuous level of attention, as dense academic curriculum of medical school, necessitates long hours of studying and concentration. Although 305 students turned out to be caffeine consumers out of 356, only 86 (28%) considered themselves as caffeine addicts.

A comparable result reached by study from Pakistan[16] where (31.3%) of students perceived themselves as caffeine addicts.This finding could be due to the fact that medical students may have more awareness and understanding about caffeine and its effects and know that caffeine is not very addicting in comparison with other CNS stimulants .

The results obtained from the present study revealed that the majority of students enrolled in the study were able to identify correctly the role of caffeine to increase attention and about 64.9% of them properly

recognized that caffeine is not substitute for sleep. This might be due to that such information been deliberated in medical training. Moreover, it was found that students were unknowledgeable of the diseases (e.g. Parkinson's, Alzheimer's and type2 diabetes mellitus) that could probably be prevented by caffeine, and that caffeine consumption could improve long-term, but not short-term, memory. In over-all, the students had inadequate knowledge about the benefits of caffeine consumption.

On the other hand, the students had better knowledge concerning caffeine side effects and withdrawal symptoms. These results mightbeen influenced by the fact that the majority of the participants were caffeine consumers. They may perhaps have experienced the side effects and withdrawal symptoms themselves and as a result had better information about caffeine side effects and withdrawal symptoms. Comparable results were also documented by previous studies.[4,24]

4. Recommendation

Health awareness sessions and seminars, in addition to implement measures, for instance displaying posters in college or distribution of information leaflets are needed to encourage students to adopt healthy life style as well as to the correct student's misconception on the subject of caffeine consumption and to improve students' knowledge of caffeine to prevent its unwise use.

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