

Medical students perspective about adverse effects of caffeine consumption

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Objective: To determine the frequency of caffeine consumption and perspective of about adverse effects of caffeine consumption among undergraduate medical student of University of Karachi, Pakistan.

Methodology: This cross-sectional study was conducted at Dow University of Health Sciences for the period of six months from January to June 2016. A total of 400 medical students from first to final year were included in this study through systematic random sampling technique. Data regarding the socio demographic characteristics, caffeine consumption and medical student's perspective about adverse effects of caffeine were collected through self-administered semi-structured questionnaire, which was piloted on 5% of the sample size in a similar setting. Data were analyzed by SPSS version 21.

Results: Out of 400 students, 58.5% were

females and 41.5% males. Mean age was 20.831.57 years. About 94% study participants were consuming caffeine and 44% were consuming it twice daily while 14.5% were consuming it thrice or more daily. About 70% of the students had knowledge about the safety limits of caffeine and 66% reported that caffeine can harm their health and 56% reported to feel addicted to caffeine.

Conclusion: Caffeine consumption is alarmingly high among undergraduate medical students. They had adequate knowledge about the adverse effects of caffeine on their health. Health promotional program with primary focus on primordial prevention would be the best way to reduce the harm of caffeine. (Rawal Med J 201;43:156-160).

Keywords: Caffeine Consumption, medical students, adverse effects of caffeine, safety limits of caffeine

INTRODUCTION

Caffeine is the most popular substance, which is consumed by more than 80% of the world's population as a part of their daily diet.¹ Caffeine is contained in common beverages (coffee, tea, soft drinks, and energy drinks), products containing chocolate and also in several medications.² Since many decades, there is a long debate whether caffeine is good or bad for human health. A review of Health Canada 2012 reported that up to 400mg/day caffeine is an acceptable daily consumption for an average adult with minimum or no health risks.³ Excess caffeine consumption may lead to drowsiness, irritability, headache, indigestion, cardiovascular diseases, higher rates of miscarriages, urinary incontinence and allergies.^{4,5}

Studies has shown that caffeinated beverages consumption has become widespread among medical college students and is considered as energy

health risk behavior among students.^{6,7} A survey conducted in medical school of Saudi Arabia reported that more than 95% of the students consuming caffeine in one or other form and average intake was 8.3g/month and it increased with length of stay at university.⁸ Another study from an Iranian medical university reported that majority of the students consumed caffeine to overcome the sleep, as energy booster and due to craving after seeing their friends consuming caffeinated substances.⁹ A study from India reported that majority of the medical students consumed caffeine to overcome their academic stress and enhance their performance with its peak consumption during the examinations.¹⁰ A study from a Medical College of Islamabad, Pakistan reported that almost all the study participants were using caffeinated beverages to stay awake during exams and they had inadequate knowledge about benefits, harmful effects and withdrawal symptoms of caffeine.¹¹

Medical students as future physicians will have an influence on community's lifestyle and behavior towards their health and well-being. Their good understanding of caffeine and its detrimental side effects will be helpful for the extension of awareness within the community. This study was conducted to determine the frequency of caffeine consumption among medical students of large Public sector Medical University of Pakistan and to assess the perspective of medical students regarding adverse effects of caffeine consumption.

METHODOLOGY

This cross-sectional study was conducted on undergraduate medical students of Dow University of Health Sciences, Karachi, Pakistan for the period of six months from January to July 2016. The sample size of 400 was calculated through WHO calculator by using the proportion of 52% with 95% C.I, 5% margin of error and 10% non- response rate. Ethical approval was obtained from Institutional Review Board and Informed consent was obtained from all participants.

Eighty MBBS students from each academic year (first to final) were selected through systemic random sampling. Data were collected through self administered semi structured questionnaire consisting of socio demographic characteristics and their perspective about harmful effects of caffeine consumption after piloting it on 5% of sample size population. Data were analyzed using SPSS version 21.00.

RESULTS

Out of 400 medical students, 58.5% were females and 41.5% males. Mean age of the study participants was 20.83 \pm 1.57 years. About 94% medical students were consuming caffeine in different forms, 35.2% were consuming it once a day, 44% were consuming twice a day and 14.5% were consuming three times or more daily. The most common reason for caffeine intake among medical students was "Mood elevation" followed by "Exam preparation" and "Reducing fatigue". About 54.8% reported that they were dependent upon caffeine for academic load or stress, 23% reported that they "Always" consume

caffeine during exams. About 33% reported that 20-200 mg of caffeine intake in a day can be beneficial for mental alertness while 37% reported that daily dose of 200-400 mg of caffeine can be beneficial for mental alertness (Table 1).

Table 1. Caffeine consumption.

Variable	Number	Percent
Consume caffeine in any form		
Yes	376	94.0
No	24	6.0
How often do you consume caffeine per day		
once	141	35.2
twice	177	44.2
thrice or more	58	14.5
never	24	6.0
What is the purpose of consuming caffeine		
exam preparation	95	23.8
as a sleep aid	8	2.0
mood elevation	157	39.2
whenever stressed	30	7.5
reducing fatigue	93	23.2
non consumer	17	4.2
Do you depend upon caffeine for academic load or stress		
Yes	219	54.8
No	181	45.2
How much caffeine do you think beneficial for mental alertness		
a little (20-200mg)	132	33.0
moderate (200-400mg)	151	37.8
a lot (>400mg)	28	7.0
not at all	89	22.0
Do you prefer taking caffeine during exam		
always	95	23.8
often	116	29.0
rarely	113	28.2
never	76	19.0

Table 2. Students perspective on caffeine.

Variable	Number	Percent
Do you believe that caffeine can harm your health		
yes	267	66.8
no	133	33.2
Do you feel any addiction to caffeine products after consistent use		
Yes	226	56.5
No	174	43.5
Do you observe weight gain after continues use of caffeine		
Yes	120	30.0
No	280	70.0
Do you observe any palpitation or racing heart on using caffeine		
Yes	85	21.2
No	315	78.8
Do you experience stress/tiredness/anxiety after intake		
Yes	51	12.8
No	349	87.2
Do you observe that caffeine consumption causing agitation		
Yes	147	36.8
No	253	63.2
Will you be able to withdraw from caffeine intake		
Yes	221	55.2
No	179	44.8
Do you know any other psychoactive medication or beverage in addition to caffeine		
Yes	38	9.5
No	362	90.5
Do you observe awake drunkenness after high intake of caffeine		
yes	74	18.5
No	326	81.5
Which symptom you experience the most after not taking caffeine beverages/products		
palpitation	14	3.5
insomnia	46	11.5
headache, nervousness	120	30.0
skin reaction, hot flushes	7	1.8
GIT disturbance	6	1.5
Others	11	2.8
None	196	49.0

Regarding perspective of adverse effects of caffeine, 66.8% reported that caffeine can harm their health. About 56.5% reported "being addicted" to caffeine products after its consistent use, 30%

observed their "weight gain", 21.2% "felt palpitation", 36.8% observed "agitation" and 12.8% observed "stress/tiredness/tiredness" after consistent caffeine intake. Nearly 45% of the study participants believed that they will not be able to quit caffeine from their daily life. About 30% students experienced "headache and nervousness" while 49% did not observe any symptom after not consuming caffeine (Table 2).

DISCUSSION

We found that caffeine consumption was popular among medical students, half of them were consuming caffeine in moderate quantity. The most common reason for caffeine intake was to elevate their moods. Majority of the medical students believed that caffeine consumption may harm their health. In this study, the frequency of caffeine consumption was quite high. These results are similar to those reported from India¹² and Lebanon.¹³ However, another study from Middle East reported that prevalence of caffeine consumption among Dental students was slightly low in contrast to findings of our study.¹⁴

We found that the most common reported reason for caffeine consumption was to elevate their moods. Our results are in line with the findings of a Randomized controlled trial from USA, which reported that caffeinated groups had elevations in their mood and their scores were skewed towards relaxed and happy mood.¹⁵ Another study found that caffeine consumption had mood enhancing impact.¹⁶ A large study from USA observed that suicide risk decreased with increased dosage of caffeine.¹⁷ However, another study from Australia, which recruited young adults, anxiety symptoms were associated with caffeine intake among males.¹⁸ Safe limit for caffeine consumption is 300-400mg/day for adults, if this amount exceeds it cause harm to health.¹⁹ In this study, one-third of the students knew that moderate amount of caffeine can be beneficial for their mental health while some of them believed that caffeine is not at all beneficial for mental alertness, similar to a report from Netherland.²⁰ It is noteworthy that majority of the medical students knew the safety limit of caffeine or in other way they had better understanding of

caffeine consumption pros and cons.

We found that majority of the students believed that they were dependent upon caffeine due to their academic stress, similar to a study from University of Kentucky.²¹ Another study from South Africa which included medical students of all five years, reported increase in caffeine consumption during examinations to cope up with academic load and its use increased with every successive year of education.²² However, there is no established relationship between caffeine intake and academic performance has been proposed yet.¹

Caffeine intake is high among medical students but literature suggests that majority of the undergraduate students had adequate knowledge regarding the adverse effects of caffeine on their physical and mental health.^{23,24} Similar findings has been reported in this study where nearly two-third population believed, caffeine is hazardous for their health. Furthermore, we observed in this study that more than half of the students accepted their dependence to caffeinated products and claimed they were unable to quit caffeine from their daily consumption and headache/nervousness were the most common symptoms experienced as a withdrawal symptom. A study conducted in medical school of Thailand found high dependency rate of caffeinated beverages among undergraduate students, which was linked with several sociodemographic characteristics including family history of smoking and female gender.²⁵

Numerous studies has been conducted to evaluate the effect of caffeine on weight gain/obesity, however, studies from Germany²⁶ and Ghana²⁷ reported that consumption of caffeine helps in weight reduction and it is noteworthy that majority of the study participants in present study did not observe any weight gain/obesity after the consistent use of caffeine. Results of study from Netherlands which assessed the perspective of medical students about the benefits, side effects and withdrawal symptoms are consistent with our findings.²⁰ However, a cross sectional study from Western Maharashtra medical college negate our findings where mainstream believed that caffeinated beverages consumption especially the carbonated drinks cause weight gain.²⁸

There were several limitations to this study. Firstly, this is a single-centered study so results cannot be generalized over the entire population of medical background. Secondly, it was a cross sectional study so causality relationship cannot be established.

CONCLUSION

We found that caffeinated beverages consumption was alarmingly high among medical students. Medical students had better understanding of the average requirement of caffeine in a day. Given observed adverse effects of caffeine consumption among medical students and their keen knowledge about caffeine dependency warrants further evaluation and action. Steps should be taken to minimize the availability of caffeine to medical students at home as well as in their institutes. Parents should be educated about the potential harmful effects of caffeine so they halt their children from its consumption.

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