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Research Article

CAFFEIN: THE WONDER DRUG OR THE DEMON

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Abstract:*Objective: To study the consumption of caffeine in form of coffee and tea among medical students.**Study Design: Cross sectional study**PLACE AND DURATION OF STUDY: Present research paper was completed in period of five months from march 2015 to July 2015 at venue of Pak Red Crescent Medical and Dental College, Lahore.**Material and Method: Study was carried out on 100 students of various classes of Pak Red Crescent Medical and Dental College.**A specifically designed questionnaire was filled individually by students of PRCM AND DC.**Results: Total 100 students including 58% male and 42 % female took part in this survey among them 88% students were found as tea consumers while 12% were fond of taking coffee.**Conclusions: Our research concludes that major consumption of caffeine containing beverages among medical students are more common.***Keywords:** Coffee, Tea, Caffeine.**Corresponding author:****Dr. Shamsa Shafique,**

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INTRODUCTION:

Coffee and tea are considered as relaxants in stressful situations. As there is a huge burden of multiple subjects and practical work on medical students which make their routine hectic and stressful, they are more prone to take drinks containing caffeine (1). Caffeine is the key active ingredient of coffee, sodas and tea. It actually increases the dopamine levels in blood which blocks the adenosine receptor and keeps the mind alert. Caffeine also affects mood, enhances stamina, activates the cerebral vascular system and increases the gastric and colonic activity (2). There is a trend of high consumption of tea and coffee among medical students. Caffeine induced sleep disorder is a psychiatric disorder that results from overconsumption of the stimulant caffeine (6).

Caffeine elevates the stress hormones cortisol, epinephrine and norepinephrine. These hormones are responsible for increased heart rate (7), increased blood pressure (4&9) and a sense of emergency alert. Caffeine intoxication is rarely fatal. There is average 125-185 mg of caffeine per cup of coffee and 55mg per cup of tea. The lethal dose of caffeine is 5000-10.000 mg which can be obtained by consuming 50-60 cups of coffee at the same time. Like smoking, caffeine containing beverages also make a person addicted to them. Prolonged, uninterrupted, unexpected and unmanageable stress results in coping with the help of high intake of caffeine containing beverages.

A number of studies are being done to evaluate the effects of caffeine in athletes, pregnant women (3,5) and people having Parkinson diseases but there is no specific study available which directly explains the

intake of caffeine in doctors. As doctors are commonly one of highly caffeine consuming community. So, there was a need to observe the effects of consuming caffeine containing beverages in doctors. This study was designed to cover this knowledge gap through a survey held in Pak Red Crescent Medical and Dental College LHR.

MATERIAL AND METHODS:

A specifically designed questionnaire was filled individually by the students of PRCM&DC, Lahore. Amount of caffeine in coffee is more than tea; each 8 ounce of tea contains average 50 mg of caffeine whereas each 8 ounce serving of coffee contains 83 mg of caffeine. According to Medline Plus, 5 servings of 8-ounce tea and 3 servings of 8-ounce coffee contains average 270 mg of caffeine, which is considered as moderate caffeine consumption. The consumption of 3 servings of 8-ounce tea or 2 servings of 8-ounce coffee contains 160 mg of caffeine which is considered as mild caffeine consumption. The consumption of more than 8 servings of 8-ounce tea or more than 5 servings of 8-ounce coffee which contains average 420 mg of caffeine is considered as heavy caffeine consumption.

RESULT AND DISCUSSION:

In this survey only those students were included who consume caffeine either in form of coffee or tea. Total 100 students including 58% males and 42% females took part in this survey. Among them 88% students were found as tea consumers while 12% were fond of taking coffee. First 4 questions of the questioner were related to the prevalence of caffeine consumption among students of PRCM & DC. So the results were summarized collectively.

Table1. Prevalence of caffeine containing beverages (tea/coffee) among PRCM&DC

Caffeine consumption	No. of 8 ounce serving (tea/coffee)		Average amount of caffeine (mg)	Percentage of students
	Tea	coffee		
Mild consumers	3	2	150-170	22
Moderate consumers	5	3	250-270	60
Severe consumers	8	5	400-430	18

According to this study about 22% of PRCM&DC doctors were mild consumers of Caffeine, 60% were in moderate consumers and 18% fall in the category of severe intake.

Reasons of consuming caffeine containing beverages:

The trend of prevalence of caffeine containing beverages (coffee/tea) because of their taste among mild, moderate and heavy consumers of these beverages is given in table 2.

Caffeine consumption	Mild (%)	Moderate (%)	Severe (%)
	0	3.3	0
Rarely	18.2	6.7	0
Sometimes	45.5	38.3	27.8
Always	36.3	51.7	72.2

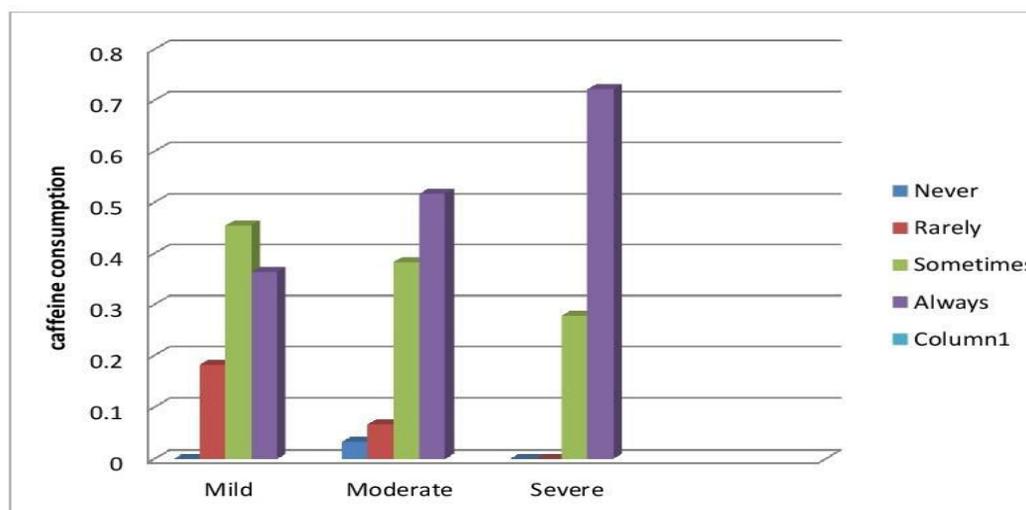


Figure 1. consumption of caffeine containing beverages (tea/coffee) because of their taste among mild, moderate and severe consumers

According to survey mild caffeine users only 45% take their beverage merely because they like the taste of the beverage. Among the moderate users 51% take their beverage because of its taste. Among the severe caffeine intake users 72% doctors always take the beverage because of its taste.

Some consumers of caffeine containing beverages consume them because of their habit. The trend is given in table 3.

Caffeine consumption	Mild consumers (%)	Moderate consumers (%)	Severe consumers (%)
Never	54.5	23.3	0
Rarely	18.2	26.7	0
Sometimes	18.2	20	33.3
Always	9.1	40	66.6

According to the survey 54% of the doctors who are mild in takers are not habitual to their beverage. Among the moderate users 40% of the doctors are always habitual to intake of their beverage. The severe caffeine users 67% are quite habitual to caffeine intake.

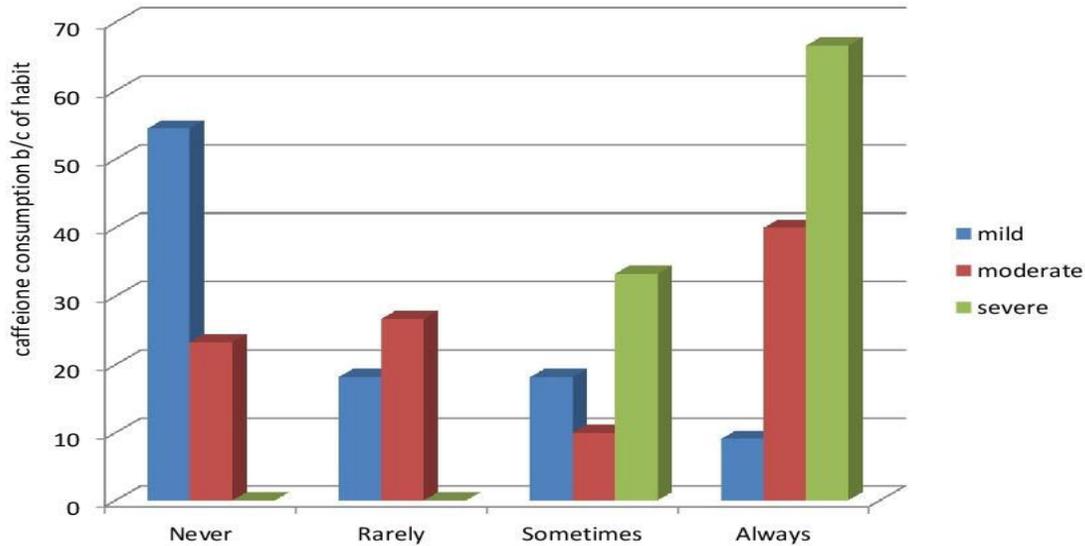


Figure 2. consumption of caffeine containing beverages because of habit among mild , moderate and severe consumers.

Students consume caffeine containing beverages to combat headache. The % age of students among mild, moderate and heavy consumers who use caffeine containing beverages is given in table 4.

Table4. Consumption of Caffeine Containing beverages (tea/coffee) among medical students to Combat headache

Caffeine consumption	Mild consumers(%)	Moderate consumers (%)	Severe consumers(%)
Never	27.2	11.7	0
Rarely	27.2	26.6	0
Sometimes	45.5	50	61.1
Always	0	11.7	38.9

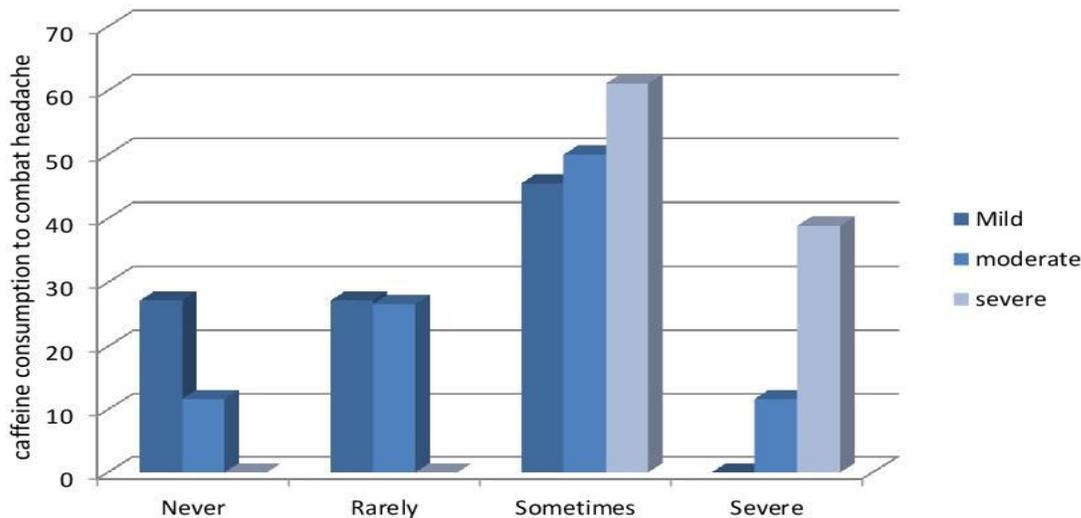


Figure3. Consumption of caffeine containing beverages because of their taste among mild, moderate and severe consumers to combat headache.

According to the survey 45% of the mild in takers take their beverage to combat their headache. Among the moderate users 50% of the doctors take in caffeine to combat their headache. The severe caffeine users 61% sometimes take in the beverage to combat headache.

Participants who consume caffeine containing beverages to stay alert ,among mild ,moderate and severe caffeine in takers is given in table 5.

Caffeine consumption	Mild consumers(%)	Moderate consumers(%)	Severe consumers(%)
Never	36.4	10	0
Rarely	27.2	23.3	0
Sometime	36.4	41.7	55.6
Always	0	25	44.4

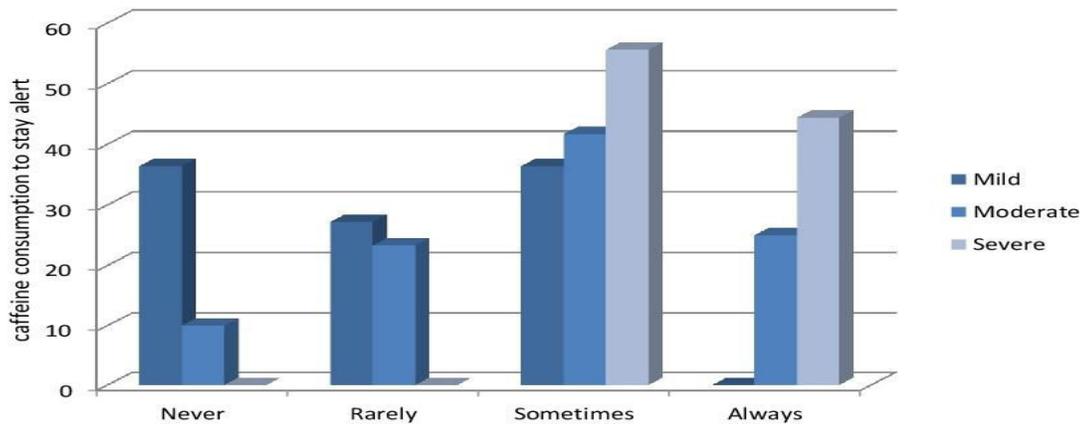


Figure4. consumption of caffeine containing beverages among mild moderate severe consumers to increase their alertness.

According to the survey 36% of the mild users take their beverage to stay alert. Among the moderate users 41% sometimes take it too maintain their alertness. The severe caffeine in takers 55% sometimes take in caffeine to stay alert.

Change in sleeping patterns associated with caffeine consumption:

Students who consume caffeine containing beverages before going to bed among mild ,moderate and severe consumers is given in table 6.

Response of participants	Mild consumers (%)	Moderate consumers (%)	Severe consumers (%)
Yes	27.2	16.7	44.4
No	72.8	83.3	55.6

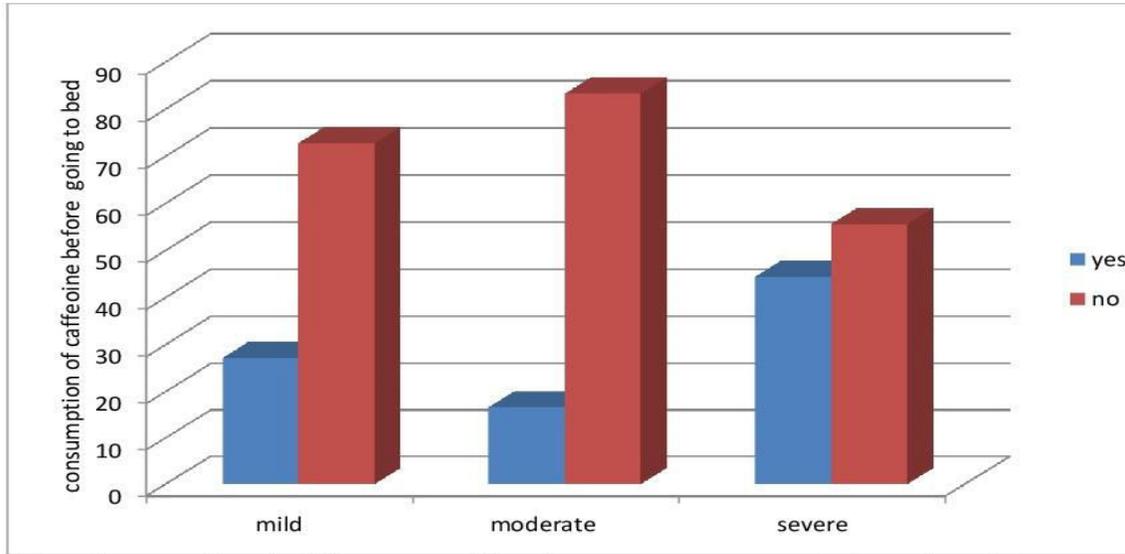


Figure5.consumption of caffeine among mild moderate severe consumers before going to bed

According to survey among the mild caffeine intakes only 27% take caffeine before going to bed. Among the moderate caffeine users only 17% take their beverage before going to bed else they have during the day time. Among the severe category only 44% take their beverage before off to bed.

Time required to fall asleep varies among the doctors who take bed tie beverages or not so the data collected is on basis of beverage taken or not at bed time.

Time to fall asleep	Mild consumers(%)	Moderate consumers (%)	Severe consumers (%)
<15min	16.7	10	0
15min-1hr	83.3	80	25
>1hr	0	10	75

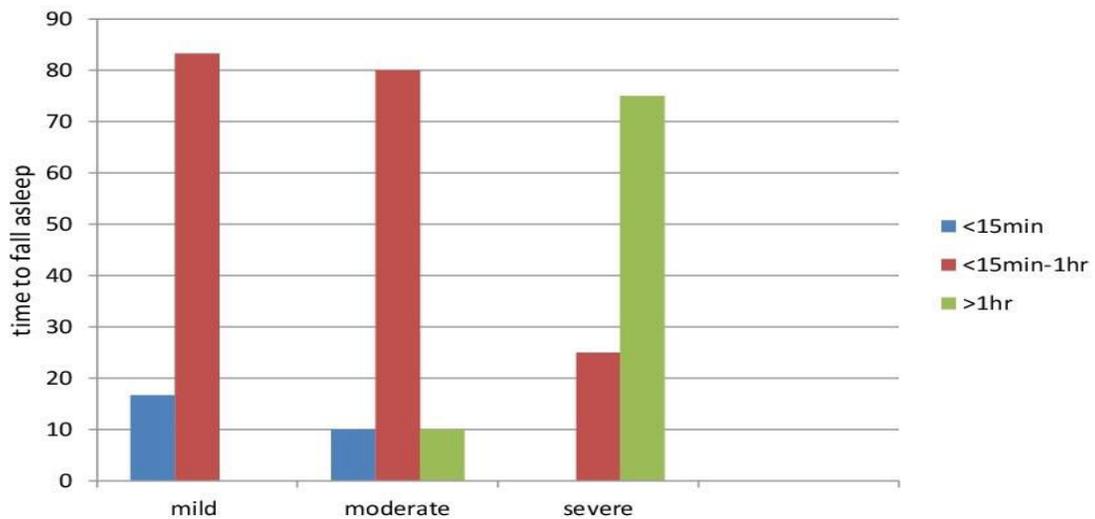


Figure 6.time require to fall asleep after consuming caffeine containing beverages among mild moderate and severe consumers.

Among the mild caffeine users 83% take 15mins to 1hr to fall asleep, the moderate in takers 80% take 15mins to 1hr to fall asleep and among the severe caffeine users 75% take more than an hour to fall asleep. The sleeping patterns differ without consuming caffeine containing beverages before going to bed. The distribution of participants among mild, moderate severe consumers who do not consumes these beverages is given in table 8.

Time to fall asleep	Mild consumers(%)	Moderate consumers(%)	Severe consumers(%)
<15mins	75	30	0
15min-1hr	25	50	80
>1hr	0	20	20

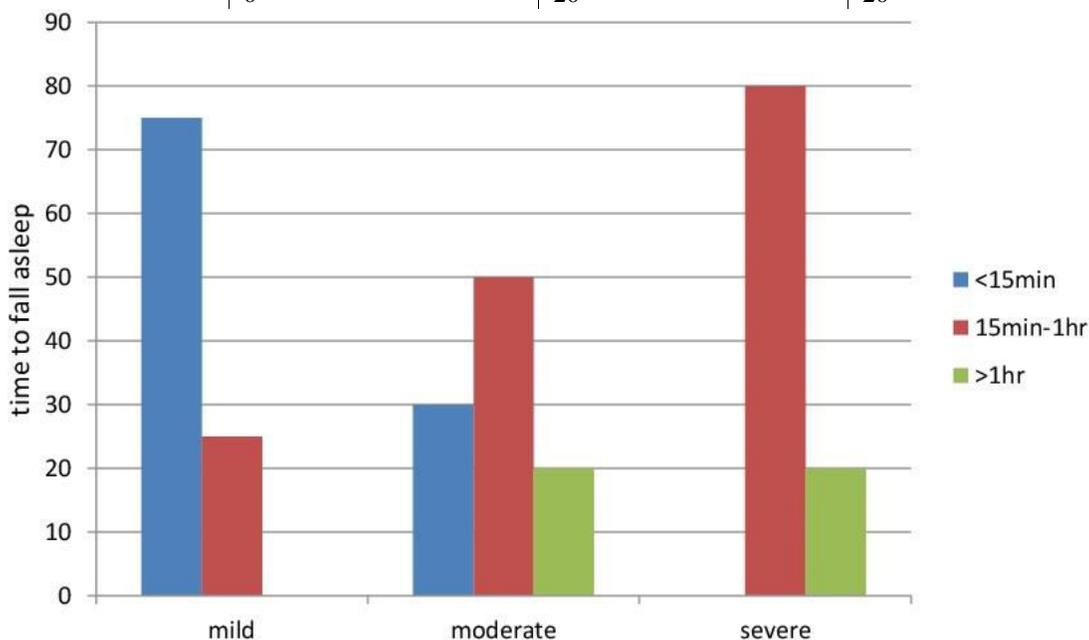


Figure7. time required to fall asleep without consuming coffee containing beverages among mild ,moderate and severe consumers.

Among the mild caffeine in takers 75% of the doctors fall asleep in less than 15 minutes among the moderate in takers 50% fall asleep in 15 mins to 1hr and among the severe caffeine in takers 80% fall asleep in more than 1 hr. Caffeine in the beverages effects the duration of sleeping period of mild moderate and severe consumers is given in table 9.

Average sleeping time(hr)	Mild consumers (%)	Moderate consumers(%)	Severe consumers (%)
4-6	16,7	40	75
6-8	83.3	60	25
8-10	0	0	0

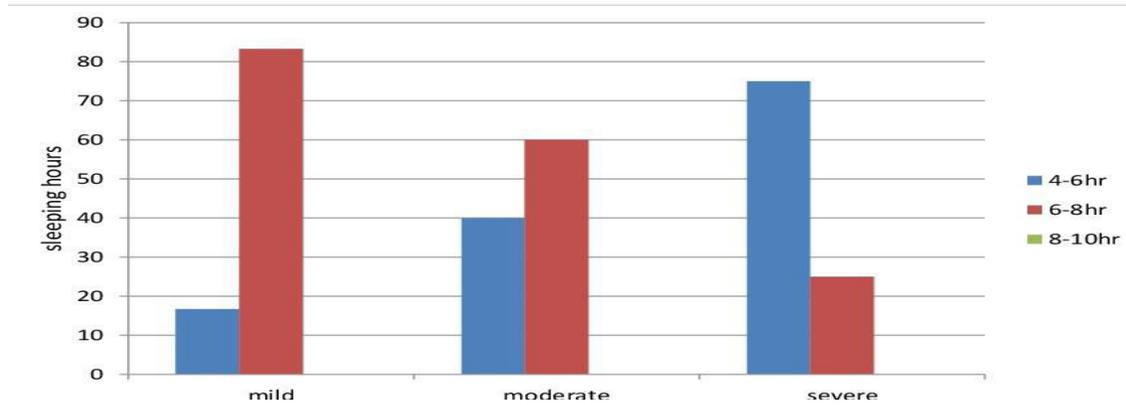


Figure 8.average sleeping hours of students who consumes mild moderate and severe dose of caffeine containing beverages before going to bed

Among those doctors who take beverage before going to bed and mild caffeine users 83% have 6-8 hourly sleep per day, among the moderate in takers 60%have 6-8 hourly sleep and among the severe caffeine in takers 75% have 4-6 hourly sleep.

The sleeping duration varies among participants who do not consume caffeine containing beverages before going to bed .The difference is given in table 10.

Table 10.average sleeping hours of students who do not take caffeine containing beverages before going to bed

Average sleeping time (hr)	Mild consumers(%)	Moderate consumers(%)	Severe consumers(%)
4-6	37.5	20	80
6-8	37.5	50	20
8-10	25	30	0

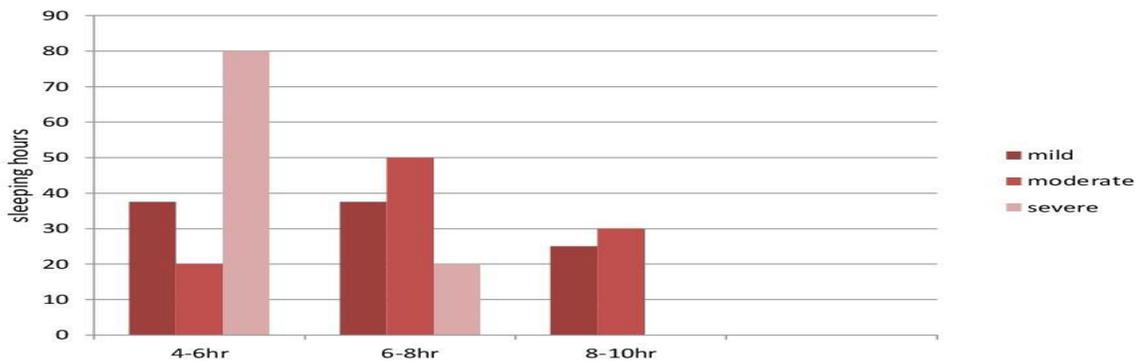


Figure 9.average sleeping hours of students who do not consume mild moderate and severe dose of caffeine containing beverages before going to bed .

Among the mild caffeine in takers 37% have 4-6hr sleep and 37% have 6-8hr sleep, among the moderate in takers 50% sleep about 6-8hrs daily and the severe category doctors have 4-6hr sleep pr day.

Symptoms associated with skipping caffeine containing beverages :

Medical students consume caffeine containing beverages because they experience headache after skipping them

The distribution of participants who experience headache among mild, moderate and severe consumers is given in table 11.

Table 11. Students experience headache after skipping their caffeine containing beverages.

Response of participants	Mild consumers(%)	Moderate consumers (%)	Severe consumers (%)
Yes	18.2	33.3	100
No	81.8	66.6	0

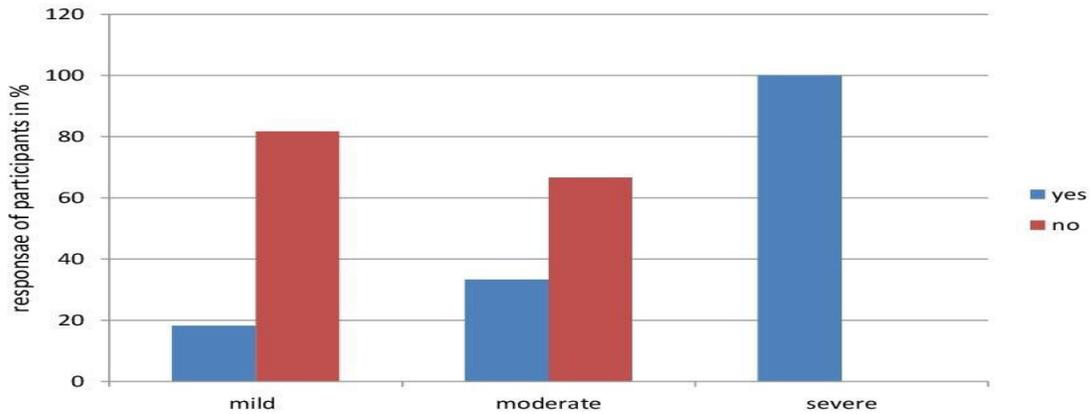


Figure 10. Response of participants who experience headache after skipping caffeine containing beverages among mild, moderate, and severe consumers.

According to the survey among mild caffeine users 81% does not have headache after skipping their beverage, among the moderate users 67% does not have headache after skipping their beverage and among the severe caffeine users 100% of the doctors experience headache on skipping their daily beverage.

Drowsiness

The distribution of participants, faced health disorders among mild, moderate, and severe users after skipping consumption of caffeine containing beverages is given in table 12.

Table 12. Students experience drowsiness after skipping their caffeine containing beverages.

Response of participants	Mild consumers(%)	Moderate consumers(%)	Severe consumers(%)
Yes	0	33.3	100
No	100	66.7	0

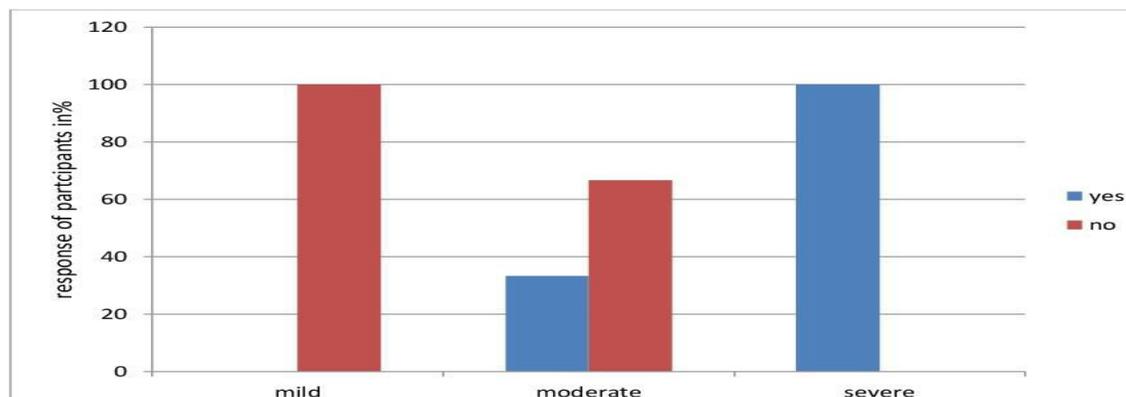


Figure 11. Response of participants who experience drowsiness after skipping caffeine containing beverages among mild, moderate, and severe consumers.

According to the survey mild caffeine users 100% of the doctors does not feel drowsy after skipping their daily beverage, among the moderate users only 66% of them feel drowsy after skipping their beverage rest are fine and 100% of the severe caffeine in taker doctors feel drowsiness after skipping their beverage.

Other agitated symptoms :

Table 13. students experience restlessness nervousness or anxiety after skipping their caffeine containing beverages.			
Response of participants	Mild consumers(%)	Moderate consumers (%)	Severe consumers(%)
Yes	0	16.7	100
No	100	83.3	0

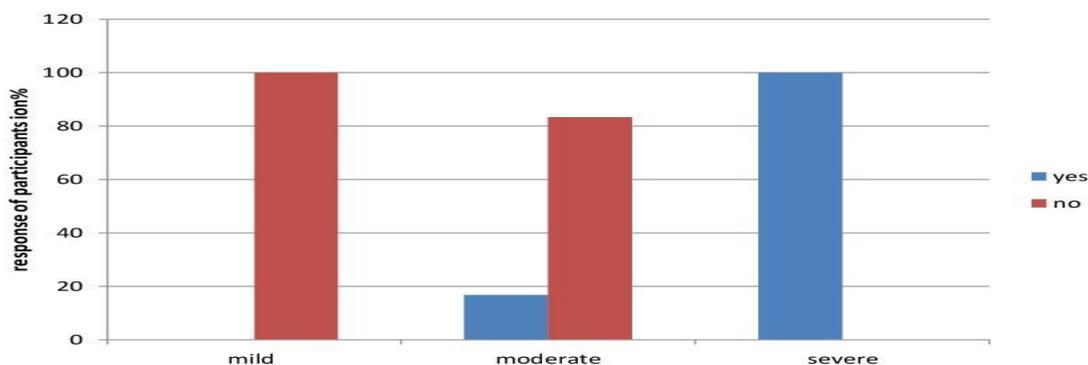


Figure 12. Response of participants who experience agitated symptoms after skipping caffeine containing beverages . Among the mild category doctors 100% does not have any symptoms of agitation, among the moderate category doctors 83% feel the agitated symptoms after skipping their beverage and among the severe category doctors 100% feel agitated after skipping their daily beverage.

Caffeine addiction :

Caffeine consumption makes a person addicted to it ,it is difficult to quit the habit of caffeine consumption. The participants among mild moderate and severe consumers ,who were successful to quit caffeine consumption in form of beverages is given in table 14.

Table 14 students who tried to quit the consumption of caffeine containing beverages.			
Response of participants	Mild consumers (%)	Moderate consumers(%)	Severe consumers(%)
Yes	63.6	10	88.9
No	38.4	90	11.1

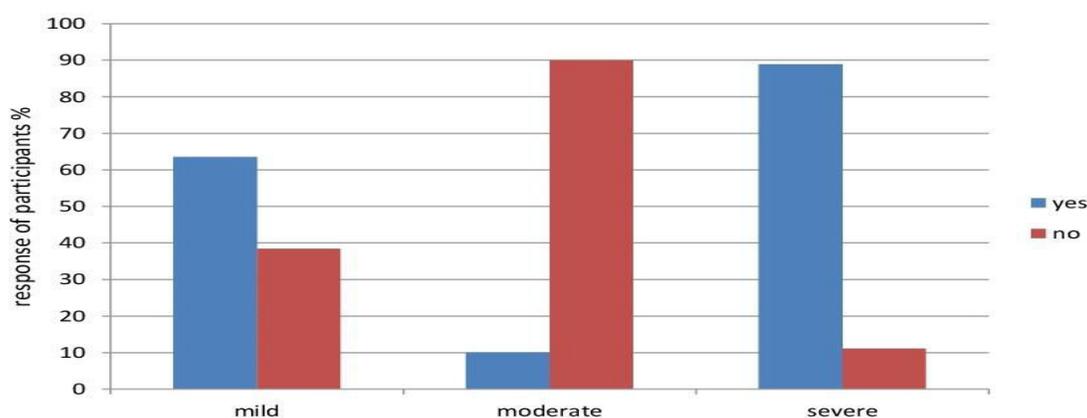


Figure 13. Response of participants who tried to quit the consumption of caffeine containing beverages.

According to the survey among the mild caffeine takers 63% have tried to quit their daily beverage usage, among moderate users 90% have never tried to quit their beverage intake and rest have tried and among severe 89% have tried to quit their beverage intake.

Response of participants	Mild consumers(%)	Moderate consumers(%)	Severe consumers(%)
Yes	85.7	66.7	18.7
No	14.3	33.3	81.3

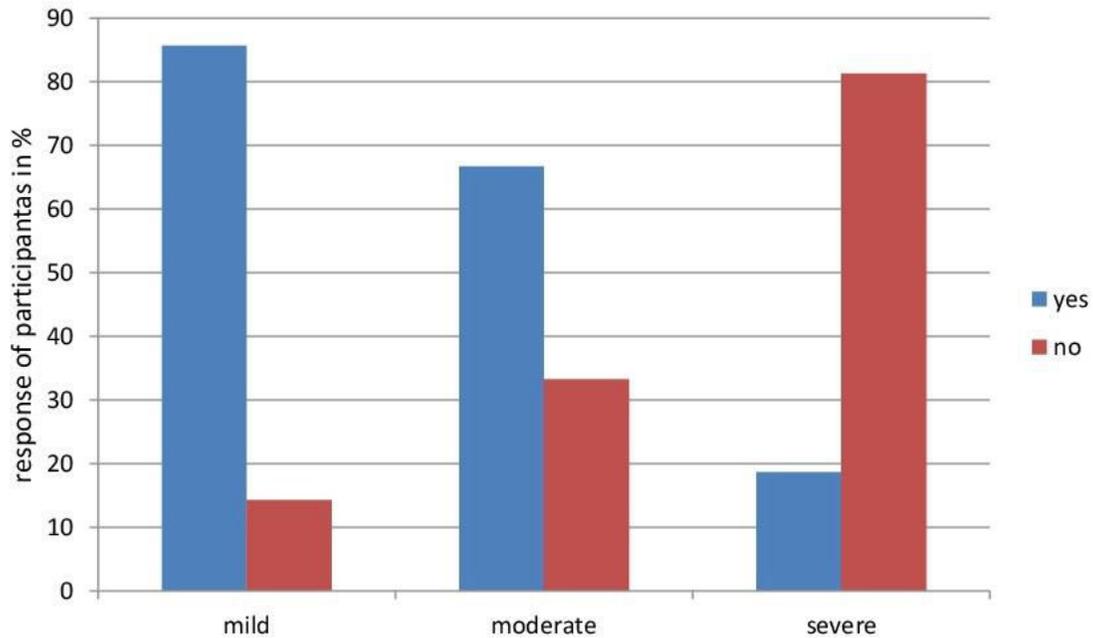


Figure 14. Response of participants who were successful in quitting caffeine containing beverages.

Among those who fall in the mild category and have tried to quit their beverage, 85% were successful in quitting their beverages, and the rest were not. Among the moderate category, 66.7% were successful in doing so, and among severe users, 81% of them were successful in quitting their beverages.

Response of participants	Mild consumers (%)	Moderate consumers (%)	Severe consumers (%)
Yes	0	16.70	88.90
No	100	83.3	11.10

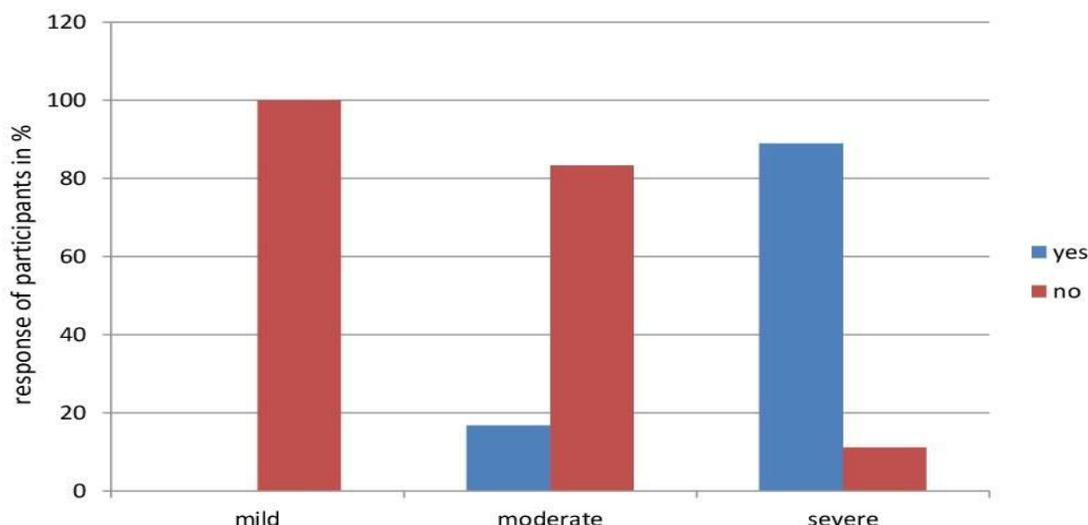


Figure 15. Response of participants who addicted to consume caffeine containing beverages.

According to the doctors participated in the survey and fall in the mild category 100% of them do not call themselves a caffeine addict, those who lie in the moderate category 83% do not while 16% call themselves a caffeine addict and among the severe caffeine in takers 88.9% call themselves a caffeine addict.

Among the moderate category doctors who tried to quit caffeine intake 66.7% were successful ,while 18.7% of the heavy in takers succeeded.

DISCUSSION:

Tea and coffee are two widely consumed beverages in Pakistan .Almost 67% of adults like to start their day with a cup of tea and 16% prefer to take coffee in morning .Most people are habitual to take caffeine containing beverages because they feel alert and energetic after consuming them. Actually caffeine is that key ingredient which rises the dopamine levels in brain which eventually makes a person happier and relaxes. It also blocks the adenosine receptors which stops the person from getting drowsy .Caffeine temporarily increases once ability to learn and also increases the comprehension , memory, reflexes and clarity of thoughts. It works on the same part of the brain as cocaine , amphetamines and heroin but it has relatively very milder effect than other drugs. A study has shown that the 5mg/kg body weight of caffeine improves endurance by reducing glucose burning and increasing fat burning during heavy exercise in athletes.

The international Olympic committee has banned the consumption of caffeine because it enhances the stamina and ability of players and they start taking caffeine as drug.

It is estimated that 12,000 tons of caffeine is consumed annually. About 54% of users take caffeine via a coffee, 43% through tea and rest of 3% consumed caffeine in form of other foods and cola's.

In our study, 58% males and 42% females were found as daily caffeine consumers. Now a days decaffeinated drinks are also introduced in market which contain 2.5% of the product as caffeine.

Our study was based on different aspects related to caffeine consumption in medical students .It is common observation that people related to medical field are more vulnerable to consume caffeine containing beverages on daily basis. According to our study, 88% doctors of different ages prefer to take tea and 12% prefer to take coffee as a source of caffeine and almost all 100 students were found as caffeine consumers .They were further catergorized in mild, moderate and severe consumers on basis on data collected .Out of these 100 students 22% students were found as mild in takers of caffeine, 60% as moderate users and 18% were found as heavy .On the basis of parameters define in the questionnaire actually majority of medical students uses caffeine containing beverages to release their tension related to their hectic routine ,difficult exam and long practicals . They neither take these beverages only to satisfy their taste buds nor as drug.

About half of the mild and moderate and 2/3 of severe consumers take caffeine containing beverages because they like their taste. In case of being habitual of these beverages, half of the mild, 40% moderate and 67% severe caffeine consumers found habitual.

Beside that almost half of the mild, moderate and severe consumers of coffee or tea also suffered headache. The consumption of caffeine is directly related to the level of alertness. The heavy consumers of caffeine needs heavy dose to stay alert. Caffeine completely absorbed in body after 30 mins of intake and its effects stays for almost 3 hours. Medical students usually have a habit to stay awaken late night for study and they take coffee or tea in these hectic hours caffeine containing beverages consumption few hours before sleeping may affect the sleeping pattern of the students. Studies shows that the high and regular uses of these beverages cause sleep deprivation .Almost 80% of medical students belong to any caffeine consuming category took almost 1hr to fall asleep after laying on bed. Actually the stimulant effect of caffeine is thought to keep once brain over active does it prevents sleep .Alternatively the diuretic properties of caffeine containing beverages prevent sleep because of frequent peeing.

The sleeping time was also associated with the intake of caffeine containing beverages, large %age of mild moderate consumers of caffeine have average sleep of 7hr while 2/3 of doctors consuming heavy amounts of caffeine have average sleep of 5 hr.

Caffeine intake makes it consumers habitual to it. There are a lot of drawbacks associated with caffeine consumption .High doses of caffeine can cause blurred vision ,dryness of mouth, dizziness, anxiety, confusion flushing, cold sweats ,fast heartbeat , hyperglycemia, respiratory disorder ,muscle tremor, diarrheal and frequent urination etc. The continous consumption of caffeine makes the body use to it .First the stimulatory effects of caffeine are substantially reduced, a phenomenon known as tolerance .Secondly because of this adaption the person become more sensitive reduction in caffeine intake will effectively increase the normal physiological effect of adenosine resulting in unwelcoming withdrawal symptoms in tolerance users. So, when heavy consumers of caffeine try to quit it they face a lot of health problems.

The most common health problems after withdrawal of caffeine are headache tiredness, depression, irritability, decrease energy and insomnia .Caffeine causes physical dependence & it withdrawals begin within 12-24 hrs & lasts for 2-9 days.

The symptoms of mild consumers were mild ,in moderate were moderate and in high consumers were severe. According to our study 100% of heavy caffeine consumers faced headache & drowsiness

when they skip their caffeine intake. All of them also felt agitated when they tried to skip their caffeine containing beverages .So it seems relatively very easy for mild caffeine consumers to quit if they want, rather than moderate and heavy users .85% of mild consumers of caffeine were found themselves successful when they tried to quit caffeine consumption, while on other hand 81%of heavy consumers of caffeine were found themselves unsuccessful wherever they tried to quit their caffeine containing beverages.

CONCLUSION:

Caffeine is one of the major ingredient of tea & coffee which are commonly consumed beverages among medical students .The prevalence of caffeine consumption was studied on 100 students of PRCMDC. More than half were found as moderate consumers of caffeine. Medical students were found habitual of taking caffeine containing beverages because of their taste and freshness. They consumed these beverages because they felt energetic and alter after taking them .The high amount of caffeine containing beverages consumption effect the sleeping pattern of students .The withdrawal symptoms were also found associated with the dose of caffeine containing beverages. The consumers of high doses were faced more headache, drowsiness and agitation while withdrawing them than the mild consumers.

Whereas the continous use of caffeine containing beverages made almost 89% of heavy doses consumers addicted. The results of this survey shows the prevalence of caffeine containing beverages among medical students and its effects on their health and sleeping patterns.

RECOMMENDATIONS;

- Although the community of doctors is well aware of the ill- effects of caffeine, the caffeine addicts DONOT put their willpower to test and quit caffeine..It's not impossible to quit the caffeine habit and it should be promoted..
- DRINK LOTS OF WATER, LOTS AND LOTS OF WATER. Get yourself a replacement drink, it could be water, juice, decaf - just something to get when the urge for a cup sneaks in.
- Herbal Tea can also be used a good alternative to Caffeine containing beverages.
- Doctors should avoid drinking Caffeine beverage at least 4hrs prior to sleeping, and get adequate sleep of 6-8 hrs.
- For doctors an alternate to caffeinated drinks is relaxation activities such as Meditation, Exercise.

- Doctors should have provisions for De-Caffeinated beverages, which will improve their working capacity along with a healthy life style.

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