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Attitude and Perception towards Coffee Consumption Effects: Insights from College Students in Mumbai

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Abstract

Coffee is one of the most consumed beverages in the world. It is highly consumed among many parts of India. Various studies concentrate on the effects of consuming coffee and consumer's behavior in purchasing products related to coffee. Less studies focus on their effect among college students. Therefore, the aim of this study was to determine the coffee consumption habits and the perception of its effect among college students in Mumbai. The study was performed using convenient sampling method with a sample size of 234 students studying in different colleges from Mumbai. This study collected information about the characteristics of the students participated, coffee intake habits and the perception of its effect on consuming coffee. The majority of those students consume coffee. Using factor analysis, the major factors affecting the consumption of coffee on daily basis was identified. The consumption of coffee was more during their important academic activities such as project work or examination days. Due to the burden of exams and obtain best score in exams, students consume coffee to increase their study hours and academic performance.

Keywords: Coffee, perception, examination, factor analysis, Mumbai

INTRODUCTION

Coffee is one of the most popular drinks consumed in the world. It is considered that coffee serves as the major tool in the delivery of caffeine followed by tea and many energy drinks (Schubert *et al.*, 2017). Caffeine consumption by college students has drastically increasing day by day and of which majority of students prefer drinking coffee than tea. Coffee is one of the major source of caffeine. It is a type of psychoactive substance that comes from the pharmacological class of methyxanthines (Ramli *et al.*, 2019).

In 2017–2018, it was reported that the global production of coffee beans has reached to the peak and achieved around USD 200 billion yearly. The highest consumption was reported in Europe of approximately 10 kg of coffee per year per person (Czarniecka-Skubina *et al.*, 2021). According to Statista Research, coffee consumption in India amounted to 1.21 million bags (@60 kg) during the financial year of 2022. India ranked seventh in export volumes worldwide and third in Asia after Vietnam and Indonesia. Many studies reveals that coffee market is widely expanding among Asian countries (Ramli *et al.*, 2019). It is mentioned that in Malaysia drinking coffee has become a part of their culture and

now many Western countries like United States started following the same culture (Ramli *et al.*, 2019).

Previous study (Cano-Marquina *et al.*, 2013) concentrated on the effect of coffee consumption to consumers health and the presence of caffeine in the coffee (Geleijnse, 2008). Biologically, coffee also shows significant effect on cellular level (Czarniecka-Skubina *et al.*, 2021). The consumption of coffee has been found to increase dramatically among adolescents and young adults. Their perception towards coffee may lead to addiction which may cause several negative effects on their health. It is tremendously proved that excessive consumption of coffee may have negative long term effects on their health and if people consumes five cups or more on a daily basis may show significant negative effect on their health (Czarniecka-Skubina *et al.*, 2021).

Nowadays, among young adults, consuming coffee is considered as the judgement of their social status. Hanging out with friends usually ends up in consuming coffee. Because of which, many coffee shops are expanding their outlets in various parts of the country. Previous study (Sousa *et al.*, 2016) confirms that a cup of coffee naturally give pleasure and relaxing sensation to the consumers after consumption. Consumers find themselves different after consuming coffee or any other caffeinated products. Previous study (Sousa *et al.*, 2016) says that the consumers consume coffee with certain foods such as bakery products. Additionally, it has even reported that consumption of caffeinated beverages or coffee plays a vital role in appetite control (Schubert *et al.*, 2017). It was also observed that coffee consumed in between 3–4.5 hours before a meal had minimal influence on food, while caffeine consumed 0.5–4 hours before a meal may cause acute energy intake (Schubert *et al.*, 2017).

Although various studies on coffee intake were published but still there is lack of research related to the consumption of coffee by college students. The coffee consumption habits and the perception of its effects among college students differ from person to person. Nowadays, young students prefer to consume coffee to get them out of stress and give relaxation to their mind and body. Drinking coffee is a part of their lifestyle. Their party, their enjoyment always starts and ends with a coffee. Their debate with friends, long lasting projects and many more things are interrelated with coffee. They themselves unconscious that coffee has became a part of their life. The excessive consumption of coffee may cause long term side effects. The habit and their perception towards consumption of coffee was studied in this research. The available resources related to this research were limited and referred to the topic in different perspective. This study fills this research gap.

The largest coffee shops chains such as Bombay Coffee House, Kcroasters, Starbucks Coffee, Cafe Coffee Day, are increasing their number of outlets all over Mumbai. Irrespective of the rates of coffee, students prefer to consume coffee to great extent. Therefore, this study aimed to determine Mumbai college student's habit towards the consumption of coffee and their perception towards the effects on coffee intake. The second aim was to understand the reason behind not consuming coffee on daily basis. This study classifies the respondents as coffee drinkers who have consumed coffee at least once in the previous 12 months (Loftfield *et al.*, 2016) otherwise they are considered as non-coffee drinkers. The daily coffee drinkers are defined as those who considered consuming coffee once per day in the previous 12 months. The objectives of

the study were to understand the characteristics of the respondents; to assess the relation between consumption of coffee with respect to characteristics of the respondents; to monitor the coffee intake habit among respondents; to extract the factors based on their perception towards intake of coffee; to identify the association between coffee intake habits and their perception; and to know the reason behind not consuming coffee on daily basis.

MATERIALS AND METHODS

In order to understand the perception of student's studying at Mumbai towards coffee consumption. A convenience sampling method was used to get the opinions from the students. The questionnaire consists of three parts where part A consisted of student's personal details like gender, age (in complete years), economic status, highest qualification, and the area they reside where economic status are categorized using Kuppuswamy scale (Kumar *et al.*, 2022). In this study the economic status of those who belongs to upper class is considered as affluent, upper middle class as above average, lower middle class as average, upper lower class as below average and lower class as poor. Part B aimed to collect data based on their habits and preference in consuming coffee. Part C totally aimed to understand their attitude and perception towards consuming coffee on daily basis. This part C focused on getting answers from students based on five point Likert scale indicating the highest agreement as "strongly agree" and lowest agreement as "strongly disagree".

The questionnaire was assessed by determining its reliability. The Cronbach's alpha was used to understand the validity of the questionnaire. The inclusion criteria of students were decided based on students age group in between 16 to 30 years who agreed to fill the online questionnaire. The exclusion criterion was students whose highest qualification is above postgraduate degree.

The questionnaire was validated based on the concept of reliability. It was estimated on pilot test that participants can finish up the online survey in 5 to 10 minutes. A link to the questionnaire using Microsoft forms was sent to various students studying in different colleges in Mumbai. The information collected from students were kept confidential. The data collected through Microsoft forms were exported to Microsoft Excel. As much as 251 samples were collected and then outliers were removed and the respondents belonging to exclusion criteria were also removed. After data cleaning, 234 samples were collected, this is further used for analysis.

The cleaned data were exported to Statistical package for social sciences (SPSS, version 23, IBM Corp, Armonk, NY, USA) for data analysis. Some part of data was also analyzed using Microsoft Excel 2007. The validity test of questionnaire was based on Cronbach's alpha as presented in Table 1 where the index was 0.834 which was considered as valid questionnaire since the value of Cronbach's alpha was greater than 0.5.

The categorical data were analyzed using frequency distribution and Graphical representation. The associations were obtained using Chi-square test of association, if the properties of Chi-square test fail then will proceed

Table 1. Cronbach's Alpha for the set of questionnaire

Cronbach's Alpha	Cronbach's Alpha based on Standardized Items	N of Items
0.834*	0.831	40

Note: * = valid Questionnaire (Cronbach's Alpha > 0.5).

to use Continuity Correction for 2 x 2 tables or Fisher's Exact test for m x n table and the quantitative data are analyzed using mean ± standard deviation. To determine the factors to understand the perception towards effects on consuming coffee, Factor analysis is used to determine the factor which explains the maximum variation towards the perceptions. The Scree plot was used to get an idea about the most important factors.

The research was concentrated on 95% level of confidence, and its significance level of 5% (p value < 0.05) to interpret the result to reject the hypothesis if p value < 0.05.

RESULTS AND DISCUSSION

Characteristics of Students

The characteristics of the students participated were presented in Table 2. The study involved mainly respondents from junior college and degree colleges, living in different area with different economic status. The students were mainly in the age group 16–30 years old, who belongs to Mumbai. It was clearly seen that the majority were coffee drinker (84.2%) as compared with non coffee drinker (15.8%). The respondents were females (56.0%) and males (42.3%) and some preferred not to say (1.7%). The maximum number of respondents belongs to age group 16–20 years old (59.0%) and belongs to bachelor degree (35.0%) or Grade 12 (34.6%). The highest group of respondents belonged to average economic status (65%) residing in urban area (91.9%).

It was also seen that the moderately enough coffee drinkers belongs to female category (55.8%) than male category (42.2%) as shown in Table 2a. The majority of coffee drinkers also belonged to age group 16–20 (59.4%). The coffee drinkers were either from Grade 12 (36.0%) and Graduate students (35.5%). The economic status of majority of coffee drinkers were average (64.5%) and residing in urban area (92.4%).

Table 2. Characteristics of the students participated

	Group	Number of respondents	Percentage of respondents(%)
Drinking styles	Coffee drinker	197	84.2
	Non coffee drinker	37	15.8
Total	-	234	100.0
Gender	Female	131	56.0
	Male	99	42.3
	Prefer not to say	4	1.7
Total	-	234	100.0
Age	16 – 20 years old	138	59.0
	21 – 25 years old	89	38.0
	26 – 30 years old	7	3.0
Total	-	234	100.0
Education	Grade 11	14	6.0
	Grade 12	81	34.6
	Diploma or Certificate course	3	1.3
	Bachelor degree	82	35.0
	Postgraduate degree	54	23.1
Total	-	234	100.0
Economic Status	Poor	7	3.0
	Below average	10	4.3
	Average	152	65.0
	Above average	56	23.9
	Affluent	9	3.8
Total	-	234	100.0
Area	Rural	19	8.1
	Urban	215	91.9
Total	-	234	100.0

Table 2a. Percentagewise distribution of coffee drinkers with respect to gender

Are you a Coffee drinker?		Gender			Total
		Female	Male	Prefer not to say	
Yes	Count	110	83	4	197
	Percentage (%)	55.8	42.2	2.0	100.0
No	Count	21	16	0	37
	Percentage (%)	56.8	43.2	0.0	100.0
Total	Count	131	99	4	234
	Percentage (%)	56.0	42.3	1.7	100.0

Furthermore, this study focused on the student's residential area to evaluate whether this parameter affect the consumption of coffee. The Fisher's exact test states that there was no association between consumption of coffee with respect to the area of the respondents reside (p value = 0.330). It was also observed that the consumption of coffee had insignificant association with respect to gender (p = 1.000), education (p = 0.068), economic status (p = 0.780) and age group (p = 0.261). Furthermore, it is also observed that there is significant association between the consumption of coffee with respect to age group (p = 0.04).

Coffee Intake Habits

The majority of the respondents consume coffee and aware of the presence of caffeine in coffee (97.5%). The Figure 1 showed that majority of the respondents (83.2%) drink 2 cups or less coffee per day followed by 12.7% of respondents drink 3–4 cups of coffee per day. A smaller percentage (4.0%) of respondents consumed more than five cups of coffee per day. It was also observed that, in the age group of 16–20 years majority of the respondents (82.1%) consumed two cups or less coffee followed by the age group 26–30 years (80.0%). It was also studied that maximum consumption of coffee (86.7%) was among rural area with two cups or less per day. The frequency of consuming two cups or less coffee was higher for females (84.5%) than males (81.9%). However, there was no significant association on frequency of consuming coffee with respect to characteristics of the respondents like gender (p = 0.409), education (p = 0.953), economic status (p = 0.488), age group (p = 0.964) and economic status (p = 0.488).

The habits of consuming coffee were categorized based on consuming morning time, lunch time, with dinner, during examination days, stressed out, get together with friends and relatives. The respondents were asked to answer the questions based on scaling as never, rarely, often, and always. The respondent's habits of consuming coffee are presented in Table 3.

The students (38.4%) consumed more amount of coffee during examination week and also majority of respondents (43.6%) consumed coffee when visited at friends or family place. The majority of the respondents (86.8%) said that they never consume coffee during dinner and at bedtime (75.1%). The consumption of coffee was also very less during morning break (9.6%).

Perception of Coffee Effects

The perception of the effect on consuming coffee was asked from respondents based on five point Likert scale indicating the highest agreement as "strongly agree" and lowest agreement as "strongly disagree" and the factors were evaluated based on exploratory factor analysis. It was based on two criteria suggested

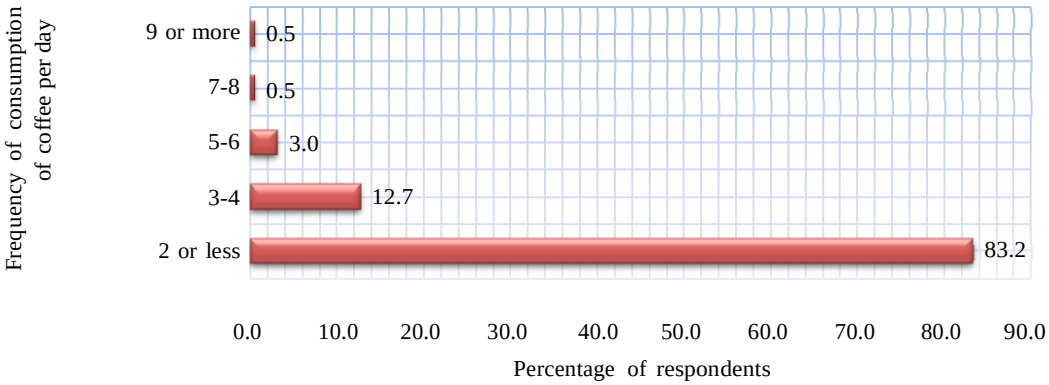

Figure 1. Frequency of consumption of coffee by respondents

Table 3. Percentage distribution of coffee intake habits among respondents

Coffee intake habits	Frequency & percentage distribution of respondents				
	Group	Never	Rarely	Often	Always
Consuming after waking upin the morning.	Frequency	59	62	35	41
	Percentage (%)	29.9	31.5	17.8	20.8
Consuming with breakfast.	Frequency	58	44	43	52
	Percentage (%)	29.4	22.3	21.8	26.4
Consuming during Morning break.	Frequency	98	52	28	19
	Percentage (%)	49.7	26.4	14.2	9.6
Consuming during Afternoon break.	Frequency	82	57	31	27
	Percentage (%)	41.6	28.9	15.7	13.7
Consuming during dinner.	Frequency	171	18	5	3
	Percentage (%)	86.8	9.1	2.5	1.5
Consuming during bed time.	Frequency	148	36	11	2
	Percentage (%)	75.1	18.3	5.6	1.0
Consuming during Examination week.	Frequency	40	52	56	49
	Percentage (%)	20.3	26.4	38.4	24.9
Consuming when visited at friends or family place.	Frequency	23	86	49	39
	Percentage (%)	11.7	43.6	24.9	19.8
Consuming while stressed out.	Frequency	64	55	40	38
	Percentage (%)	32.5	27.9	20.3	19.3

by Costello & Osborne (2019) (i) they should have salient factor loadings (>0.40) and (ii) small cross loadings (an item loads at less than 0.32 on other factors).

MacCallum *et al*. (1999) had demonstrated that when communalities after extraction are above 0.5 then a sample size between 100 and 200 can be adequate. We have a sample of size 197 coffee drinkers with all communalities above 0.5, and so the sample size is really adequate. However, the Kaiser-Meyer-Olkin (KMO) test measure of sampling adequacy was 0.878 which was above Kaiser's recommendation (Kaiser, 1974) of 0.5. This value was also termed as meritorious (Hutcheson, 1999). It was suggested that the sample size was adequate to yield distinct and reliable factors.

The Bartlett's test was performed to test whether the correlation matrix was sufficiently different from an identity matrix. In this case it is significant, χ^2 (153) = 1592.254 ($p < 0.001$) indicating that the correlations within the R – matrix are sufficiently different zero to warrant factor analysis. In order to extract factors assessing the perception of effects

on consuming coffee, exploratory factor analysis was used. Table 4 indicates the exploratory factor analysis to understand the perception of the effects on consuming coffee.

It was observed that Kaiser criterion (Kaiser, 1974) of extracting factors with eigenvalues greater than one was reliable when there are less than 30 variables and even after extracting it should be greater than 0.7 and sample size somewhere above 250. For this study, the sample size was 197 coffee drinkers, there were 18 variables, and the mean communality was 0.666, so extracting five factors was really not fruitful. Figure 2 presents Scree plot which was another way of extracting factors and it showed clear twist at one and five factors and so using the Scree Plot that one major factor could be extracted.

The Scree plot showed inflexion at one factor, hence the major factor that can be extracted was related to academics where respondents feel like consuming coffee increases their reading power, self – confidence, recalling power, academic performance, helps in overnight study, improves group work activity, increases study hours, increases IQ, boost up their energy, makes feel important, to stay awake and for relaxation.

Perception with Coffee Intake Habits

The factor analysis extracted factors related to academics. Several respondents consume coffee during their examination week as their perception is that it will increase study hours and good for academics. Table 5 reveals the association between their perception and coffee intake habits.

It was observed that during examination those who always consume coffee agreed that it boost up their energy (59.2%). Along with that (57.1%), it was also agreed that consuming coffee relaxes them and as the heredity follows during examination week, it often helps them to stay awake (55.4%). This study predicts that there was significant association between their coffee intake habits with respect to their perception. There was strong kind of relation between them.

Reasons Not Consuming Coffee Daily

It was observed from the sample of size 234, 197 (84.2%) were coffee drinkers and 37 (15.8%) of respondents were non coffee drinkers. Even though there was lesser number of people who turned up negatively

Table 4. Exploratory factor analysis

Perception	Academics	Sleep	Choice	Disease	Relax
Coffee consumption increases reading power	0.820				
Coffee consumption increases self-confidence	0.803				
Coffee consumption increases recalling power	0.791				
Coffee consumption increases academic performance	0.779				
Coffee consumption helps in overnight study	0.765				
Consumption of coffee improves group work activity	0.736				
Consumption of coffee increases study hours	0.732				
Coffee consumption increases IQ	0.711				
Consuming coffee boost up energy	0.707				
Coffee helps to stay awake	0.692	0.447			
Consuming coffee gives relaxation	0.597				0.418
Consuming coffee makes feel important	0.544				
Difficulty in fall asleep if consumed during day time		0.581	0.474		
Consuming coffee increases risk of heart diseases		0.534		0.423	
Consume coffee for the sake of friends			0.703		
Prefer other de-caffeinated drinks to caffeinated drinks		0.413	0.613		
Consuming coffee for the taste				0.719	
Preferred local brands				0.621	0.480

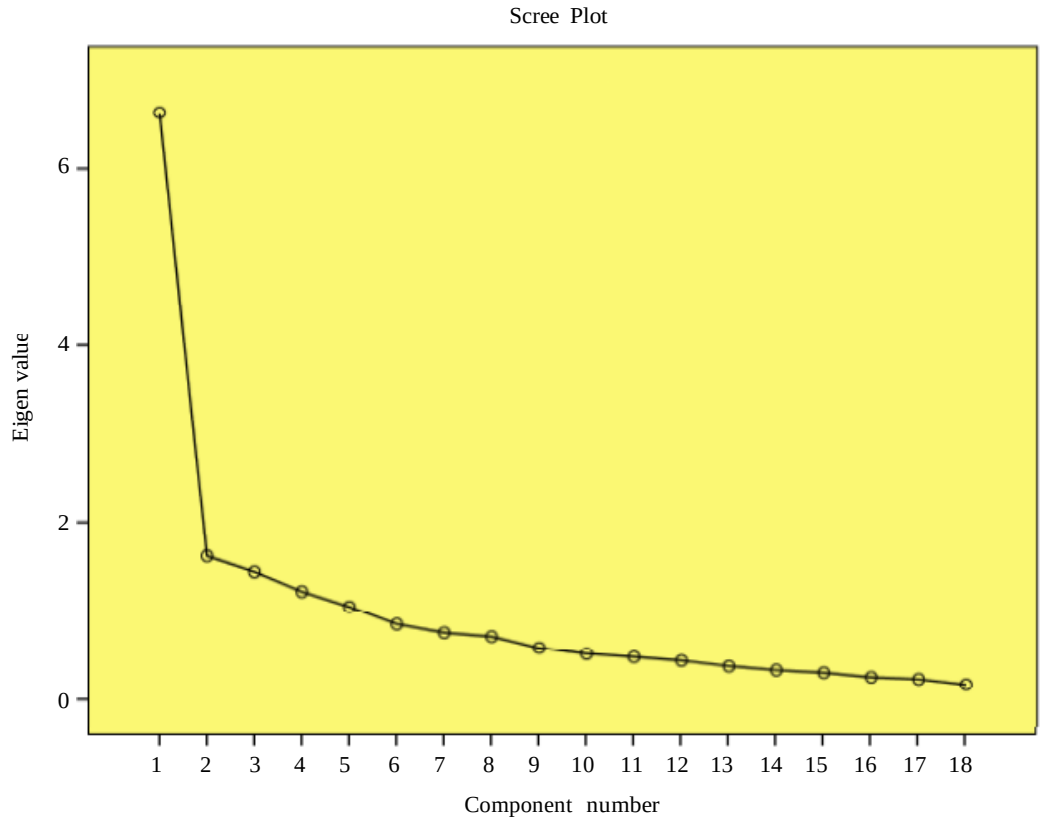

Figure 2. Scree plot for extracting factors

Table 5. Association between perception and coffee intake habits

Perception	Consuming coffee during examination week			
	Percentage (%)	Chi square	P value	Association is
Coffee consumption increases reading power	34.7	59.139	0.000	Significant
Coffee consumption increases self-confidence	32.7	60.860	0.000	Significant
Coffee consumption increases recalling power	22.4	44.197	0.000	Significant
Coffee consumption increases academic performance	24.5	59.70	0.000	Significant
Consumption of coffee improves group work activity	34.7	33.381	0.000	Significant
Consumption of coffee increases study hours	44.6	83.837	0.000	Significant
Coffee consumption increases IQ	12.2	38.458	0.000	Significant
Consuming coffee boost up energy	59.2	68.870	0.000	Significant
Coffee helps to stay awake	55.4	68.686	0.000	Significant
Consuming coffee gives relaxation	57.1	41.649	0.000	Significant

by saying they do not consume coffee on daily basis but they were asked to rank the reasons of not consuming, and it was observed that the respondents gave first rank (6.0%) to not consuming because of health reasons followed by the second rank (5.6%) was given to they don't like the taste of coffee and third rank (5.1%) was given to that they don't like the smell of the coffee. Some even expressed their viewpoints that coffee products are really expensive.

By concluding, it was understood that students studying in colleges from Mumbai prefer consuming coffee with less in amount but the consumption pattern increases during their examination days. On an average, the respondents consume coffee from past five years (mean = 60 months and standard deviation = 82.208). Some even specified that they consumed it from childhood and some said it is their habit from past one decade. Even though with the current study it couldn't say that the consumption will cause major effect to their health. However, coffee is becoming a major part of life among young adults.

The major idea of the current study was to understand the coffee consumption habits and perception of its effects among students studying in Mumbai. It was found that very large proportion (84.2%) of the respondents was coffee user. These findings were almost similar to the findings of all other studies (Ramli *et al.,* 2019) describing a high consumption of coffee among young adults (Kharaba *et al.,* 2022). The present study concluded that the majority (83.2%) of the respondents consumes two cups or less amount of coffee per day and they prefer drinking coffee during their exam days as according to them consuming coffee increases their reading power, recalling power, academic performance, increases their study hours and many more. The respondents have many such perceptions towards consuming coffee on a daily basis.

Previous studies (Czarniecka-Skubina *et al.,* 2021) stated that consuming coffee more than five cups per day (Poole *et al.,* 2017) may cause a long-term side effects and may affect their health. The present study for the time being doesn't show any long-term side effects which may lead to any addiction. There was still a possibility if the study concentrates only on understanding the pattern of coffee consumption during examination days. The consumption of coffee may increase because there are studies (Lapac *et al.,* 2018) which says the presence of caffeine works as stimulant to the central nervous system. The medical students (Rajaseharan *et al.,* 2021) were more affected due to caffeinated drinks as they have excess amount of exam work and heavy stress. It is studied (Lakshmi *et al.,* 2018) that the majority of medical students consumed coffee before studying for any exams, the reason behind this was to keep them more alert. The consumption of coffee during break was found very less (28.9%) than other categories. The major factor observed was consuming coffee boosts their energy. Strangely, it was also observed that very less (27.9%) respondents consume coffee while they were stressed out.

The present study was focused on only college going students, so it might be due to the factors like stress that consuming coffee during break doesn't reflects much importance. It was also observed that the there was no significant association between consuming coffee with respect to the characteristics of the respondents. The major factor that got extracted was related to academics but along there was some quite less weightage on diseases and relaxation.

Previous literature (Maqsood *et al.,* 2020) suggested that moderate way of consuming coffee was relative safe, however that higher consumption of coffee might cause physiological, psychological and behavioral harm. It was even suggested in many studies (Nawrot *et al.,* 2003) that the caffeinated coffee takes 40 minutes to show effect on human health (Rodak *et al.,* 2021). The caffeine related products allow immense impact on improving alertness and providing mental energy (Smit & Rogers, 2002).

It was reflected in our study that maximum number of students prefer drinking coffee during examination days as it gives

relaxation to them which may be due to the impact of caffeine (Cappelletti *et al.,* 2015) contained in coffee which act as important tool for concentration, memory enhancement (Lee & Balick, 2006) and physical performance (Weinberg & Bealer, 2004). Caffeine effects on central nervous system for shorter span but the long term effects remain unclear. Several literatures suggested wide variety of association between coffee consumed in early days associated with risk of diseases like alzheimer's (Ribeiro & Sebastião, 2010), cancer (Tavani & Vecchia, 2004) in late life (Eskelinen *et al.,* 2009).

The regular consumption (Ding *et al.,* 2014) of coffee may cause addiction as it creates several problems to human health but won't cause any sought of harm to our society (Satel, 2006). Certain studies also concentrated on identifying the effect of caffeinated coffee on children aged between 9 to 11 years which concluded that there is significant difference with respect to the effect of treatment on alertness (Heatherley *et al.,* 2006).

There were limitations in this study. This study was done on the basis of convenience sampling technique, focused on students from Mumbai. Future studies can concentrate on various other statistical methods and can compare it with different countries. Coffee consumption behavior among various students with respect to various countries may bring a wide change in the conclusion. Furthermore, considering the increasing habits of consuming coffee its long term effects on health can be studied. Further studies may also focus on giving some best alternative to coffee while students studying for their examination. It can also focus on how much amount of caffeine in terms of coffee is consumed by students during their project work or exam days. Finally, one can even concentrate on future research based on coffee consumption motives with respect to their lifestyles.

CONCLUSIONS

The coffee consumption was prevalent among the students studying in Mumbai (84.2%). Our study highlights the consumption of coffee is higher during examination days and hence reflect the importance of identifying the long term health issues and the uncon ditional overdose of caffeine. This study could be used as baseline data for research to iden- tify the addiction towards coffee consumption across the country.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interests.

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