



Prevalence of Tea Consumption among University Students of South-Eastern Region of Bangladesh and Associated Factors

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ARTICLE INFO

ABSTRACT

Research Article

Received : 12/10/2020
Accepted : 15/07/2021

Keywords:

Tea
Caffeine
Consumption pattern
Associated factors
University students

Tea has become an integral part of our culture and everyday life due to taste, together with a refreshing and mildly stimulant effect. The study was carried out to investigate the behaviour pattern and prevalence observed due to regular consumption of tea as a source of caffeine among the university students using a self-reported validated questionnaire. Socio-demographic and data related to tea consumption pattern were collected and analysed statistically. Among 245 study participants, the majority chose a greater proportion of tea (83.7%) followed by coffee (14.7%). The main reasons for tea consumption by university students included keeping alert during the examination period (38.8%), followed by the removal of anxiety and stress. Students (around 61%) mostly consume 2-3 cup of tea per day. According to the study, 12.7% of students had never consumed tea. More than two-thirds (66.9%) of the students reported having a sound sleep, normal BMI and blood pressure, a majority of them were engaged with regular physical exercise. The study also illustrated that most of the students (52.7%) give priority to the quality of the product rather than price, brand and taste while buying packaged tea leaves. Thus, this study provides basics about the prevalence and presents a recommendation for expanding tea consumption market among the university students.

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Introduction

Tea represents one of the important agricultural products in Bangladesh, with a total production of 82.13 million Kilogram (kg) in 2018, as estimated by the Bangladesh Tea Board (The Daily Star, 2019). It is the most widely consumed beverage after water (Chatterjee et al., 2012). The evergreen tea plant (*Camellia sinensis*), is valued for its young leaves and buds, which are used to produce the beverage. Tea can be differentiated based on their manufacturing process, for example, 'non-fermented' green tea, 'semi-fermented' oolong tea, and 'fermented' black tea (Subramaniam et al., 2012). Tea has been proven to express a cardio-protective and lipid-lowering effect (Vartanian et al., 2007). Polyphenols are the primary chemical components and flavonoids, which are the main polyphenols present in tea, have been elucidated to be related to vascular health (Hodgson and Croft, 2010).

Habitual tea consumption is a very common scenario in Bangladesh. People start their day with hot tea sips. University students usually exposed to stresses due to their

academic load (Bjorksten et al., 1983). As a result of their overwhelming, stressful situations, students tend to cope with consuming caffeinated beverages, mostly teas. Teas usually contain 3% caffeine (dry weight), translating to between 30 mg and 90 mg per 8-oz (250-ml) cup depending on type, brand and brewing method (Hicks et al., 1996). It is a natural chemical which activates our central nervous system. Apart from this, caffeine is considered to be an addictive drug, and high caffeine consumption is known to have adverse effects, including an increase in blood pressure and sleep disturbances in adolescents. Besides habitual tea consumption is associated with a lower waist/hip ratio and a lower BMI in adults (Wu et al., 2003). However, caution is advised against the consumption of high levels of caffeine in any form (Arria et al., 2014).

Despite the rising trends and marketing strategies aimed toward university students, there has been little research done on university students' intake of tea and relevant facts. As per the review literature, no studies have been carried out

yet in Bangladesh; regarding the prevalence of tea consumption among the university students. Thus, the study aims to investigate the patterns and motivations of tea consumption and its associated factors among the university students of the south-eastern region of Bangladesh.

Methodology

Study Setting and Sample

A cross-sectional study was conducted among the students from five different universities of Chattogram, situated in the south-eastern region of Bangladesh. A simple random sampling technique was used for the selection of study participants. The sample size was calculated via total population estimated as 2000 with 5% margin of error and 90% confidence level. Thus, the sample size was calculated to be 239. However, to ensure more representative data, a total of 245 students (45-50 from each of the university) were participated in the study. Data were assembled by a self-administered questionnaire. Pre-testing of the initial questionnaire was done among 20 students who were randomly selected and not included in the final data. Necessary corrections and modifications were done upon the responses from field-testing. Informed consents were obtained prior to data collection. All study questionnaires were anonymous, and no personal identifiers were collected.

Assessment of Baseline Characteristics

Socio-demographic profile including gender, discipline, academic year, a field of study and institutions were self-reported. The questionnaire also contained some other information's like BMI, blood pressure, frequency of physical exercise, sleep quality to assess the baseline characteristics of the study participants.

Tea Consumption Assessment

The questionnaire contained some open-ended questions regarding knowledge and perceptions of students about tea consumption, product type, preferences of using sugar and milk while consuming tea. Students were also asked multi-response questions regarding situations and purposes in which they consume tea, how often they consume tea. Tea consumers were also asked about the preference of tea type.

Statistical Analysis

Data obtained were analyzed by using the statistical package SPSS (version 23.0) software. The results of the descriptive analysis were represented as frequencies and percentages (pie charts and graphical representation) in the case of qualitative variables. A confidence level of 95% ($P < 0.05$) was accepted for all statistical analysis.

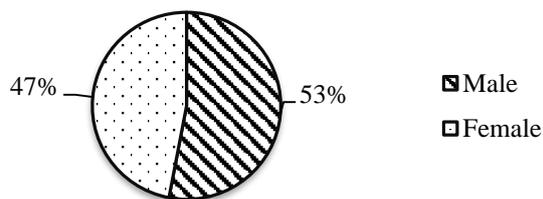


Figure 1. Ratio of the study participants

Result

Baseline Characteristics of the Study Participants

Out of 245 study participants, 130 were male (24 of them are post graduate and 106 are undergraduate students) and 115 were female (20 of them are post graduate and 95 are undergraduate students). So, the ratio of the study participants (male-female) was 53%-47% (Figure 1).

Table 1 represents the baseline characteristics of the students who participated in the present study. About two-thirds (66.9%) of the study participants reported having normal BMI, while 11.8% and 13.1% of the participants were reported underweight and overweight respectively. Rests of the students (8.2%) were found to have some degree of obesity. Table 1 illustrate the prevalence of blood pressure (bp) where a majority of students (85.7%) reported to have normal bp, whereas only 9.4% and 4.9% students have some fluctuation in blood pressure ranging from low to high respectively, consequently 29.4% students were found to have abdominal fat and the rest 70.6% students had to lack abdominal fat. Approximately one-third (31.4%) of the study participants reported engaging in 1-2 hours exercise per day while 44.5% of the study participants reported no exercise at all. 3.3% of the participants reported that they were engaged to some type of physical activity (less than 1 hour), whereas 20.8% of the participants were highlighted with more than 3 hours regular exercise per day. Table 1 also demonstrated the result of sleep quality among the study participants. More than two-thirds (81.6%) of the participants reported having a sound sleep, while 18.4% of students found to have some sort of disturbance during sleeping.

Tea Consumption Pattern

Table 2 demonstrates the frequency of tea consumed and behavioural factors related to its consumption among the study participants. According to the beverage type, students chose a greater proportion of tea (83.7%) followed by coffee (14.7%) and in smaller proportion (1.6%) consume both tea and coffee. Approximately more than one-third of the study participants (38.8%) reported that they consume a greater amount of tea during the examination period. Some other reported causes were to release stress (31.3%), to keep them awake during both examination time and stress condition (19.2%) and for keeping refreshed (10.6%).

Approximately more than one-third of the students (39.6%) consume at least 2 cups of teas per day, and 21.6% of the students consume more than 3 cups per day while 26.1% drink only a cup. Around 12.7% of the participants responded 'no' when asked whether they consumed it daily. In comparison with weekly consumption pattern, Table 2 illustrated that majority of the study participants (49.8%) consume 3-6 cup of teas per week whereas 40.4% of the students consume 10-14 cups. Approximately 8.2% of the students consume at most numbers that are more than 14 cups per week while only 1.6% of students were reported that they do not consume tea at all.

Regarding students' knowledge and attitude towards consumption of tea, more than three-quarter of the study participants were found to prefer black tea (82.4%) rather than green tea (9.8%), organic tea (1.2%) and others (6.6%).

Table 1. Baseline characteristics of the study participants (n=245)

Variable	Male (n=130)	Female (n=115)	Total (n=245)	Percent
Graduation status				
Post Graduate	24 (18.5%)	20 (17.4%)	44	18%
Under Graduate	106 (81.5%)	95 (82.6%)	201	82%
BMI				
Under weight	13 (10%)	16 (13.9%)	29	11.8%
Normal	88 (67.7%)	76 (66.1%)	164	66.9%
Over weight	19 (14.6%)	13 (11.3%)	32	13.1%
Obese	10 (7.7%)	10 (8.7%)	20	8.2%
Blood Pressure (bp)				
Low	2 (1.5%)	21 (18.3%)	23	9.4%
Normal	124 (95.4%)	86 (74.7%)	210	85.7%
High	4 (3.1%)	8 (7.0%)	12	4.9%
Abdominal Fat				
Present	32 (24.6%)	40 (34.8%)	72	29.4%
Absent	98 (75.4%)	75 (65.2%)	173	70.6%
Regular Exercise				
No exercise	46 (35.4%)	63 (54.8%)	109	44.5%
< 1 hr. exercise	3 (2.3%)	5 (4.4%)	8	3.3%
1-2 hr. exercise	49 (37.7%)	28 (24.3%)	77	31.4%
3 or more hr.	32 (24.6%)	19 (16.5%)	51	20.8%
Sleep Quality				
Good	107 (82.3%)	93 (80.9%)	200	81.6%
Poor	23 (17.7%)	22 (19.1%)	45	18.4%

Table 2. Tea consumption pattern

Variables	Male (n=130)	Female (n=115)	Total (n=245)	Percent
Beverage Type				
Tea	115 (88.5%)	90 (78.3%)	205	83.7%
Coffee	13 (10%)	23 (20%)	36	14.7%
Others/Both	2 (1.5%)	2 (1.7%)	4	1.6%
Daily Consumption				
Don't drink	14 (10.8%)	17 (14.8%)	31	12.7%
1 cup	35 (27%)	29 (25.2%)	64	26.1%
2 cup	52 (40%)	45 (39.1%)	97	39.6%
3 or more cup	29 (22.2%)	24 (20.9%)	53	21.6%
Weekly Consumption				
Don't drink	2 (1.5%)	2 (1.7%)	4	1.6%
3-6 cup	64 (49.2%)	58 (50.4%)	122	49.8%
10-14 cup	54 (41.5%)	45 (39.2%)	99	40.4%
14 or more cup	10 (7.8%)	10 (8.7%)	20	8.2%
When Consume				
Stressed Condition	48 (36.9%)	29 (25.2%)	77	31.4%
Examination Time	42 (32.3%)	53 (46.1%)	95	38.8%
Both	26 (20%)	21 (18.3%)	47	19.2%
Normal Condition	14 (10.8%)	12 (10.4%)	26	10.6%
Type of Tea Consumed				
Black Tea	112 (86.1%)	90 (78.3%)	202	82.4%
Green Tea	11 (8.5%)	13 (11.3%)	24	9.8%
Organic Tea	2 (1.5%)	1 (0.9%)	3	1.2%
Others	5 (3.9%)	11 (9.5%)	16	6.6%
Leaf Type				
Package Leaf	67 (51.5%)	90 (78.3%)	157	64.1%
Tea Bag	63 (48.5%)	25 (21.7%)	88	35.9%
Buying Parameter				
Quality	78 (60%)	51 (44.3%)	129	52.7%
Taste	29 (22.2%)	28 (24.3%)	57	23.3%
Price	9 (7%)	24 (21%)	33	13.5%
Brand	14 (10.8%)	12 (10.4%)	26	10.5%
Milk addition with Tea				
Yes	88 (67.7%)	96 (83.5%)	184	75.1%
No	37 (28.5%)	14 (12.2%)	51	20.8%
Sometimes	5 (3.8%)	5 (4.3%)	10	4.1%
Sugar addition with Tea				
Yes	115 (88.5%)	90 (78.3%)	205	83.7%
No	11 (8.5%)	20 (17.4%)	31	12.7%
Sometimes	4 (3%)	5 (4.3%)	9	3.6%

Besides almost two-third (64.1%) of the study participants reported that they prefer packaged tea leaves whereas 35.9% reported preferring tea bag. While buying tea leaves/tea-bag, the respondents reported giving top most priority to quality (52.7%) followed by taste (23.3%), brand (13.5%) and price (10.5%). Table 2 also illustrated the percentage of respondents who prefers adding milk and sugar while consuming tea. The majority of the participants reported adding milk (75.1%) and sugar (83.7%) while consuming tea. Other 20.85% and 12.7% of the participants highlighted that they neither add milk nor sugar. Rest of the participants reported that they add milk and sugar occasionally.

Discussion

The study was carried out to observe the prevalence and pattern of tea consumption along with the associated factors among the university students, a high prevalence of tea consumption (83.7%) was observed. In previous studies, the prevalence ranged in between 35-70% of the consumption of beverages and energy drinks including tea, coffee depending on the places of the study conducted (Majori et al., 2018; Martins et al., 2018). The present study highlighted that 38.8% of university students consume tea prior to the examination, followed by a stressed condition. The result is in lined with the findings published by Majori et al. (2018) and Champlin et al. (2016). They described energy drinks including tea as the first choice for students to increase concentration and feel less tired during the examination period which is the positive association. In terms of quantity, the present study illustrated that most of the students take two cup of teas per day and 3-6 cups per week. Regarding dependence related to tea, this result is supported by the result published by Naveed and Hameed (2014). Socio-demographic and psychological factors influence the consumers in the selection of tea type. According to Xiong et al. (2015), black tea provides impressive health benefits ranging from lowering the risk of cardiovascular disease to boost immunity. In another study, an independent association between perceived mental stress and green tea consumption was described by Shimbo et al., (2005). Thus, the present study has shown that the majority of the study participants prefer black tea followed by green tea. Inadequate sleep significantly affects the overall well-being of an individual and is associated with a host of unfavourable consequences. High consumption of caffeinated beverages has been suggested as a factor that contributes negatively to sleep quality (McIlvain et al., 2011). But the present study has shown that the majority of the study participants own sound sleep; this might be due to their regular engagement in physical activity. The previous study described that hot tea consumption was inversely associated with obesity: tea consumers had lower mean waist circumference and lowered BMI (25 vs 28 kg/m²-in male; 26 vs 29 kg/m²-in the female; both P<0.001), than non-consumers (Lambert and Vernarelli, 2013). The result of the present study also in lined with the previously published result. In the present study, we have evaluated the regularity of blood pressure among university students. The obtained result is supported by the study conducted by Nowak et al. (2018) that confirmed that caffeine upsurges systolic blood pressure to 17% and mean arterial blood pressure to 11%. Previously a

study was conducted on the consumption of caffeinated beverages among students of junior and senior high schools in Poland. The study reported that young people select particular energy drinks looking at the taste, price and effect (Nowak and Jasionowski, 2015). The present study showed a similar result as well. Another study conducted in Dhaka, Bangladesh summarized that the prevalence of sugar-sweetened beverages like sports/energy drinks, coffee/tea products, and flavoured milk is gaining popularity among adults. Most of the university students (95.4%) reported consuming sugared beverage stated by Bipasha et al. (2017). The current study has shown similar frequencies of sugar and milk added with tea while consuming. That means trends have been shifted to young people from conventional tea consumption to the tea mixed with sugar syrup, milk, coffee or other fruit essences.

Conclusion

So far, the results obtained, we may conclude that majority of the university students consume a stimulant drink (tea followed by coffee) and most of them usually consume it during exam periods. The results obtained from the current study contribute to continuing investigating, on relevant factors associated with tea consumption. Suggestions for further studies include assessing whether students have any knowledge of the active ingredients present in tea and whether they have the right information about the potential positive and negative effects of high consumption of caffeinated beverages.

Acknowledgement

The authors would like to express their gratitude to the Ministry of National Science and Technology, Bangladesh for funding this study. The authors would also like to acknowledge the students of different universities of Chattogram City, Bangladesh who spontaneously participated in this study. Also, we would like to thank all the participants for their support and cooperation throughout data collection.

Conflict of interest

None to declare.

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