Research Article

Social and Psychological Determinants of Caffeinated Beverage Consumption in Tamil Nadu

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Abstract

Background: Caffeine is a psychoactive substance that is most commonly consumed globally. Its use has become very significant in India because of changing lifestyle patterns, academic stress, and occupational pressure. Understanding the local consumption patterns and their effects on an individual is essential for a public health planning system.

Objective: To assess the social and psychological determinants influencing caffeinated beverage consumption among adults in Tamil Nadu and evaluate associated physical and psychological effects.

Methods: A community-based cross-sectional study was conducted for three months in Kattankulathur block among adults aged 18 years above who consume coffee or tea. The minimum required sample size calculated was 232 based on a previous study done by Kamali R et al. Participants were selected using a multistage sampling technique. The brief caffeine expectancy questionnaire was used to assess psychological factors and self-reported physical and psychological effects associated with caffeinated beverage consumption.

Results: The most frequently consumed beverages were tea (62%) and coffee (56%). These high-frequency consumers exhibited higher expectancy-related perceptions, including dependency, mood enhancement, alertness, anxiety, social facilitation, and appetite suppression. The most commonly reported psychological and physiological effects were jitteriness, restlessness, difficulty sleeping, and palpitations.

Conclusion: Caffeinated beverage consumption is highly prevalent among young adults. It has a strong psychological and behavioural reinforcement influencing daily use. While the benefits that were obtained were alertness and mood enhancement, participants also reported adverse effects, highlighting the need for targeted awareness and intervention strategies to support safer caffeine consumption practices among the population.

Keywords: Caffeine; Beverages; Adult; Health Behaviour; Psychology

Introduction

Caffeine is one of the most widely consumed psychoactive substances globally in the form of tea and coffee. Its effects on alertness, fatigue, and cognitive performance have contributed to its widespread use. Caffeine consumption has evolved as a behaviour influenced by modern lifestyle demands, particularly in urban settings where academic pressure and occupational stress.

In India, tea and coffee consumption is deeply embedded in social and cultural practices, often extending beyond mere dietary habits to include social interaction and work-related routines. A study conducted among call centre employees in Mumbai reported a high prevalence of caffeine consumption, which was significantly associated with stress and appetite changes, indicating its role as a coping mechanism in demanding work environments [1]. Similarly, research among young adults aged 18–35 years demonstrated that caffeine intake occurs throughout the day and across various settings, reflecting its habitual and context-dependent nature [2]. Among adolescents, caffeine consumption has also been reported to be considerable, raising concerns regarding early exposure and the establishment of long-term behavioural patterns [3].

Studies conducted among medical students highlight the high prevalence of caffeine consumption largely driven by academic workload and the need for sustained concentration [4]. A study from Chennai revealed that despite awareness of potential adverse effects, consumption remained high, suggesting a disconnect between knowledge

and behavioural practices [5]. Studies focusing on tea and coffee consumption patterns have also demonstrated their dominant role in daily routines, particularly in South Indian populations where cultural acceptance further reinforces regular intake [6].

Beyond prevalence, psychological factors play a crucial role in shaping caffeine consumption behaviour. Individuals often consume tea and coffee based on perceived benefits such as improved alertness, mood enhancement, and social facilitation. The development and validation of the Brief Caffeine Expectancy Questionnaire (B-CaffEQ) have provided important insights into these behavioural drivers, demonstrating that emotional, cognitive, and social expectancies significantly influence consumption patterns [7].

The European Food Safety Authority has recommended limits for caffeine consumption and advised caution among vulnerable populations such as pregnant women and adolescents [8]. Moderate caffeine consumption is generally considered safe for healthy adults, although excessive intake may be associated with adverse effects [9].

Despite the widespread consumption of tea and coffee in India, there is limited community-based evidence examining the relationship between consumption patterns, psychological expectancies, and self-reported health effects in urban populations. Most existing studies are restricted to specific groups such as students or professionals, limiting the generalisability of findings. Furthermore, the role of socio-demographic factors in influencing high-frequency consumption remains inadequately explored.

In this context, the present study aims to assess the patterns of tea and coffee consumption, evaluate associated psychological expectancies using a validated tool, and identify self-reported physical and psychological effects among adults in an urban area of Tamil Nadu.

MATERIALS AND METHODS

Study Design

This community-based cross-sectional study was conducted over three months in the Kattankulathur block among adults aged 18 years and above. Individuals who lived here for at least six months and those who consume coffee or tea were included in this study. Ethical approval was obtained from the Institutional Ethics Committee with Reference No: SRMIEC-ST1225-4083 before collecting the data, and each participant was voluntary, with assurance of confidentiality of their data and right to withdraw at any stage, and informed consent was obtained from everyone.

Sample size

The sample size for this study is calculated from a previous study done by Kamali R et al (5), with a prevalence of 83.6. Using this prevalence value, the sample size was calculated with the standard formula $n = Z^2pq/d^2$, where p is 83.6, q is 16.4, Z is 1.96, and d is 5%. The calculated sample size was 211, and it was adjusted to 232 after incorporating a 10% non-response rate.

Sampling technique

A multistage sampling technique was employed. Kattankulathur block, Chengalpattu district, was purposively selected as the study area because it constituted the field practice area of the tertiary care medical college hospital and research centre. Among the four Primary Health Centres in the block, Maraimalai Nagar Primary Health Centre was selected by simple random sampling, which serves an urban area comprising 21 wards. Among them, Ward No. 11 was selected by simple random sampling. Ward No. 11 had 1,102 households,[20] from which 350 households were randomly selected and approached for recruitment. Although the minimum required sample size was 232, a total of 350 households were approached to ensure adequate recruitment of eligible participants and to account for household-level ineligibility and non-response. In households with more than one eligible participant, each eligible individual was assigned a serial number and one participant was selected by simple random sampling. Data were collected through face-to-face interviews using a standardised questionnaire. A total of 300 eligible participants were included in the final analysis.

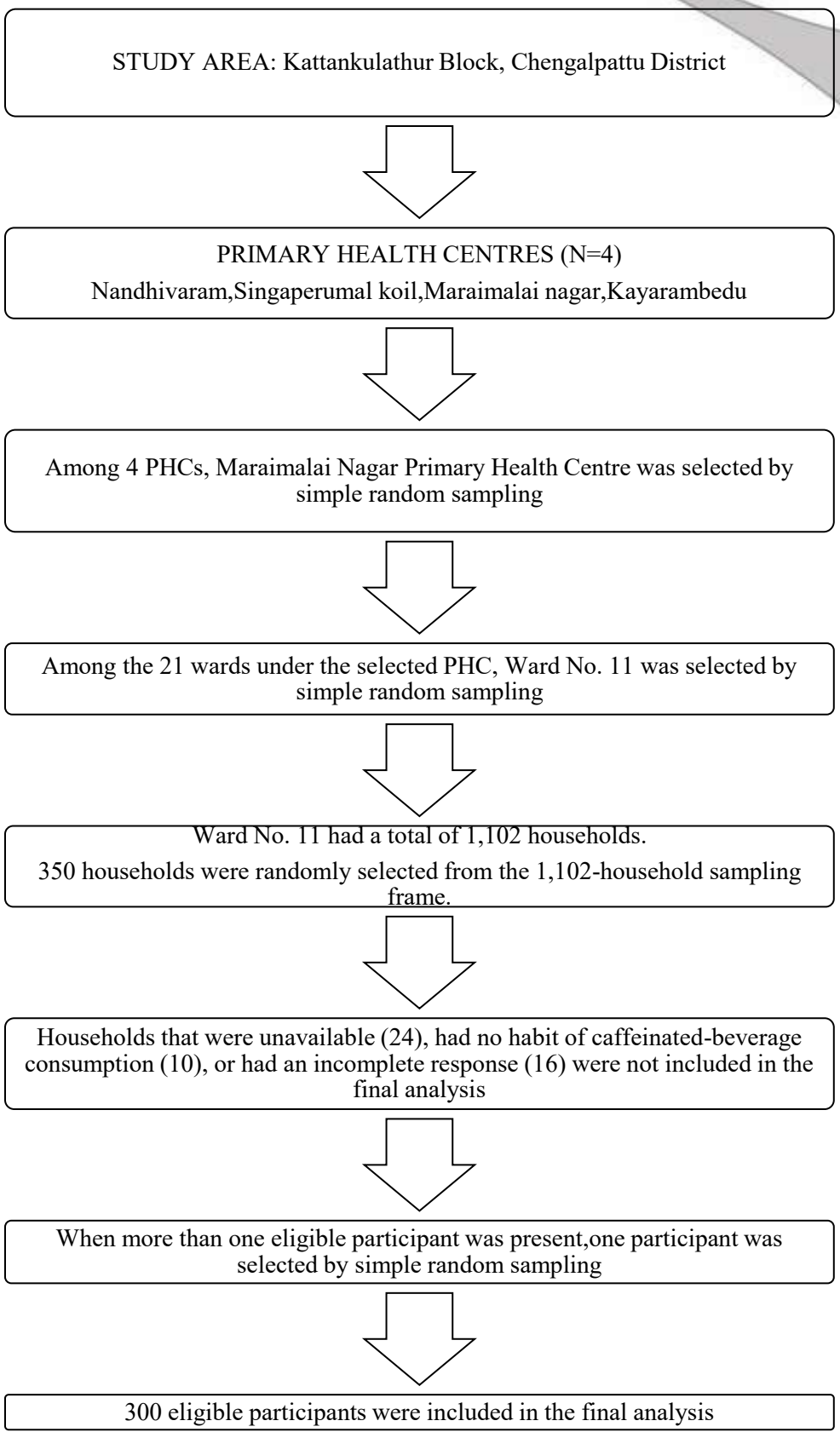
STUDY AREA: Kattankulathur Block, Chengalpattu District
PRIMARY HEALTH CENTRES (N=4)
Nandhivaram,Singaperumal koil,Maraimalai nagar,Kayarambedu
Among 4 PHCs, Maraimalai Nagar Primary Health Centre was selected by simple random sampling
Among the 21 wards under the selected PHC, Ward No. 11 was selected by simple random sampling
Ward No. 11 had a total of 1,102 households.
350 households were randomly selected from the 1,102-household sampling frame.
Households that were unavailable (24), had no habit of caffeinated-beverage consumption (10), or had an incomplete response (16) were not included in the final analysis
When more than one eligible participant was present,one participant was selected by simple random sampling
300 eligible participants were included in the final analysis

Figure 1: Flowchart of the multistage sampling procedure used for selection of study participants (n = 300)

Study Tool

This study questionnaire consisted of three sections. Section A is a standardised semi-structured questionnaire that is used to collect data regarding the socio-demographic profile of each individual. Section B is used to record the frequency and type of caffeinated beverage intake. In Section C, we applied a standardised brief caffeine expectancy questionnaire (B-CaffEQ) to assess psychological factors and self-reported physical and psychological effects that were associated with caffeinated beverage consumption.

Statistical Analysis

Data were coded and they were entered into Microsoft Excel. They were analysed using SPSS version 26.0. Descriptive statistics were used to summarise sociodemographic profile, patterns of caffeinated beverage consumption, frequency of caffeinated beverage consumption, psychological expectancy scores, and self-reported physical and psychological effects from each individual. Categorical variables were expressed in frequencies and percentages, while continuous variables were used, such as mean, standard deviation, median, interquartile range, and 95% confidence intervals. Psychological expectancy scores that were obtained from this B-CaffEQ questionnaire were analysed across multiple domains. For analytical comparison, participants were first classified into high-frequency consumers and low-frequency consumers. High frequency means more than or equal to one cup per day; low frequency means less than one cup per day. The association between the frequency of caffeine intake and its psychological expectancy domains were analysed using a chi-square test. Statistical significance was considered if the p-value was less than 0.05. Binary logistic regression was performed to show the association between socio-demographic factors and high-frequency consumption. There were no missing data for any of the variables included in the analysis.

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Results

A total of 300 adults participated in the study. The mean age group was 27.9 ± 11.1. Females constituted a higher proportion (56.0%) compared to males (44.0%). Half of the respondents were graduates (48.0%), followed by postgraduates (28.0%) and high-school–educated individuals (24.0%). Regarding occupational status, students formed the largest group (58.0%).

Table 1. Socio-demographic characteristics of the study participants (n = 300)

Category	**n (%)**
Age, mean (SD),	27.9 (11.1)
Gender	
Male	132 (44.0)
Female	168 (56.0)
Marital Status	
Unmarried	228 (76.0)
Married	72 (24.0)
Education Level	
High School	72 (24.0)

Graduate	144 (48.0)
Postgraduate	84 (28.0)
Occupational Status	
Student	174 (58.0)
Employed	90 (30.0)
Unemployed	36 (12.0)

The psychological expectancies associated with caffeinated beverage consumption for a weekly interval are presented in Table 2. The caffeine consumption appears to be mainly driven by perceived positive psychological benefits rather than any negative effects. Alertness and performance (Median 5, IQR 4–6) and mood enhancement (Median 4, IQR 3–5) have shown the highest median scores. Withdrawal dependence (Median 4, Mean 3.8) and social facilitation (Median 4, Mean 3.9) showed moderately low expectancy levels only.

Table 2. Mean Scores of Psychological Expectancies (B-CaffEQ Domains)

Domain	Median (IQR)	Mean (SD)	95% CI
Alertness& Performance	5 (4–6)	4.4 (1.0)	4.3-4.6
Withdrawal& Dependence	4 (3–5)	3.8 (1.2)	3.6-4.0
Appetite Suppression	3 (2–4)	2.8 (1.1)	2.6-3.0
Mood Enhancement	4 (3–5)	4.0 (1.0)	3.8-4.2
Social Facilitation	4 (3–5)	3.9 (1.2)	3.7-4.1
Anxiety/Jitteriness	3 (2–4)	3.4 (1.1)	3.2-3.6

Table 3 shows that there is a High-frequency consumers showed significantly higher proportions across all six psychological expectancy domains than low-frequency consumers (all P≤0.005), with the strongest associations observed for alertness and performance, social facilitation, and withdrawal and dependence.

Table 3: Association Between Frequency of Caffeine Intake and Psychological Expectancy

Psychological Domain	High-Frequency Consumers (≥1 cup/day) n=195 n (%)	Low-Frequency Consumers (<1 cup/day) n=105 n (%)	χ^2	p-value
Alertness & Performance (cutoff >4.0)	153 (78.5%)	43 (41.0%)	42.4	<0.001

Withdrawal & Dependence (cutoff ≥3.5)	140 (71.8%)	40 (38.1%)	32.3	<0.001
Anxiety / Jitteriness (cutoff >3.5)	108 (55.4%)	31 (29.5%)	18.36	<0.001
Mood Enhancement (cutoff >4.0)	117 (60.0%)	33 (31.4%)	22.29	<0.001
Social Facilitation (cutoff ≥3.5)	147 (75.4%)	42 (40.0%)	36.66	<0.001
Appetite Suppression (cutoff ≥3.5)	61 (31.3%)	17 (16.2%)	8.08	0.005

Table 4 shows that these effects occur only occasionally, but not daily, and the mean scores range from 2.2 to 2.8 on a 0 to 4 Likert scale. Jitteriness and shakiness, and difficulty in sleeping were the most major symptoms reported as sometimes by 32.0% to 34.0% of participants respectively. For Heart racing/palpitations, only 19.0% of them reported that it occurs sometimes, and 6.0% of the consumers reported that it occurs always.

Table 4. Self-Reported Physical and Psychological Effects Following Caffeine Intake

Symptom	Never n (%)	Rarely n (%)	Sometimes n (%)	Often n (%)	Always n (%)	Mean (SD)
Feeling jittery/shaky	60 (20.0%)	54 (18.0%)	96 (32.0%)	60 (20.0%)	30 (10.0%)	2.8 (1.3)
Feeling anxious/restless	72 (24.0%)	66 (22.0%)	96 (32.0%)	45 (15.0%)	21 (7.0%)	2.6 (1.2)
Heart racing/palpitations	120 (40.0%)	66 (22.0%)	57 (19.0%)	39 (13.0%)	18 (6.0%)	2.2 (1.1)
Difficulty sleeping	69 (23.0%)	57 (19.0%)	102 (34.0%)	48 (16.0%)	24 (8.0%)	2.7 (1.2)
Difficulty relaxing/concentrating	78 (26.0%)	60 (20.0%)	102 (34.0%)	45 (15.0%)	15 (5.0%)	2.5 (1.1)

In table 5 Age, sex, education and occupation were associated with high-frequency caffeinated beverage consumption. Participants aged 18–25 years had higher odds of high-frequency consumption than those aged 26–35 years (adjusted OR 117.3, 95% CI 11.3–1223.1; P<0.001). The >35-year age group was not significantly different from the 26–35-year reference group (adjusted OR 3.8, 95% CI 0.4–38.4; P=0.254). Females had higher odds than males (adjusted OR 4.5, 95% CI 1.7–11.9; P=0.002). Graduates had higher odds than participants with high-school education (adjusted OR 3.7, 95% CI 1.3–11.2; P=0.018). Employed and unemployed participants also had higher odds than students (P<0.001 and P=0.008, respectively).

Table 5. Binary logistic regression showing the association between socio-demographic factors and high-frequency consumption

Predictor	Adjusted OR	95% CI	P value
Age			
18–25 vs 26–35 years	117.3	11.3–1223.1	<0.001
>35 vs 26–35 years	3.8	0.4–38.4	0.254
Sex			
Female vs Male	4.5	1.7–11.9	0.002
Education			
Graduate vs High school	3.7	1.3–11.2	0.018
Postgraduate vs High school	4.1	1.0–16.7	0.049
Marital status			
Married vs Unmarried	1.2	0.3–5.1	0.787
Occupation			
Employed vs Student	373.5	42.9–3251.4	<0.001
Unemployed vs Student	72.6	3.1–1687.2	0.008

Discussion

A key finding was the statistically significant association between consumption frequency and psychological expectancies, where high-frequency consumers showed markedly higher alertness, withdrawal dependence, mood enhancement, social facilitation, and anxiety/jitteriness compared to low-frequency consumers. These findings indicate a strong behavioural reinforcement cycle driven by perceived benefits. Poole et al. [10] similarly reported that coffee consumption demonstrates a dual profile of beneficial and adverse effects depending on intake levels; however, our findings further quantify this duality by showing that high perceived benefits coexist with significantly higher adverse expectancy scores among frequent consumers.

Alertness and mood enhancement were the most dominant expectancies. Despite recognising adverse effects, participants continued frequent consumption, as reflected by the high proportion of daily users (65.0%). Previous evidence by Muley A et al suggests that coffee consumption may be associated with a lower risk of type 2 diabetes, with both caffeinated and decaffeinated coffee showing inverse associations [11]. In the present study, the high frequency of caffeinated beverage consumption warrants attention to overall dietary patterns and consumption practices. In contrast to our findings, Loftfield et al. [12] found that higher coffee intake was linked to lower overall mortality and similar results were reported by Gunter et al. [13] in a large European cohort, where higher consumption was associated with reduced risk of death from multiple causes. Our study also highlights a considerable burden of self-reported adverse effects. Difficulty sleeping was reported “sometimes” by 34.0% of participants. Drake et al. [14] demonstrated that caffeine intake even six hours before bedtime significantly impairs sleep quality. These findings are consistent with experimental evidence that caffeine intake can impair sleep.

Similarly, cardiovascular and neuropsychiatric symptoms observed in our study are consistent with the known physiological effects of caffeine. The prevalence of jitteriness (32.0%), anxiety (32.0%), and palpitations (19.0%) is consistent with Nawrot et al. [15], who reported increased heart rate, anxiety, and dependence at higher caffeine intake.

The binary logistic regression analysis further strengthens the understanding of determinants of high-frequency consumption. Younger age, female sex, higher education and employment were associated with high-frequency consumption. These findings indicate that caffeine consumption is closely linked to productivity demands and lifestyle patterns. The ICMR–NIN dietary guidelines [16] recommend moderation; however, the high prevalence of daily intake (65.0%) and associated adverse symptoms in our study suggest a gap between recommended and actual consumption.

Chen et al. [17] and Inoue-Choi et al. [18] reported associations between tea or coffee consumption and lower all-cause mortality, while Wang et al. [19] reported a lower risk of coronary heart disease with green tea consumption.

These findings suggest that moderate consumption may have potential health benefits; however, our findings of high-frequency consumption, dependence-related expectancies and adverse symptoms highlight the importance of moderation.

Overall caffeine consumption through tea and coffee is highly prevalent and strongly influenced by psychological expectancies, with high-frequency consumers exhibiting both enhanced perceived benefits and increased adverse effects. The integration of our findings with existing literature highlights a behavioural reinforcement model, where perceived benefits drive continued consumption despite adverse effects. Also, the expectancies most resembled the reported symptoms like jitteriness, sleep difficulty, and anxiety; hence, these phenomena could be taken as an indication of strong behavioural reinforcement of caffeine use on a daily basis. Some participants have suffered from adverse effects because of caffeine, which indicates that consumption timing, serving size, and personal tolerance should be taken into consideration. This urges the necessity to implement health education programs that are specifically targeted at young adults who are at high risk of exposure.

Public health recommendations shall be focused on young adults and students to encourage them to reduce their caffeine intake. This helps them to gain benefits like alertness and mood elevation, while also reducing the adverse effects like sleep disturbance, dependence, and jitteriness. Culturally appropriate strategies also should be promoted, such as avoiding tea and coffee before bedtime, monitoring total caffeine intake from multiple sources and their symptoms, like anxiety, and promoting a balanced consumption habit for a safer, longer time of caffeine use. Workplace and academic programs should also raise awareness about the psychological reinforcement of caffeine use.

Strengths and Limitations

The strengths of this study include its community-based design and adequate sample size, which improves the relevance of the findings to the general population. A validated tool, the Brief Caffeine Expectancy Questionnaire (B-CaffEQ), was used to assess psychological expectancies related to caffeine consumption. The study also evaluated both psychological and physical effects of caffeine intake, providing a broader understanding of consumption behaviour. In addition, the study focused on young adults, who are considered a high-risk group for frequent caffeine consumption, and provides important regional data from Tamil Nadu where limited community-based evidence is available**.**

The main limitation is the cross-sectional design, which prevents establishing temporal relationships. Information was collected using questionnaires, so responses were dependent on participants' understanding and their recall memory. The study was conducted in one location to ensure consistency, which may limit applicability to other demographic areas.

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