

Available online on 15.05.2026 at <http://jddtonline.info>

# Journal of Drug Delivery and Therapeutics

Open Access to Pharmaceutical and Medical Research

Copyright © 2026 The Author(s): This is an open-access article distributed under the terms of the CC BY-NC 4.0 which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited



Open Access Full Text Article



Case Report

## Caffeine Consumption Patterns and Awareness Among Pharmacy Undergraduate Students: A Case Study from IMT Pharmacy College, Odisha

Bishnupriya Jyotish <sup>1\*</sup>, Prasad Kumar Mohapatra <sup>2</sup>, Sujit Harichandan <sup>3</sup>, Abhimanyu Muduli <sup>4</sup>

<sup>1</sup> IMT Pharmacy College, New Nabakalebar Road, Puri, Odisha, India, PIN-752004

<sup>2</sup> IMT Pharmacy College, New Nabakalebar Road, Puri, Odisha, India, PIN-752004

<sup>3</sup> IMT Pharmacy College, New Nabakalebar Road, Puri, Odisha, India, PIN-752004

<sup>4</sup> IMT Pharmacy College, New Nabakalebar Road, Puri, Odisha, India, PIN-752004

### Article Info:



#### Article History:

Received 23 Feb 2026  
Reviewed 14 April 2026  
Accepted 06 May 2026  
Published 15 May 2026

#### Cite this article as:

Jyotish B, Mohapatra PK, Harichandan S, Muduli A, Caffeine Consumption Patterns and Awareness Among Pharmacy Undergraduate Students: A Case Study from IMT Pharmacy College, Odisha, Journal of Drug Delivery and Therapeutics. 2026; 16(5):12-17 DOI: <https://dx.doi.org/10.22270/jddt.v16i5.7748>

#### For Correspondence:

Bishnupriya Jyotish, IMT Pharmacy College, New Nabakalebar Road, Puri, Odisha, India, PIN-752004

### Abstract

**Background:** Caffeine is a socially sanctioned stimulant of the central nervous system and is frequently employed by students to increase alertness and focus and to deal with academic pressures. An over-use of it can have negative consequences and lead to insomnia, palpitations, anxiety, etc.

**Objective:** This case study aimed to assess the prevalence, consumption patterns, and awareness regarding caffeine use among pharmacy undergraduate students of IMT Pharmacy College, Gopalpur, Puri, Odisha.

**Methods:** The study was a cross-sectional survey using a semi-structured pre validated questionnaire. Information was obtained on demographic characteristics, types of caffeinated products used, daily amount of caffeine used, use during examinations, and knowledge of possible side effects.

**Results:** Most participants reported daily caffeine consumption, averaging 165mg of caffeine per day among males and 138mg among females. Importantly, 37.8% of respondents also reported consuming over the recommended 300 mg/day during exam periods. Participants were more aware of the side effects of caffeine than the possibility of foods containing chocolate and medications for migraine being other sources.

**Conclusion:** Such a high prevalence of caffeine use, particularly among grad students in times of academic stress, indicates the importance of awareness programs. Providing education on safe caffeine use, as well as promoting other stress-reducers such as yoga and meditation, could aim to establish better lifestyle options for students.

**Keywords:** Caffeine consumption, Academic stress, Awareness, Side effects, Cross-sectional study, Daily intake, Yoga, and meditation

## INTRODUCTION

Caffeine is a psychoactive substance that stimulates the central nervous system, and is the most frequently consumed drug among college students internationally <sup>1</sup>. It is also a central nervous system stimulant that produces a sense of improved alertness and decreased fatigue by blocking adenosine receptors <sup>2</sup>. Caffeine increases respiration, heart rate, alertness, and performance on mental and physical tasks <sup>1</sup>. Like physical endurance, caffeine is a substance many students use to improve concentration, maintain long study hours, and perform better academically <sup>4</sup>. In addition to this, caffeine is increasingly present in other products such as energy drinks, dietary supplements, and cosmetics, which could lead to instances of overconsumption and even toxicity that are not recognized so <sup>5</sup>.

Recent introductions of energy drink products into the marketplace are partially responsible for this dramatic rise in caffeine consumption, particularly among youth, in the last several decades <sup>6</sup>. Among other effects, moderate doses of caffeine have been demonstrated to improve memory, locomotor speed, vigilance, and even performance on academic exams, among other effects <sup>1</sup>. Possible negative side effects of overconsumption include insomnia, anxiety, digestive upset, palpitations, and dependence on caffeine itself along with many other effects of withdrawal <sup>7</sup>.

Caffeine appears in most of the world's most popular beverages, food items, and medications: coffee, tea, sodas, energy drinks, pain and migraine relief medications, and chocolate <sup>8</sup>. While one cup of caffeinated coffee reportedly has approximately 95–137 mg of caffeine, decaffeinated coffee contains around 2–5 mg per cup. Caffeine content is approximately 47 mg per

cup of tea and about 46 mg per 340 ml of caffeinated soft drinks<sup>9</sup>. Caffeine can vary to as much as 80mg/can in energy drink products or averages around 7mg/200g in caffeine estimates for food items such as chocolate or other non-drink foods or certain medications<sup>5</sup>.

Use of caffeine is highly prevalent, according to research conducted in other countries among medical students. Caffeine consumption amongst medical students, for example, was reported at 94% at Dow University<sup>10</sup>. The same applies to a caffeine consumption of 98.4% among medical students from the University of Jordan<sup>11</sup>. Similarly, caffeine is regularly consumed by 98% of the students in a study conducted in South India, with 72.0% of them taking less than 199 mg/day, 23.3% less than 399 mg/day and 2.7% more than 400 mg/day<sup>10</sup>. Similarly,<sup>10</sup>, report a study from Chennai in which 97% of medical students were low-category caffeine consumers, whereas 3% were moderate-category. Plus, consumption frequently increases during exam time when the pressure of the school year is present, indicating a pattern of dependence on caffeinated products to maintain mental performance, and excessive dependence at that<sup>12</sup>.

As in the case of medical students, pharmacy undergraduates are presumably similarly vulnerable to high caffeine consumption, given demanding study loads and long hours, coupled with frequent exams<sup>10</sup>. Caffeine consumption has also been linked to a later bedtime, increased wakefulness, greater attentiveness, and general stress relief in academia. The same population, but may not be aware of the potential negative secondary effects and the limits of safe consumption. Negative side effects, including headaches, palpitations, anxiety and insomnia are overlooked due to ignorance or the immediate perceived advantages of caffeine<sup>13</sup>.

Considering the prevalence of usage along with the associated harms, it is important to understand caffeine consumption habits among pharmacy students and how aware they are about its safe use and possible negative effects. Thus, the aim of the current work, conducted at IMT Pharmacy College, Gopalpur, Puri, Odisha, is to identify caffeine consumption patterns and to determine the knowledge and awareness regarding side effects and safe limits of caffeine, in pharmacy undergraduates. Also, this work is intended to underscore the need for educational programming to encourage safe and responsible use of caffeinated products among this population.

## MATERIAL AND METHODS

### Study Design and settings

A cross-sectional study was conducted in the Department of Pharmacology at IMT Pharmacy College, Gopalpur, Puri, Odisha, among pharmacy undergraduate students (Bachelor of Pharmacy – B. Pharm).

### Study Participants and Sampling

The current institute of pharmacy clears a total of 100 pharmacy undergraduates every year. The study population included all professional year pharmacy

undergraduates numbering approximately 400. An attempt was made to have more students participate. The study included participants who had given informed consent to be surveyed. Two additional attempts to contact students absent during the initial data collection were conducted for each cohort year. Students absent for any three of the data collection days were not included. The study included a total of 280 undergraduate pharmacy students in all years of study. Subject participation was 70%, which also provided adequate power to detect meaningful differences and generalizability. The timeline for the study was 3 months, Dec 2024-Feb 2025.

### Data Collection Tools and Technique

The current institute of pharmacy clears a total of 100 pharmacy undergraduates every year. The study population included all professional year pharmacy undergraduates numbering approximately 400. An attempt was made to have more students participate. The study included participants who had given informed consent to be surveyed. Two additional attempts to contact students absent during the initial data collection were conducted for each cohort year. Students absent for any three of the data collection days were not included. The study included a total of 280 undergraduate pharmacy students in all years of study. Subject participation was 70%, which also provided adequate power to detect meaningful differences and generalizability. The timeline for the study was 3 months, Dec 2024-Feb 2025.

### Data Entry and Analysis

Data were entered into Microsoft Excel and the statistical package for social sciences version 21, SPSS Software for statistical analysis. Summary statistics were shown using percentages. The Chi-square test for proportions was utilized and a p value <.05 was considered significant.

## RESULTS

The sample contained 280 people between the ages of 17 and 22. The average age was 19.2 years. Of these, 33% was 18 years old, 25% was 20 years old and 24% was 19 years old. 9% were 21 years old, 6% were 17 years old, and 3% were 22 years old. As depicted in Table 1, 40% of the participants were hostellers, while 60% were day scholars.

**Table 1:** Distribution of study subjects as per their residential status

Residential status of study subjects	Frequency (%)
Hostellers	112(40%)
Day scholars	168(60%)
Total	280(100)

A female majority among pharmacy students was also seen in the present study (63%). Among subjects, males represented 37% of the sample. As illustrated in Figure 1, B. Pharm 1st professional year constituted maximum number of respondents among the participants.

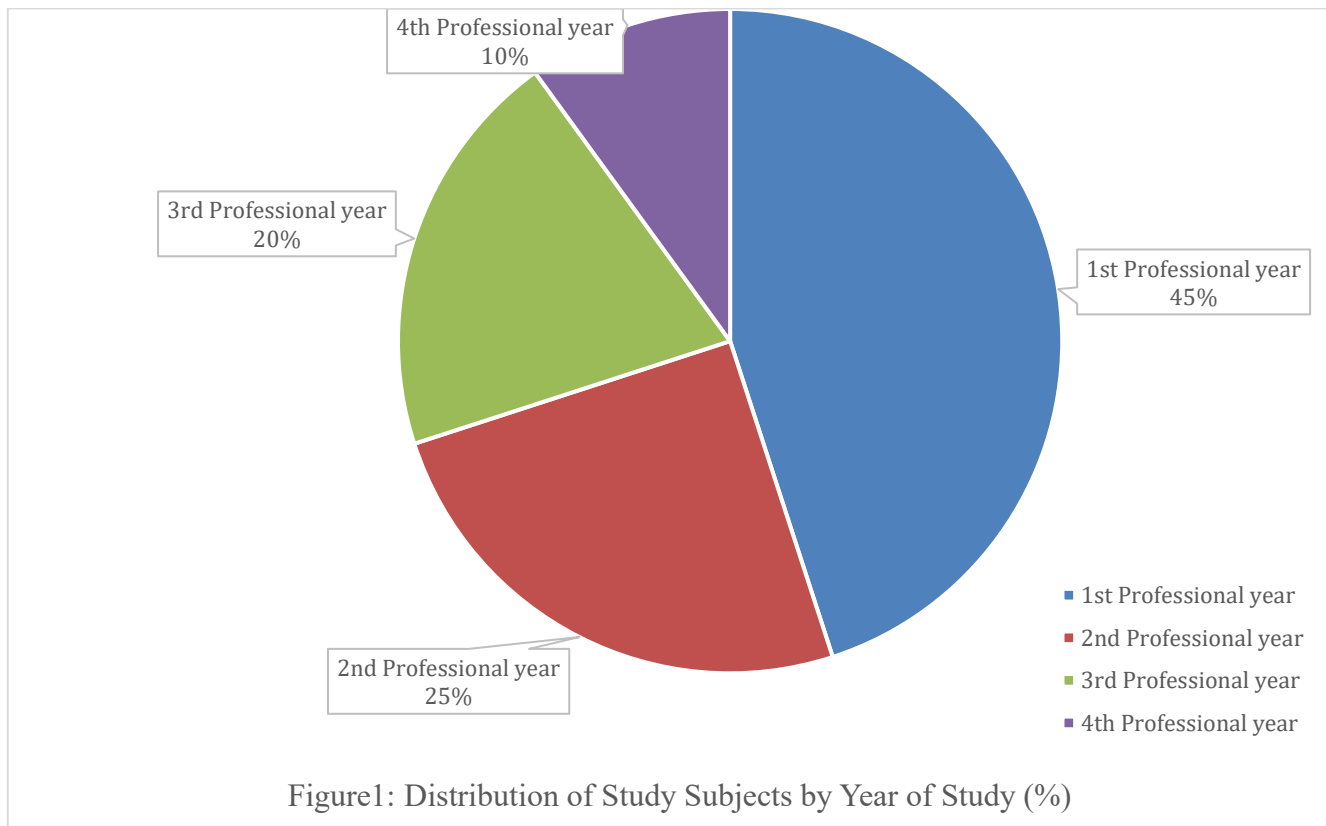


Figure1: Distribution of Study Subjects by Year of Study (%)

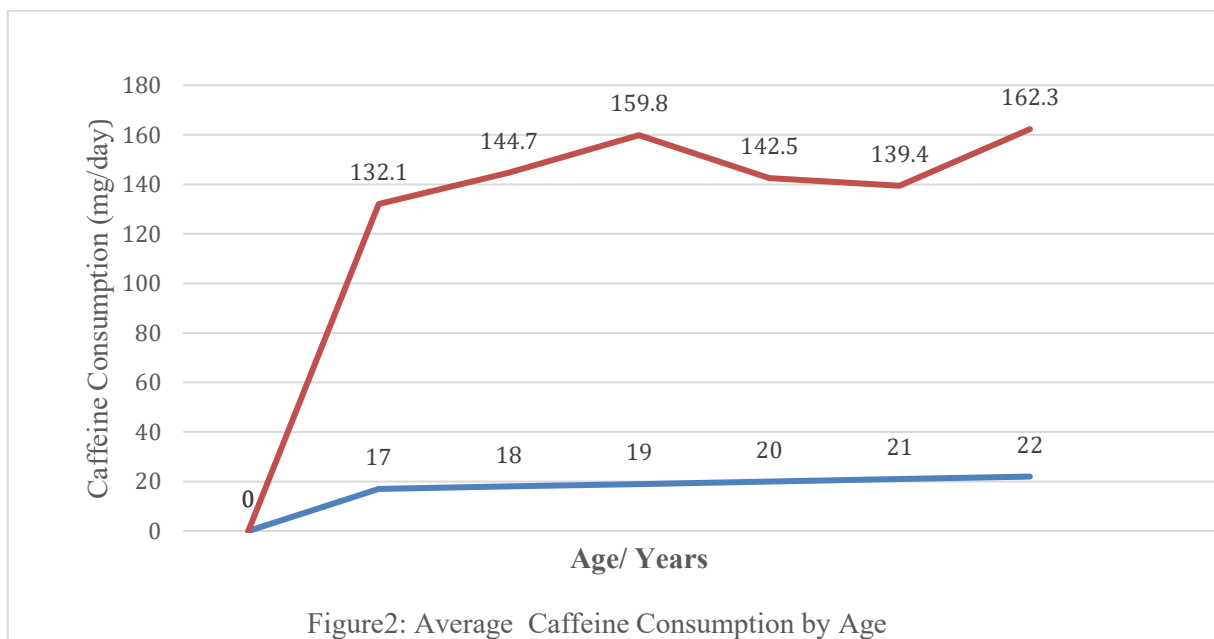


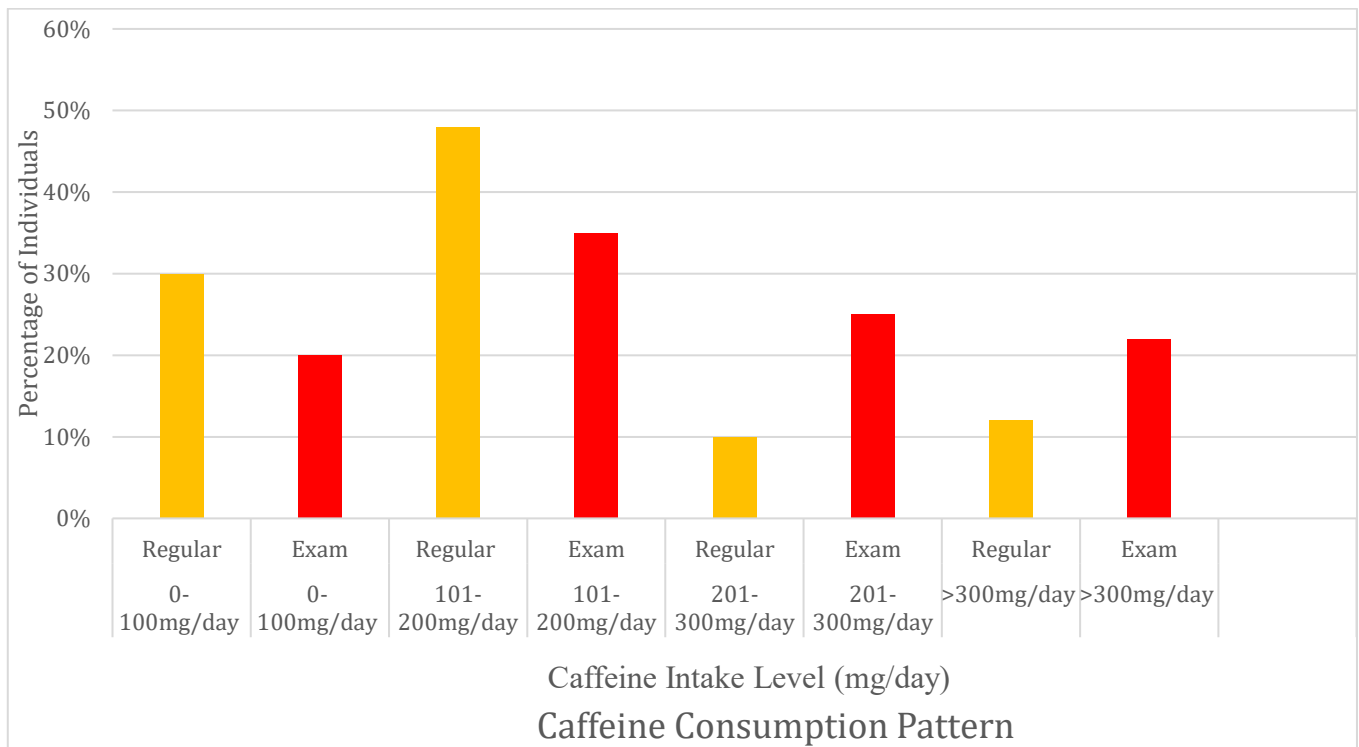
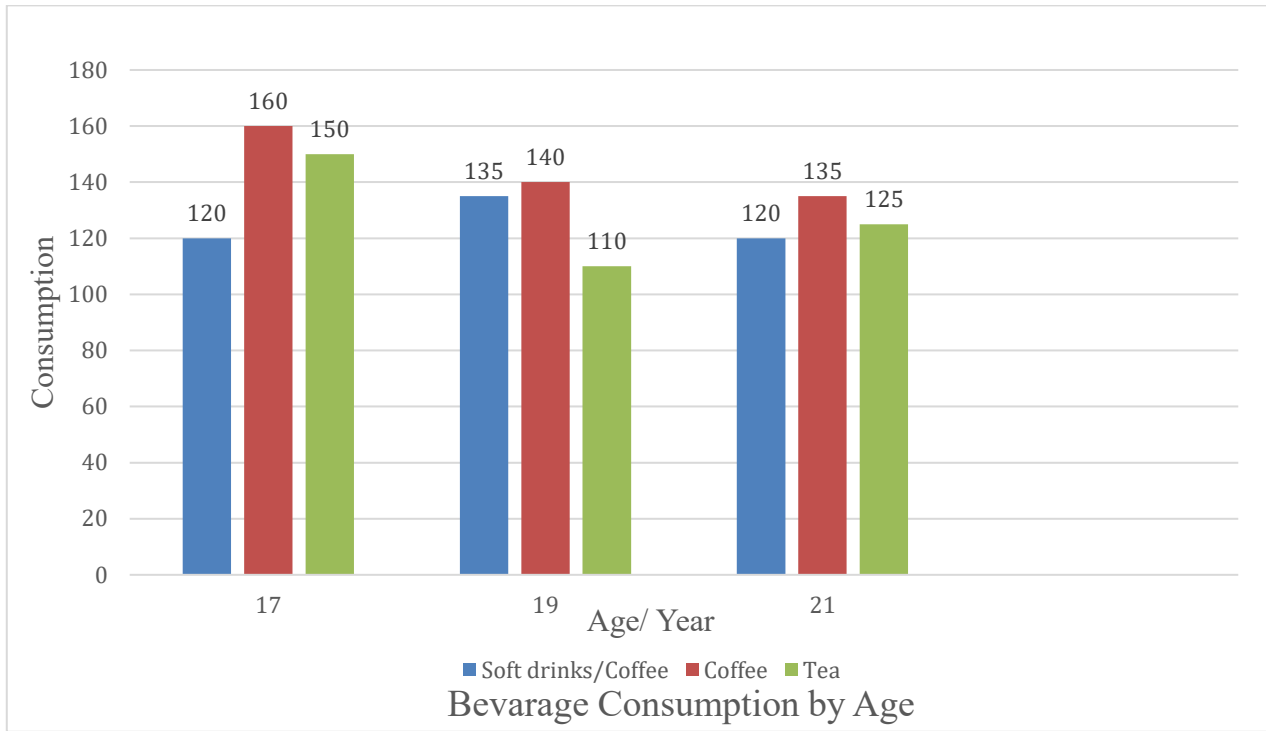
Figure2: Average Caffeine Consumption by Age

In the present study all participants reported daily caffeine use. Self-reported caffeine intake averaged at 148.6 mg/day. Males had a higher average daily caffeine consumption of 165mg, relative to 138mg daily among females. Caffeine intake was noted to be highest among 22- year-old students (M=162.3mg caffeine/day) and 19-year-old students (M= 159.8 mg caffeine/day) as shown in Figure 2.

There was an observed trend that younger initiators of caffeinated beverage consumption had higher reported average daily caffeine consumption as pharmacy students (Figure 3). Also, males were significantly more knowledgeable of caffeine and caffeinated products

generally than females, including energy drinks, soft drinks, chocolates, and medications.

It was found that students were also likely to over consume caffeine when studying for or taking tests, indicating that another factor associated with high levels of caffeine consumption was stress, namely, academic stress and anxiety during test periods. Caffeine use during exams averaged over the recommended threshold daily ceiling (>300 mg/day) in 37.8% of students. The disparity between caffeine intake during a regular day versus during examinations, was a highly significant finding, (Chi-square =5.72, P=0.016). See Figure 4.



A total of 66.1% of participants in the present study, and 69.2% of female and 61.4% of male respondents, reported

That there was no reading of the statutory label regarding caffeinated products. This gender variability was but not significant (Chi-square value = 1.682; P = 0.19).

Also, among all the participants, 59% were unaware of any possible side effects of caffeine intake, including 57.3% and 61.2% of female and male participants, respectively. This also was not significant by gender,

again, the Chi-square value of 1.694 indicated a P value of 0.18.

In addition, 81.2% of females and 85.8% of males did not know what the daily caffeine ceiling dose is. In total, 83.1% did not know about the limit. This was also not significant statistically (Chi-square value = 2.01; P = 0.14).

**DISCUSSION**

For its neurostimulators effects, caffeine is among the most popular beverage worldwide. Its accessibility is frequent, as it can be found in tea, coffee, chocolate, sodas, energy drinks, etc., all of which are beverages

regularly incorporated into life <sup>14</sup>. Sporting events and long cram sessions are also conducive to the use of these drinks, as caffeine provides the “oomph” energy and mental drive to perform and keep going. Pharmacy students, like other health professional students, are particularly vulnerable to developing caffeine dependency because their coursework requires sustained mental and physical performance in compressed time frames.

Participants had a mean age of 19.2, and were 63% female. This is in corroboration of the study done by <sup>10</sup>. The overall sample was mostly 20-21 years old (44.3%) and 79.4% were female students.

In the current study, pharmacy students’ self-reported daily caffeine consumption averaged 148.6 mg, with all students reporting current caffeine use. Among students, males consumed an average of 165 mg/day while females averaged 138 mg/day. This difference can be due to higher adrenaline activities and social activities among male learners that would later lead to more caffeinated products intake.

Younger onset of caffeinated beverage consumption was also associated with higher current average daily caffeine consumption. This is consistent with <sup>14</sup>, in which students developed dependency symptoms with an early onset caffeine use in adolescence.

On average, caffeine intake during the exams period surpassed the daily ceiling limit (>300 mg/day) for 37.8% of the students. This may be due to heightened academic stress as well as anxiety in the context of exams. Regular day vs exam day caffeine intake was significantly different ( $p < .01$ ).

These results reflect the work of <sup>15</sup> in which about half of the subjects indicated increased energy drink use when studying for exams or preparing for significant projects. This is different from the findings of a Serbian study among adolescents, in which caffeine consumption was linked to leisure activities, peer pressure, and habit rather than academic pressure <sup>16</sup>.

Among the participants in this study, 66.1% of pharmacy students did not read statutory labels on caffeine-containing products, while 59% did not know possible side effects of caffeine. This is like study of <sup>17</sup> which reported that 48.6% of students had no accurate information regarding caffeine’s adverse effects. Another study <sup>18</sup> indicated lower awareness among participants about caffeine products and their side effects, with poor awareness reported by about a third of the participants.

## CONCLUSION

All pharmacy students reportedly consumed caffeine, and daily caffeine consumption was reported to be higher in males (165 mg/day) than females (138 mg/day). Caffeine consumption generally was reported to significantly increase around times of examinations and students who initiated caffeinated beverage consumption at a younger age reported drinking more at the present time.

Few pharmacy students recognized the presence of caffeine in migraine medications, chocolates, and chocolate-based foods. Pharmacy students demonstrated overall low knowledge and awareness of caffeinated products and associated health risks with a mean of 59. This points to the need for awareness and sensitization programs aimed at pharmacy students to make them aware of the detrimental impacts of caffeine overconsumption and to promote alternative forms of stress relief like yoga and meditation.

**Acknowledgment:** We wish to thank the management and administration of IMT Pharmacy College, Gopalpur, Puri, Odisha, to have given us the facilities and support to conduct a meaningful research work. We would be pleased to state that we have the warmest thanks to all the members of the faculty who have guided us, encouraged and made constructive suggestions during the study. Their assistance was key in the successful execution of this study. We owe the undergraduate students of the pharmacy who kindly agreed to take part in this study and answer truthfully and give us sincere answers and make this research feasible. Lastly, we recognize everyone who helped in the successful completion of this study, directly or indirectly.

**Author Contributions:** All authors contributed equally to the conception, design, data collection, analysis, and manuscript preparation. All authors have read and approved the final manuscript.

**Funding Source:** The authors received no financial support for the research, authorship, and/or publication of this article.

**Conflicts of Interest:** The authors declare no conflicts of interest.

**Ethical Approval:** This study was conducted in accordance with institutional guidelines. Informed consent was obtained from all participants prior to data collection.

## REFERENCES

1. Nehlig A. Interindividual differences in caffeine metabolism and factors driving caffeine consumption. *Pharmacol Rev*, 2016; 68(3): 1058-78.
2. Davis JM, Zhao Z, Stock HS, Mehl KA, Buggy J, Hand GA. Central nervous system effects of caffeine and adenosine on fatigue. *Am J Physiol Regul Integr Comp Physiol*, 2003; 284(2): R399-404. <https://doi.org/10.1152/ajpregu.00386.2002> PMID:12399249
3. Nehlig A, Daval JL, Debry G. Caffeine and the central nervous system: mechanisms of action, biochemical, metabolic and psychostimulant effects. *Brain Res Rev*, 1992; 17(2): 139-70. [https://doi.org/10.1016/0165-0173\(92\)90012-B](https://doi.org/10.1016/0165-0173(92)90012-B) PMID:1356551
4. James JE. Caffeine and cognitive performance: persistent methodological challenges in caffeine research. *Pharmacol Biochem Behav*, 2014; 124: 117-22. <https://doi.org/10.1016/j.pbb.2014.05.019> PMID:24892519
5. Temple JL, Bernard C, Lipshultz SE, Czachor JD, Westphal JA, Mestre MA. The safety of ingested caffeine: a comprehensive review. *Front Psychiatry*, 2017; 8: 80. <https://doi.org/10.3389/fpsy.2017.00080> PMID:28603504 PMID:PMC5445139
6. Seifert SM, Schaechter JL, Hershorin ER, Lipshultz SE. Health effects of energy drinks on children, adolescents, and young adults. *Pediatrics*, 2011; 127(3): 511-28.

- <https://doi.org/10.1542/peds.2009-3592> PMID:21321035  
PMCID:PMC3065144
7. Shirlow MJ, Mathers CD. A study of caffeine consumption and symptoms: indigestion, palpitations, tremor, headache and insomnia. *Int J Epidemiol*, 1985; 14(2): 239-48.  
<https://doi.org/10.1093/ije/14.2.239> PMID:3874838
8. Evans J, Richards JR, Battisti AS. Caffeine. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026.
9. Lucas M, O'Reilly EJ, Pan A, Mirzaei F, Willett WC, Okereke OI, et al. Coffee, caffeine, and risk of completed suicide: results from three prospective cohorts of American adults. *World J Biol Psychiatry*, 2014; 15(5): 377-86.  
<https://doi.org/10.3109/15622975.2013.795243>  
PMid:23819683 PMCID:PMC4213948
10. Pulla A, Syed A, Boliseti V. Patterns of caffeine consumption among medical undergraduates in Secunderabad, Telangana, India. *J Educ Health Promot*, 2024; 13: 280.  
[https://doi.org/10.4103/jehp.jehp\\_50\\_24](https://doi.org/10.4103/jehp.jehp_50_24) PMID:39310000  
PMCID:PMC11414877
11. Qasem NW, Al-Omouh OM, Al Ammouri ZM, Alnobani NM, Abdallah MM, Khateeb AN, et al. Energy drink consumption among medical students in Jordan: prevalence, attitudes, and associated factors. *Ann Med Surg*, 2024; 86(4): 1906-14.  
<https://doi.org/10.1097/MS9.0000000000001791>  
PMid:38576977 PMCID:PMC10990385
12. Zunhammer M, Eichhammer P, Busch V. Sleep quality during exam stress: the role of alcohol, caffeine and nicotine. *PLoS One*, 2014; 9(10): e109490. <https://doi.org/10.1371/journal.pone.0109490>  
PMid:25279939 PMCID:PMC4184882
13. Jahrami H, Al-Mutarid M, Penson PE, Faris MAI, Saif Z, Hammad L. Intake of caffeine and its association with physical and mental health status among university students. *Foods*, 2020; 9(4): 473.  
<https://doi.org/10.3390/foods9040473> PMID:32290044  
PMCID:PMC7230284
14. Kharaba Z, Sammani N, Ashour S, Ghemrawi R, Al Meslamani AZ, Al-Azayzih A, et al. Caffeine consumption among various university students in the UAE. *J Nutr Metab*, 2022; 2022: 5762299. <https://doi.org/10.1155/2022/5762299>  
PMid:35646395 PMCID:PMC9132715
15. Malinauskas BM, Aeby VG, Overton RF, Carpenter-Aeby T, Barber-Heidal K. A survey of energy drink consumption patterns among college students. *Nutr J*, 2007; 6: 35.  
<https://doi.org/10.1186/1475-2891-6-35> PMID:17974021  
PMCID:PMC2206048
16. Trunzo JJ, Samter W, Morse C, McClure K, Kohn C, Volkman JE, et al. College students' use of energy drinks, social problem-solving, and academic performance. *J Psychoactive Drugs*, 2014; 46(5): 396-401. <https://doi.org/10.1080/02791072.2014.965291>  
PMid:25364992
17. Jamil NF, Sadiq MA, Salih AA. Caffeine consumption: habits and knowledge of medical students. *J Med Health Sci*, 2023; 6(1): 1-10.  
<https://doi.org/10.22259/2638-4787.0601001>
18. Faris ME, Saif ER, Turki EA, Abdelrahim DN, Abu-Qiyas S, Shihab KA, et al. Caffeine intake and its association with nutrition, sleep, and physical activity among schoolchildren in the United Arab Emirates: a national cross-sectional study. *Eur J Nutr*, 2024; 63(2): 549-62. <https://doi.org/10.1007/s00394-023-03285-8>  
PMid:38151534