

From Beans to CGPA: How Caffeine Practice Influences Academic Performance among University Students

Siti Shahirah Mat Daud^{1*}, Habibah Ayob²

¹Faculty of Pharmacy, Universiti Teknologi MARA Cawangan Pulau Pinang, Kampus Bertam, 13200, Kepala Batas, Pulau Pinang, Malaysia.

Email: shahirah3671@uitm.edu.my

²Academy of Contemporary Islamic Studies (ACIS), Universiti Teknologi MARA Cawangan Pulau Pinang, Kampus Permatang Pauh, 13500, Pulau Pinang, Malaysia

Email: habibah69@uitm.edu.my

CORRESPONDING AUTHOR (*):

Siti Shahirah Mat Daud
(shahirah3671@uitm.edu.my)

KEYWORDS:

Caffeine
Academic performance
Pharmacy

CITATION:

Siti Shahirah, M. D., & Habibah, A. (2025). From Beans to CGPA: How Caffeine Practice Influences Academic Performance among University Students. *Malaysian Journal of Social Sciences and Humanities (MJSSH)*, 10(10), e003624. <https://doi.org/10.47405/mjssh.v10i10.3624>

ABSTRACT

Caffeine is a widely consumed natural stimulant popular among students, including those in pharmacy course. Despite this widespread use, existing research often fails to establish a direct link between caffeine intake frequency or amount and a student's Cumulative Grade Point Average (CGPA). This study was conducted to assess practice of caffeine intake and its relationship between academic performance among diploma pharmacy students at UiTM Cawangan Pulau Pinang, Bertam Campus. A cross-sectional survey was administered to 103 students at the campus between April 22 and May 5, 2025. The questionnaire gathered data on students' characteristics and caffeine consumption practices, which were then compared with their academic performance. The collected data were analyzed with statistical methods that are both descriptive and inferential using *Statistical Package for Social Sciences (SPSS) version 22*. Descriptive statistics was performed in terms of percentages and frequencies that summarized demographic factors and caffeine intake practices. For inferential statistics, Pearson Chi-Square test was conducted to examine the relationship between academic performance (CGPA) and nine specific caffeine consumption practices. It's noteworthy to note that most respondents (n=65, 61.3%) only sometimes drink caffeine, typically 1-2 times per week. Caffeine comes primarily from coffee (n=51, 48.1%), followed by tea (n=43, 40.6%). The results indicated that napping during the day was the only practice significantly associated with better academic performance with p -value=0.02 among the nine tested. In conclusion, diploma pharmacy students at UiTM Bertam appear to use caffeine responsibly as a coping mechanism for their demanding academic schedule.

Contribution/Originality: This study contributes to shift the focus from caffeine consumption as a direct predictor of performance to its role as a responsible coping mechanism for diploma pharmacy students. It suggests that time management and good

sleep hygiene should be given more importance in interventions aimed at improving student performance.

1. Introduction

Over the last two decades, caffeinated beverages have grown increasingly popular, and their widespread consumption has become a global phenomenon, particularly in many developed countries, including Malaysia (Dahlawi et al., 2024). Caffeine is a naturally occurring stimulant widely consumed globally through coffee, tea, energy drinks, and soft drinks. It is especially popular among university students, including those pursuing pharmacy studies, who use it to enhance alertness, reduce fatigue, and improve cognitive function during intense academic endeavors and examination periods (Jamal & Abu Hasan, 2024).

Caffeinated drinks enhance brain cognitive function by improving an individual's wakefulness and productivity. Caffeine exerts its effects by blocking adenosine receptors (McLellan et al., 2016), a neurotransmitter that promotes the feeling of sleepiness and tiredness. By blocking adenosine, caffeine stimulates dopamine and norepinephrine levels, thereby making the consumer's brain function more efficient in processing information. This suggests that many students consume caffeinated beverages primarily to prevent falling asleep in class or while studying, rather than just enjoying the taste or alleviating stress.

Understanding students' knowledge, attitude, and practice (KAP) regarding caffeine intake is crucial as it affects both their health and academic performance. Previous studies have shown that the majority of students have a decent awareness of caffeine sources, but their patterns of consumption may escalate, especially during exams, often without full consideration of possible side effects or dependency risks (Arul Prakasam et al., 2022). Students' attitudes toward caffeine consumption often reflect a strong belief in its benefits, such as relief from headaches and improved concentration, which encourages regular intake. However, some students experience withdrawal symptoms like headaches, irritability, and fatigue when they abruptly stop consuming caffeine, indicating potential dependence (Arul Prakasam et al., 2022). While consumption practice varies, levels typically escalate during periods of academic stress. Yet, many students lack adequate knowledge about safe consumption limits and the negative impacts of excessive intake, highlighting the need for increased awareness and education (Jamal & Abu Hasan, 2024).

In the context of Islamic teachings, caffeine consumption must be balanced with the principles of moderation (*wasatiyyah*), self-control, and an emphasis on preserving one's health. Islam permits the consumption of halal substances that do not cause harm. The integration of Islamic values with caffeine use among Muslim pharmacy students at UiTM Bertam offers a culturally appropriate framework for understanding and managing intake. This perspective ensures that students not only optimize cognitive function and academic success but also maintain spiritual and physical well-being. Considering the above scenario, this proposed study aims to assess the practices regarding caffeine consumption and examine the relationship between caffeine consumption practices and academic performance among diploma pharmacy students at UiTM Cawangan Pulau Pinang, Bertam Campus. The findings could inform targeted educational programs that help students make informed decisions about caffeine use, ultimately supporting holistic student development and academic achievement. To the best of our knowledge, no study

has assessed caffeine's influence on academic performance at UiTM Bertam Campus, though related research suggests academic outcomes are often more influenced by factors such as lecturer quality, infrastructure, family influences, gender, and academic year.

1.1. Research Objectives

- i. To determine the practice regarding caffeine intake among diploma of pharmacy students.
- ii. To investigate the relationship between academic performance of students and the practices of caffeine intake among diploma of pharmacy students.

2. Literature Review

Caffeine consumption is highly prevalent among university students, particularly those in high-demand programs like medicine and pharmacy. Research consistently shows high intake rates, with studies reporting 94% of medical students and 70.4% of pharmacy students consuming caffeine in various forms (Khan et al., 2017; Annuar et al., 2023). With rates ranging from 91 to 98 percent, caffeine usage among college students is very common across all demographics (Jahrami et al., 2020; Riera-Sampol et al., 2022). In Malaysia, university students believed that coffee helps them do better academically, but too much of it can cause addiction and other health issues (Jamal & Abu Hassan, 2024). This widespread use is primarily motivated by the perceived cognitive benefits, such as enhancing alertness, reducing fatigue, and improving focus during intense academic periods (Jamal & Abu Hasan, 2024; Riera-Sampol et al., 2022). According to a study in UAE, caffeine consumption was very common among university students, with studying being the most common reason given (Kharaba et al., 2022).

Coffee is probably the most common source of caffeine, followed by tea and energy drinks (Riera-Sampol et al., 2022; Jamal & Abu Hassan, 2024; Kharaba et al., 2022). For instance, a study of UAE medical students found that 97% drank coffee or tea primarily to stay awake for class (53%) and feel refreshed (51%) (Bhojaraja et al., 2016). Many students increase their consumption after starting college (Bhojaraja et al., 2016), highlighting its role as a coping mechanism for the academic workload. In addition, caffeine intake mostly from coffee, is consumed in large quantities by college students for a variety of purposes, such as enhancing focus, feeling alert, and appreciating the taste (Mahoney et al., 2019). But however, excessive caffeine consumption (≥ 400 mg/day) is linked to negative consequences such as headaches, panic attacks, and anxiety symptoms (Jahrami et al., 2020), as well as worse sleep quality (Riera-Sampol et al., 2022). These results underline the necessity of educating university populations on safe caffeine intake habits.

Despite the high prevalence and perceived benefits with 68% of medical students reporting perceived academic benefits (Khan et al., 2017), empirical evidence largely fails to establish a direct, significant association between caffeine intake and measures of academic success like CGPA or GPA. Multiple cross-sectional studies in diverse settings including those in Malaysia, Saudi Arabia, and Turkey have found no significant correlation between caffeine consumption and academic performance (Jamal & Abu Hasan, 2024; Khan et al., 2017; Dahlawi et al., 2024). Interestingly, one Malaysian study of undergraduates found that students with a CGPA above 3.00 preferred coffee but consumed it less than five times a week, suggesting that higher-achieving students may manage their intake more moderately (Jamal & Abu Hasan, 2024).

Instead of caffeine, researchers have suggested that factors like gender and academic semester are more significant predictors of academic achievement (Jamal & Abu Hasan, 2024). In conclusion on this front, research consistently shows that medical students who consume large amounts of caffeine did not fare better academically (Tahir et al., 2022). Several studies indicate that high caffeine consumption was associated with poorer subjective sleep quality ($p < 0.001$), suggesting that while students may use caffeine to counteract fatigue, it can ultimately degrade their sleep (Riera-Sampol et al., 2022). Studies among pharmacy students found no significant associations between caffeine intake and scores for anxiety or depression (Annuar et al., 2023). Some research suggests a potentially negative correlation, with high caffeine consumption associated with increased symptoms of caffeinism and lower academic performance (Gilliland & Andress, 1981), and higher intake of caffeine associated with lower academic achievement in Korean adolescents (Jin et al., 2016). Despite the high prevalence of consumption, students often exhibit a lack of knowledge about safe caffeine intake limits, even while being aware of potential health risks (Bhojaraja et al., 2016). These findings collectively emphasize the need for educational programs focused on the health effects of caffeine and responsible consumption practices among university students (Jaferi et al., 2023).

3. Research Methods

3.1. Study Design and Setting

This study employed a quantitative survey to investigate the relationship between caffeine intake and academic performance among diploma in pharmacy students. This design was chosen for its efficiency in gathering data from a large sample at a single point in time, focusing on collecting and analysing numerical data on the quantification of variables and the examination of associations between them. The survey measured the variable specifically caffeine intake through self-reported consumption (frequency and amount) and academic performance (cumulative grade point average) that could be precisely measured. Furthermore, a cross-sectional design was chosen for its efficiency in gathering data from a large sample at a single point in time focusing on diploma students in UiTM from allowing for the quantification of variables and the examination of associations between them (Wang & Cheng., 2020). This design is cost-effective and time-efficient, making it suitable for descriptive studies and for establishing the prevalence of level of caffeine use within this population. Since the survey employed the cross-sectional design, it only can identify associations or correlations between caffeine intake and academic performance but cannot establish cause-and-effect of caffeine intake among diploma pharmacy students. Since both variables are measured concurrently, it is impossible to determine definitively if caffeine intake preceded and caused a change in performance, or vice-versa.

3.2. Research Location

The target population for this research was diploma pharmacy students enrolled at the Universiti Teknologi MARA (UiTM) Pulau Pinang, Bertam Campus. This specific, homogenous population was selected to control for potential confounding variables related to differing academic programs, institutional cultures, or geographic locations. A convenient random sampling technique was employed due to the limited time to access the availability of all the students as all students in semester 6, were having practical in various hospital over Malaysia. Every student in the population frame has an equal and independent chance of being selected, ensuring the sample mirrors the overall population

characteristics. By utilizing this design, the study aimed to quantify and describe the relationship between caffeine intake and academic performance within the specified student group, providing foundational data for further research.

3.3. Data Collection

This study involved 103 students (n=103) from the enrolled diploma of pharmacy students in Universiti Teknologi MARA (UiTM) Pulau Pinang, Bertam Campus ranging from gender, different age and semesters. The theoretical and statistical considerations were used to establish the sample size. For basic survey research, the central limit theorem states that a minimum of 30 participants is typically adequate to guarantee statistical power and generalizability (Memon et al., 2020., Roscoe, 1975, RUBIKTOP, 2023). Despite the small sample size, it satisfied the minimal requirements for quantitative research in the social sciences. In addition, Roscoe (1975) recommended a sample size of 30 to 500 for most statistical research. This rule of thumb is supported by the central limit theorem, which stipulates that sampling distribution will approach normality when there are 30 or more respondents, allowing for acceptable statistical inference.

Data was collected using a self-administered questionnaire (the survey instrument), which included closed-ended questions to quantify caffeine consumption patterns and gather demographic information from 22 April 2025 to 5 May 2025, targeting students based on their willingness and availability to participate. Research conditions and confidentiality concerns were clearly communicated to the respondents, who were assured of their anonymity, while their responses would be kept strictly confidential. They were also told that they could stop participating in the survey anytime. The survey instrument was distributed online via Google Forms. Invitations and links were shared with all pharmacy students through the WhatsApp and Telegram messaging platforms, accompanied by written instructions outlining the requirements for participation. The questionnaire was titled: *“Exploring the Influence of Caffeine Intake on the Pharmacy Students’ Academic Performance in UiTM Bertam Campus.”* The questionnaire was divided into four main sections, a total of 30 questions, all of which were required to be completed by the participants. The first section aimed to collect demographic information such as age, gender, and semester of study. The second section consisted of 10 questions intended to assess the respondents’ level of knowledge about caffeine, including its effects, recommended intake, and sources. The study utilized five-point Likert scale values for 10 knowledge domains. The following scores was used for knowledge domain, scores of ‘5’, ‘4’, ‘3’, ‘2’ and ‘1’ for ‘strongly agree’, ‘agree’, ‘neutral’, ‘disagree’ and ‘strongly disagree’ respectively (Nor Asyikin et al., 2015). The third section included 9 questions focusing on the students’ practices related to caffeine consumption, such as how often they consume it and in what form. The final section comprised 8 questions designed to explore students’ behavioral patterns during caffeine intake.

3.4. Data Analysis

All collected data were automatically transferred onto a spreadsheet and subsequently analysed using the IBM SPSS statistical software (version 22). First, frequency analysis and percentage distributions were utilized on the sociodemographic profile of the respondents (gender, age and semester of study). Following this, descriptive statistics (e.g., means and standard deviations) were applied to evaluate the overall levels of students’ knowledge, practices, and behavioural patterns concerning caffeine

consumption. Secondly, a Pearson's Chi-Square test was performed to determine if there were any significant differences in the students' academic performance and their caffeine consumption practices.

4. Results

4.1. Respondents' Demographic Profile

Table 1 illustrated the demographics of respondents that involved in this survey. Based on Table 1, a total of 103 students from UiTM Bertam Campus, Pulau Pinang, participated in this study. The demographic profile revealed that the majority of respondents were female (n=83, 80.6%), while male participants accounted for n=20 (19.4%). Participants were drawn from Year 1 to Year 3 (Semesters 2, 4, and 6). The largest group of participants was from Semester 6 (n=37, 35.9%), followed closely by Semester 4 (n=35, 34.0%), and Semester 2 (n=31, 30.1%). In terms of age distribution, the sample was predominantly young adults, with the largest category being students aged 18 to 20 years (n=54, 52.4%). The next largest group was aged 21 to 23 years (n=46, 44.7%). Students aged 24 to 26 years (n=2, 1.9%) and those aged 27 or above (n=1, 1.0%) represented a small minority of the total sample. These demographic results establish the context for determining the influence of caffeine intake on students' academic performance.

Table 1: Demographics of respondents (n=103)

Characteristics	Frequency (n)	Percentage (%)
Gender		
Male	20	19.4
Female	83	80.6
Age		
18-20	54	52.4
21-23	46	44.7
24-26	2	1.9
27 and above	1	1.0
Semester of Study		
Sem 2	31	30.1
Sem 4	35	34
Sem 6	37	35.9

Table 2 represents the practice regarding caffeine intake among diploma students. The frequency and distribution of caffeine consumption habits were analysed in this analysis across five major domains: frequency of usage, drink type, time of intake, purpose for use, and perceived impact on sleep. The overall frequency of caffeine usage among respondents is displayed in the table. It's noteworthy to note that most respondents (n=65, 61.3%) only sometimes drink caffeine, typically 1-2 times per week. After then, a significant percentage consumes it three to four times a week (n=25, 23.6%). Just 1.9% of respondents said they have never used caffeine. The findings showed that while caffeine consumption was not daily, it was common among the respondents. Caffeine comes primarily from coffee (n=51, 48.1%), followed by tea (n=43, 40.6%). Coffee and tea together account for over 90% of the caffeine sources that have been identified. Other sources, such as energy drinks, soda, and others, account for relatively small percentages (less than 6% each). The amount of caffeine used is comparatively evenly distributed throughout the day. The afternoon has the highest frequency of consumption (n=36, 34.0%). During daytime, the morning (31.1%) and evening (27.4%) are also very popular

times, with a distribution that is about equal. With only 7.5% (n=8) reporting late-night consumption, it is the least popular time.

Table 2: Practice regarding caffeine intake among diploma students

Domain		Frequency(n)	Percentage (%)
Caffeine a day	Never	2	1.9
	Rarely (1-2 times per week)	63	61.20
	3-4 times per week	25	24.3
	Frequently (daily)	10	9.7
	Multiples times a day	3	2.90
Type of caffeinated drinks	coffee	50	48.50
	Tea	43	41.70
	Energy Drinks	3	2.90
	Soda	6	5.80
	Others	1	1.0
Time Consume	Morning	31	30.1
	Afternoon	16	15.5
	Evening	28	27.2
	Late Night	28	27.2
Main Reason Taking Caffeine	Stay awake and focus	34	33.0
	Improve academic	2	1.90
	Out of habit	6	5.80
	For the taste	33	32.0
	No specific reason	28	27.20
Increase caffeine intake during exam	Yes	65	63.10
	No	38	36.90
Average Hours of Sleep	Less than 4 hours	4	3.9
	4-5 hours	47	45.6
	6-7 hours	51	49.5
	More than 8 hours	1	1.0
Caffeine affects sleep quality	Yes, absolutely	28	27.20
	Maybe	45	43.70
	No, it doesn't	30	29.10
	Sometimes, not really	69	67.0
Trouble falling asleep	No, never	22	21.40
	Yes	12	11.70
	Regularly	32	31.10
Nap during the day	Sometimes	65	63.10
	Never	6	5.80

A combination of hedonic (taste) and functional (alertness) factors influence caffeine use. The functional necessity to be alert and focused is the most common explanation (n=34, 32.1%). Reasons relating to taste are also important. Together, flavour (21.7%) and overall drink taste (19.8%) account for more than 41% of motivations. The other explanations are due to habit (8.5%) and lack of precise reason (17.9%).

Additionally, the domain "Increase caffeine intake during exam" investigates how caffeine is believed to influence the quality of sleep. Caffeine is used as a study aid, as reported by a considerable majority of respondents (n=69, 65.1%), although a smaller percentage (n=38, 36.90%) did not increase their caffeine intake during exam periods. The average sleep duration is 6-7 hours (n=51, 48.1%), with 4-5 hours (40.6%) coming in second. This implies that most sample members had comparatively short sleep durations, which may be impacted by caffeine use or academic responsibilities. This implies that most sample members had comparatively short sleep durations, which may be impacted by caffeine use or academic responsibilities.

Some respondents (29.10%) said that caffeine have an impact on their sleep quality, despite 70.90% (combined "Yes, absolutely" and "Yes, maybe") believing that it did. While a small percentage of students (n=12, 11.79%) reported having trouble falling asleep when taking caffeine, the majority of students (89.40%) did not experience difficulty falling asleep despite consuming caffeine (combining "Sometimes, not really" and "No, never"). The fact that almost all respondents say they nap during the day (Yes at 31.1% and Sometimes at 63.10%) indicates that napping is a very widespread habit, probably to make up for the short average amount of sleep each night. Just 5.8% of respondents say they never nap. The high frequency of naps could be a coping mechanism for the stated low average amount of sleep per night.

According to this study, the majority of pharmacy students consumed coffee (n=51, 48.1%) and tea (n=43, 40.6%) to get their caffeine. These beneficial drinks corroborate the results of other studies that revealed coffee to be the most preferred caffeine source among university students in the United Arab Emirates, with tea following in second (Riera-Sampol et al., 2022; Jamal & Abu Hassan, 2024; Kharaba et al., 2022). In line with the results of a study published in Beirut, university students, especially during exams, consumed a significant amount of caffeine from sources other than coffee and energy drinks (Khalil & Antoun, 2020).

Similarly, 42.6% of Malaysian university students reported consuming an average of 306.98 mg of caffeine daily, with 81.3% reporting taking it 1-3 times a week. Staying awake and aware was one of the primary reason given by the 28.3% of Malaysian students who showed symptoms of caffeine dependence in the same study (Ramli et al., 2019). These results are consistent with the current study, which found that a significant portion of students (n=65.61.3%) used caffeine 1-2 times per week in order to stay alert and focused while studying and doing assignments (n=34.31.%).

The current study additionally discovered that 70.90% of participants had poor sleep quality after consuming caffeine, which is supported by previous studies showing that caffeine consumption has a negative impact on university students' sleep quality. About 55.3% of 300 Malaysian undergraduate students who participated in the study claimed they had poor sleep quality, and there was a significant ($p<0.01$) link between caffeine use and poor sleep quality (Khairul Ikram et al., 2024). Similarly, a study conducted in Saudi Arabia revealed that 80.7% of 476 college students had poor sleep quality, and 83.3% of regular coffee drinkers had trouble falling asleep (AlSharif et al., 2018). A Spanish study of 886 undergraduates identified that caffeine use was related to worse subjective sleep quality ($p<0.001$), even though the primary motivation for caffeine consumption was cognitive enhancement (Riera-Sampol et al., 2022).

The relationship between academic performance of students and practices of caffeine intake among students is illustrated in Table 3. Pearson Chi-Square test was conducted to examine the relationship between the academic performance of students and all nine practices of caffeine intake. Among the nine practices tested, only one practice revealed a statistically significant association with academic performance: the frequency of taking naps during the day. The result showed a statistically significant association between academic performance and the frequency of taking naps during the day, $\chi^2(6, N=103)=20.412, p=0.002$. Since the p -value is smaller than 0.05 ($p<0.05$), we reject the null hypothesis.

Table 3: Relationship between academic performance of students and practices of caffeine intake among students

Domain		Academic Performance (CGPA)				Chi-square value	p-value	df
		Excellent (>3.5)	Good (3.00-3.49)	Average (2.75-3.00)	Poor (<2.75)			
Caffeine a day	Never	0	1	1	0	10.324	0.588	12
	Rarely (1-2 times per week)	32	23	7	1			
	3-4 times per week	13	6	6	0			
	Frequently (daily)	4	3	3	0			
	Multiples times a day	3	0	0	0			
Type of caffeinated drinks	coffee	23	15	12	0	7.865	0.796	12
	Tea	23	15	4	1			
	Energy Drinks	1	1	1	0			
	Soda	4	2	0	0			
	Others	1	0	0	0			
Time Consume	Morning	20	5	6	0	11.729	0.229	9
	Afternoon	9	4	3	0			
	Evening	13	10	5	0			
	Late Night	10	14	3	1			
Main Reason Taking Caffeine	Stay awake and focus	16	11	7	0	8.265	0.764	12
	Improve academic	2	0	0	0			
	Out of habit	4	1	1	0			
	For the taste	19	10	3	1			
	No specific reason	11	11	6	0			
Increase caffeine intake during exam	Yes	36	17	12	0	4.861	0.182	3
	No	16	16	5	0			

Average Hours of Sleep	Less than 4 hours	1	2	1	0	7.806	0.554	9
	4-5 hours	23	15	8	1			
	6-7 hours	28	16	7	0			
	More than 8 hours	0	0	1	0			
Caffeine affects sleep quality	Yes, absolutely	13	8	7	0	5.696	0.458	6
	Maybe	25	13	7	0			
	No, it doesn't	14	12	3	1			
Trouble falling asleep	Sometimes, not really	35	21	13	0	4.953	0.550	6
	No, never	10	8	3	1			
	Yes	7	4	1	0			
Nap during the day	Regularly	14	13	5	0	20.412	0.002	6
	Sometimes	37	17	11	0			
	Never	1	3	1	1			

In contrast, the analysis revealed that the other eight practices of caffeine showed no significant relationship with students' academic performance. The frequency of caffeine intake per day demonstrated a non-significant association with academic performance, $\chi^2 (12, N=103)=10.324, p=0.588$. Since the p -value is greater than 0.05, we do not reject the null hypothesis. For the type of caffeinated drinks usually consumed, the test showed that there was no significant association with academic performance, $\chi^2 (12, N=103)=7.865, p=0.796$. Since the p -value is greater than 0.05 ($p>0.05$), we do not reject the null hypothesis. Similarly, no significant association was presented between academic performance and the time the students usually consume caffeine, ($\chi^2 (9, N=103)=11.729, p=0.229$). As the p -value is more than 0.05, we do not reject the null hypothesis. For the main reason for taking caffeine among students, there was no statistically significant association with academic performance, $\chi^2 (12, N=103)=8.265, p=0.764$. Since the p -value is greater than 0.05, we do not reject the null hypothesis. In addition, there was no significant association between academic performance and the increase of caffeine intake during the exam period among students, ($\chi^2 (3, N=103)=4.861, p=0.182$). Since the p -value is above 0.05 ($p>0.05$), the null hypothesis was not rejected.

As a result, there was no statistically significant association between academic performance and the average number of hours students sleep on school or workdays, $\chi^2 (9, N=103)=7.806, p=0.554$. Since the p -value is greater than 0.05, we do not reject the null hypothesis. For the relationship between academic performance and the students' belief that caffeine affects their sleep quality, the statistical test showed that there was no significant association between the two variables, $\chi^2 (6, N=103)=5.696, p=0.458$. Since the p -value is greater than 0.05, we do not reject the null hypothesis. Moreover, the findings revealed that the association between academic performance and the student having trouble falling asleep after consuming caffeine was not significant, $\chi^2 (6, N=103)=4.953, p=0.550$. As the p -value is greater than 0.05, the null hypothesis was not rejected.

The purpose of this study was to examine the practices of caffeine intake among diploma pharmacy students at UiTM Bertam and how these practices may influence their academic performance. The most striking result to emerge from the data is that only one domain out of nine related to caffeine intake practices, "Nap during the day," presented a significant

association with academic performance, with a p -value of 0.002 (less than 0.05). This finding is consistent with research conducted by [Brooks and Lack \(2006\)](#), which shows that short naps lasting 10 to 30 minutes can boost thinking skills and reduce tiredness, particularly after inadequate sleep. Similarly, [Lovato and Lack \(2010\)](#) suggested that daytime naps can help people feel more awake and improve their mood and memory, especially after poor nighttime sleep. It is plausible that high-achieving students take naps as a functional way to cope with a heavy academic workload and associated sleep deprivation. Since many university students have irregular sleep patterns and stay up late studying, taking naps during the day may be a crucial, non-caffeine-related strategy to maintain focus and academic productivity.

The overall frequency of caffeine intake did not appear to influence the sample's CGPA, which is demonstrated by the lack of a significant correlation between students' consumption frequency and academic performance. These findings support [Wimbush \(2023\)](#) research, which demonstrated that while caffeine is known to improve mood, focus, and short-term memory by increasing dopamine levels, these short-term advantages may not consistently translate into long-term academic success. Instead, numerous other factors are likely to impact academic performance, such as study habits, time management, and chronic sleep quality. Furthermore, with a p -value of 0.796, it is apparent that students' academic performance cannot be influenced by the kind of caffeinated beverages they typically consume. This finding reflects the study by [Jamal and Abu Hassan \(2024\)](#), which also found no significant correlation between the two variables. Although different caffeinated drinks contain varying levels of caffeine, their effects may depend more on individual tolerance and overall consumption patterns, offering no certainty in increasing students' academic performance.

In addition, a non-significant association was found between academic performance and the usual time students consumed caffeine. While 20 out of 52 students with excellent CGPAs consumed their caffeine in the morning, the suggested optimal time to consume coffee is mid-to-late morning when cortisol levels are naturally lower to increase the hormone's boosting effect ([Van De Walle, 2020](#)). Due to the study's small sample size, we cannot establish a significant association between these two variables, and the short duration of caffeine's effects may also limit its long-term academic benefit.

Interestingly, no significant relationship was found between students' primary motivation for consuming caffeine and their academic achievement. Consistent with the common perception of caffeine enhancing focus, 34 out of 103 participants chose to stay awake and focus as their main reason. These results corroborate previous research by [Mahoney et al. \(2019\)](#), who reported that 79% of their college student respondents also chose to feel more awake as their primary reason. However, due to caffeine's primary short-term cognitive benefits, it appears that a student's long-term academic performance does not rely on it. It likely assists students during revision or late-night study periods, but other factors play a greater role in academic success.

Consequently, there is also no apparent correlation between increased caffeine consumption during the examination period and academic achievement, despite 65 out of 103 respondents reporting an increase in intake. This supports the previous research by [Mohannad Hawamdeh et al. \(2024\)](#), which reported the same results in a study involving students at The Hashemite University. Students often use caffeine as a coping mechanism to deal with academic stress, believing it can improve memory ([Mohannad Hawamdeh et](#)

al., 2024). While this may assist students during the revision process, increasing caffeine intake can also result in side effects like anxiety.

Most students reported using caffeine to stay alert while studying but did not consume it in excessive amounts. Some reported minor sleep issues, but overall, the impact on sleep was not severe. These results are in line with the previous study by O'Callaghan et al. (2018), who discovered that students often use caffeine for academic reasons but may not fully realize its effect on sleep. Consistent with findings by Hershner and Chervin (2014), regular caffeine use among students can lead to poor sleep quality and daytime tiredness. While the current study shows no serious problems, continued use may affect students' health and sleep over time.

In terms of sleep, there was no apparent link between students' average sleep duration during the school week and their academic achievement. These findings differed from various other research studies that demonstrate a direct correlation between adequate sleep and academic success. For instance, Khaled et al. (2025) discovered poor sleep quality is common among medical students, which can affect academic performance and general health. Likewise, Lemma et al. (2013) found that students with better sleep quality scores achieved better academic performance. However, sleep affects each person differently. Some students might need less sleep and still get good grades because they manage their time well, practice effective study methods, or have genetic predispositions for needing less sleep.

Finally, the Chi-Square test showed that there is no significant association between academic performance and the poor sleep quality. This finding is supported by previous research suggesting that poor sleep quality was significantly associated with elevated levels of stress but had no statistically significant relationship with academic performance (Alotaibi et al., 2020). Students reported that caffeine affects their sleep, but this did not necessarily translate into poor sleep quality or lower grades. Additionally, many students may manage their caffeine intake responsibly or adapt their study habits to offset any sleep disturbances. A student's academic performance is ultimately shaped by many factors that influence their learning and progress (Suleiman et al., 2024).

5. Conclusion

This study aimed to examine the caffeine intake practices among diploma pharmacy students at UiTM Bertam and their potential influence on academic performance. The findings reveal a complex and largely non-significant relationship between caffeine consumption and academic success. The core finding is the lack of a significant correlation between caffeine intake practices and students' overall CGPA. This suggests that while students widely use caffeine as a short-term aid for alertness and focus especially under academic stress, it is not a primary determinant of long-term academic achievement. Short-term cognitive benefits do not appear to reliably translate into better sustained performance. Crucially, the only significant association found was between napping during the day and better academic performance. In summary, diploma pharmacy students at UiTM Bertam appear to use caffeine responsibly as a coping mechanism for their heavy academic load, but their academic success is ultimately governed by structural factors like effective time management, study habits, and sleep optimization. Napping is a scientifically supported method for reducing fatigue and boosting alertness, which is more effective than solely relying on caffeine. Further research is needed to investigate the context and mechanism of the napping behavior observed. Researcher can conduct a

longitudinal study tracking students' caffeine practices and academic performance over multiple semesters to determine if long-term, chronic caffeine use eventually leads to the negative sleep and health outcomes suggested by previous literature.

Ethics Approval and Consent to Participate

The research complied with UiTM Research Ethics Committee prior to data collection. Informed consent was obtained from all respondents who were ascertained of their anonymity, with their responses kept strictly confidential.

Acknowledgement

The authors wish to thank all the participants of the study as well as Faculty of Pharmacy, Universiti Teknologi MARA Cawangan Pulau Pinang, Kampus Bertam and Academy of Contemporary Islamic Studies (ACIS), Universiti Teknologi MARA Cawangan Pulau Pinang, Kampus Permatang Pauh for technical supports. All authors have contributed equally to the study.

Funding

No funding

Conflict of Interest

The authors report no conflict of interest regarding this study in terms of the research, or publication of this article.

References

- Alotaibi, A. D., Alosaimi, F.M., Alajlan, A. A., & Abdulrahman, K. A. (2020). The relationship between sleep quality, stress, and academic performance among medical students. *Journal of Family & Community Medicine*, 27(1), 23–28. https://doi.org/10.4103/jfcm.JFCM_132_19
- AlSharif, S. M., Al-Qathmi, M. S., Baabdullah, W. M., Alhrkan, T. A., Fayoumi, Y. A., Alhejaili, F., & Wali, S. O. (2018). The Effect of Caffeinated Beverages on Sleep Quality in College Students. *Saudi Journal of Internal Medicine*, 8(1), 43-48. <https://doi.org/10.32790/sjim.2018.8.1.6>
- Annuar, N. A., Shia, J. K. S., Yob, N. J., Zakaria, Y., & Hussin, S. N. (2023). Caffeine Intake and Its Association with Mental Health Status among Pharmacy Students at UiTM Puncak Alam. *Malaysian Journal of Medicine and Health Sciences*, 19(3), 36–44. <https://doi.org/10.47836/MJMHS.19.3.6>
- Arul Prakasam, K. C., Glady, G. G., Grant, C. J., Aarthy, P., & Shaji, H. M. (2022). Knowledge, attitude, and practice on caffeine and caffeinated beverages consumption among college students. *International Journal of Pharmacy and Pharmaceutical Research*, 25 (3), 329-339. <https://ijppr.humanjournals.com/wp-content/uploads/2022/11/23.Arul-Prakasam-K.C-Glady-Gloria-Grant-C.J-Aarthy-P-Feba-Shaji-Harish-M-Azad-VP.pdf>
- Bhojaraja, V. S., Janardhan, H., Abdul Hameed, N., Gulsoom, F. A. R., & Ali, M. Z. (2016). Knowledge, attitude and practices towards consumption of caffeine containing

- drinks among the student population of Ras al-Khaimah medical and health sciences university, UAE. *International Journal of Research in Medical Sciences*, 4(8), 3537-3541. <https://doi.org/10.18203/2320-6012.ijrms20162326>
- Brooks, A. & Lack, L. (2006). A Brief Afternoon Nap Following Nocturnal Sleep Restriction: Which Nap Duration is Most Recuperative?. *Sleep*, 29(6), 831-840. <https://doi.org/10.1093/sleep/29.6.831>.
- Dahlawi, M., Hennawi, Y. B., & Baharith M., Almurakshi, M., Bawashkhah, A., Dahlawi, S., Alosaimi, S. B., Alnahdi, F. S., Alessa, T. T., Althobity, O., & Obaid, M. (2024). The Association Between Caffeine Consumption and Academic Success in Makkah Region, Saudi Arabia. *Cureus*, 16(4), e57975. <https://doi.org/10.7759/cureus>.
- Jaferi, N. A. M., Hamdan, N. E. A., Tan, C. S., Long, C. M., & Manan, M. M. (2023). A cross-sectional study: Caffeine consumption and their perception among pharmacy students. *Pharmacy & Pharmacology International Journal*, 11(1), 15-19. <https://doi.org/10.15406/ppij.2023.11.00396>
- Jamal, N. F., & Abu Hasan, N. (2024). Caffeine Consumption and Academic Performance: A Cross-Sectional Study among University Students in Malaysia. *International Journal of Research and Innovation in Social Science*, 8(09), 2752-2759. <https://doi.org/10.47772/ijriss.2024.8090229>.
- Gilliland, K., & Andress, D. (1981). Ad lib caffeine consumption, symptoms of caffeinism, and academic performance. *The American journal of psychiatry*, 138(4), 512-4, <https://doi.org/10.1176/ajp.138.4.512>
- Hershner, S. D., & Chervin, R. D. (2014). Causes and consequences of sleepiness among college students. *Nature and Science of Sleep*, 6, 73-84. <https://doi.org/10.2147/NSS.S62907>
- Jahrami, H., Al-Mutarid, M., Penson, P. E., Al-Islam Faris, M., Saif, Z., & Hammad, L. (2020). Intake of Caffeine and Its Association with Physical and Mental Health Status among University Students in Bahrain. *Foods*, 9(4), 473. <https://doi.org/10.3390/foods9040473>
- Jin, M. J., Yoon, C. H., Ko, H. J., Kim, H. M., Kim, A. S., Moon, H. N., & Jung, S. P. (2016). The Relationship of Caffeine Intake with Depression, Anxiety, Stress, and Sleep in Korean Adolescents. *Korean journal of family medicine*, 37(2), 111-116. <https://doi.org/10.4082/kjfm.2016.37.2.111>
- Khairul Ikram, E. H., Rosli, N. A., Mat Hussin, A., & Chasni, A. N. (2024). The Effect of Caffeine Consumption on Sleep Quality among Undergraduate Students in Malaysia. *Jurnal Gizi dan Pangan*, 19(1), 79-86. <https://doi.org/10.25182/jgp.2024.19.Supp.1.79-86>
- Khaled, A., Almaghaslah, D., Siddiqua, A., Kandasamy, G., & Orayj, K. (2025). Impact of sleep quality on academic achievements of undergraduate medical students: a cross-sectional study from Saudi Arabia. *BMC medical education*, 25(1), 59. <https://doi.org/10.1186/s12909-025-06664-3>
- Khalil, M., & Antoun, J. (2020). Knowledge and consumption of caffeinated products by university students in Beirut, Lebanon. *Clinical Nutrition ESPEN*, 37, 213-217. <https://doi.org/10.1016/j.clnesp.2020.02.014>.
- Khan, M. S., Nisar, N., & Ahmed Naqvi, S. A. (2017). Caffeine Consumption and Academic Performance among Medical Students of Dow University of Health Science (DUHS), Karachi, Pakistan. *Annals Abbasi Shaheed Hospital & Karachi Medical & Dental College*, 22(3), 179-184. <https://doi.org/10.58397/ashkmdc.v22i3.126>
- Kharaba, Z., Sammani, N., Ashour, S., Ghemrawi, R., Al Meslamani, A. Z., Al-Azayzih, A., Buabeid, M. A., & Alfoteih, Y. (2022). Caffeine Consumption among Various University Students in the UAE, Exploring the Frequencies, Different Sources and Reporting Adverse Effects and Withdrawal Symptoms. *Journal of nutrition and metabolism*, 2022, 5762299. <https://doi.org/10.1155/2022/5762299>

- Lemma, S., Berhane, Y., Worku, A., Gelaye, B., & Williams, M.A. (2014). Good quality sleep is associated with better academic performance among university students in Ethiopia. *Sleep and Breathing=Schlaf & Atmung*, 18(2), 257–263. <https://doi.org/10.1007/s11325-013-0874-8>
- Lovato, N., & Lack, L. (2010). The effects of napping on cognitive functioning. *Progress in brain research*, 185, 155–166. <https://doi.org/10.1016/B978-0-444-53702-7.00009-9>.
- Mahoney, C. R., Giles, G. E., Marriott, B. P., Judelson, D. A., Glickman, E. L., Geiselman, P. J., & Lieberman, H. R. (2019). Intake of caffeine from all sources and reasons for use by college students. *Clinical Nutrition*, 38(2), 668–675. <https://doi.org/10.1016/j.clnu.2018.04.004>
- McLellan, T. M., Caldwell, J. A., & Lieberman, H. R. (2016). A review of caffeine's effects on cognitive, physical and occupational performance. *Neuroscience and biobehavioral reviews*, 71, 294–312. <https://doi.org/10.1016/j.neubiorev.2016.09.001>
- Memon, M. A., Ting, H., Cheah, J-H., Ramayah, T., Chuah, F., & Cham, T. H. (2020). Sample size for survey research: Review and recommendations. *Journal of Applied Structural Equation Modeling*, 4(2), i-xx. [https://doi.org/10.47263/JASEM.4\(2\)01](https://doi.org/10.47263/JASEM.4(2)01).
- Mohannad Hawamdeh, M., Mashaal, A. H., Obaidat, S. M., Al-Nassan, S., Shallan, A., Altam, T. A., & Muhsen, A. (2024). Effects of Caffeine Consumption on Exam Performance Throughout University Students. *South Eastern European Journal of Public Health*, XXV(S1), 2244–2250. <https://doi.org/10.70135/seejph.vi.2406>
- Nor Asyikin, Y., Nani, D., Nor Azwany, Y., Shamsul Kamal, A., Imran, A., Shaiful Bahari, I., & Rosediani, M. (2015). Knowledge of and attitudes towards of menstrual disorders adults in north-eastern state of Peninsular Malaysia. *Malaysian family physician: the official journal of the Academy of Family Physicians of Malaysia*, 10(3), 2–10. eCollection 2015.
- O'Callaghan, F., Muurlink, O., & Reid, N. (2018). Effects of caffeine on sleep quality and daytime functioning. *Risk management and healthcare policy*, 11, 263–271. <https://doi.org/10.2147/RMHP.S156404>.
- Ramli, N.A. A., Sriperumbuduru, V.P.K., Ghazi, H.F., & Dalayi, N. (2019). A Study of Caffeine Consumption Patterns and Dependence among Management and Science University Students. *Indian Journal of Forensic Medicine & Toxicology*, 13(1), 101. <https://doi.org/10.5958/0973-9130.2019.00021.5>
- Riera-Sampol, A., Rodas, L., Martínez, S., Moir, H.J., & Tauler, P. (2022). Caffeine Intake among Undergraduate Students: Sex Differences, Sources, Motivations, and Associations with Smoking Status and Self-Reported Sleep Quality. *Nutrients*, 14(8), 1661. <https://doi.org/10.3390/nu14081661>
- Roscoe, J. T. (1975). *Fundamental research statistics for the behavioral sciences (2nd ed.)*. Holt, Rinehart and Winston, Inc.
- RUBIKTOP. (2023, September 14). The magic number 30: Why a sample size of 30 is often considered sufficient for statistical significance. *LinkedIn*. <https://www.linkedin.com/pulse/magic-number-30-why-sample-size-often-considered-sufficient/>
- Suleiman, I.B., Okunade, O.A., Dada, E.G., & Ezeanya, C. U.(2024). Key factors influencing students' academic performance. *Journal of Electrical Systems and Information Technology*, 11(1), 41. <https://doi.org/10.1186/s43067-024-00166-w>
- Tahir, D., Rehman, I., & Zahra, T. (2022). Assessing the correlation between caffeine Consumption and its effect on the academic performance of medical students of Shifa College of Medicine, Islamabad, Pakistan: A Cross-Sectional Study. *Journal of Rawalpindi Medical College*, 26(1), 5-10. <https://doi.org/10.37939/jrmc.v26i1.1559>

- Van De Walle, G. (2020, May 15). When Is the Best Time to Drink Coffee? *Healthline*.
<https://www.healthline.com/nutrition/best-time-to-drink-coffee>.
- Wang, X., & Cheng, Z. (2020). Cross-Sectional Studies: Strengths, Weaknesses, and Recommendation. *Chest*, *158*, S65–S71.
<https://doi.org/10.1016/j.chest.2020.03.012>
- Wimbush, R. (2023, May 19). Caffeine: can it help or hinder our studying abilities? *MyLaTrobe*.
<https://www.latrobe.edu.au/mylatrobe/caffeine-can-it-help-or-hinder-our-studying-abilities/>