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### Quantitative Research Article

## Coffee Consumption and Screen Time with College Students' Sleep Quality

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### Abstract

**Background/ problem:** The rise of coffee shops has made coffee consumption a lifestyle among college students, especially during the pandemic. Coupled with screen time activities, using gadgets for a long time can affect sleep quality and health.

**Objective/ purpose:** This study aims to analyze the relationship between coffee consumption, screen-time activity duration, and sleep quality of university students during the new normal period.

**Design and Methodology:** This study used a cross-sectional study design involving 267 students of the Faculty of Health Sciences of Universitas Pembangunan Nasional Veteran Jakarta (UPNVJ) who were selected using the Proportionate Stratified Random Sampling technique. The research instrument used questionnaires to measure coffee consumption, screen time, and the Pittsburgh Sleep Quality Index (PSQI).

**Results:** Most respondents had poor sleep quality (53.6%), were heavy coffee consumers (56.2%), and did excessive screen time activities (57.3%). There was a significant relationship between coffee consumption and student sleep patterns ( $p = 0.006$ ;  $POR = 2.053$ , 95% CI: 1.256- 3.356) and a significant relationship between screen-time and sleep patterns of Health Science UPNVJ students ( $p = 0.018$ ;  $POR = 1.863$ , 95% CI: 1.140- 3.044).

**Conclusion and Implications:** Coffee consumption and duration of excessive screen time activities are closely related to students' sleep quality.

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## Introduction

The COVID-19 pandemic has significantly impacted the sleep quality of college students, exacerbating prevalent sleep disorders that afflict the student's demographic. According to Santos et al., only 24.4% of college students reported good sleep quality during remote learning, while 62.8% suffered from poor sleep quality and 12.8% were diagnosed with sleep disorders. This indicates a significant decline from pre-pandemic statistics, where 34.1% of students reported good sleep quality in the USA (Santos et al., 2023).

Coffee can now be served in a variety of ways beyond the traditional method of brewing coffee beans in hot water and then adding sugar or milk. Sales of coffee increased along with the introduction of various coffee-making methods. For people who live in large cities, coffee has become a need and a new way of

life, and is increasingly popular among young people and in corporate circles (Anand, 2008).

The everyday routines of college and university students have significantly changed because of the COVID-19 pandemic, including their use of screens, coffee consumption, and sleep patterns. In the new normal era, the new academic implementation, which began in August 2020, has seen students and educators carry out the learning process online. In the implementation of online learning, there may be obstacles that arise. Online learning needs supporting technology facilities, because all attributes of its implementation require the use of existing technology (Pradana & Syarifuddin, 2021). One of the obstacles to online learning is the internet, which not all students have at home. So many of them do campus assignments or projects by going to coffee shops that provide Wi-Fi or internet facilities (Titiek Murniati et al., 2022)

In a study by Muhammad and Hussain (2021), it was discovered that among college and university students, screen time and sleep quality are significantly correlated. (Muhammad et al., 2021). The study discovered that college students who use screens more often have less restful sleep. This is in line with another study by Garret et al. (2016) that discovered that college students who use social media also get little sleep (Garett et al., 2018) .

College and university students frequently consume caffeine, which has been shown to have an impact on how well they sleep. In a 2013 study, Lohsoonthorn et al. discovered a link between frequent caffeine consumption and poor sleep quality among Thai college students (Lohsoonthorn et al., 2013). Another study by Choi (2020) found that abusing caffeinated beverages may lead to poor sleep quality among Korean college students (Choi, 2020).

Apart from the caffeine contained in coffee, one's sleep quality can also be affected by screen-time. In today's adults, screen time is a concern, especially at night, which can reduce sleep duration (Kadita & Wijayanti, 2017). The current COVID-19 pandemic makes students undergo online learning using laptops, tablets, and smartphones through applications such as Schoology, Google Classroom, and Zoom so that screen time activities increase (Pratiwi & Sodik, 2018) .

Using devices can increase screen time. One study revealed that 53.92 percent of people reported increased screen time during the pandemic (Bhutani et al., 2021). Studies of students in India and Spain have shown an increase in screen time before and during the pandemic (Trott et al., 2022). A study in Italy proved that the prevalence of students with poor sleep quality increased from 58 percent to 73.3 percent (Marelli et al., 2021).

Research by Bambangafira and Nuraini (2017), regarding the quality of sleep of health science students in Indonesia, found that 74.8% of students have poor sleep quality (Bambangafira & Nuraini, 2017). Meanwhile, research by Tasya (2021) regarding the comparison of screen-time based on the quality and quantity of sleep of FK UPN Veteran Jakarta students during the COVID-19 pandemic states that 56.9%

of students have poor sleep quality, and students with high screen time tend to have poor sleep quality (Bambangsafira & Nuraini, 2017).

Some previous research on student sleep quality has shown that there is still less than ideal quality of sleep among students in Indonesia (Arum Meiranny & Avida Muanisatul Chabibah, 2022; Hanifah et al., 2023; Purdiani, 2014). Based on preliminary studies of FIKES UPN Veteran Jakarta students, the average student has a habit of drinking coffee and screen time. Among the 19 students, only four (21%) are not fond of drinking coffee, and 15 students (79%) are fond of drinking coffee.

A total of 13 students (68.5%) drink coffee less than three times a week, and six others (31.5%) drink coffee more than 3 times. The time of consumption also varies, namely at night, as many as six students (31.5%), during the day, two students (10.5%), in the afternoon, one student (5%), and 10 other students (53%) at all three times. Students' sleep patterns after consuming coffee on average became irregular, as many as 13 students (68.5%), while the other six (31.5%) were regular. As for screen-time, 100% of respondents did screen-time for more than two hours and seven of them (37%) experienced irregular sleep patterns, while the other 12 students (63%) had regular sleep patterns. The preliminary study data can describe the phenomenon that occurs in FIKES UPN Veteran Jakarta students, namely the habit of consuming coffee and high screen-time that which can cause irregular sleep patterns. Therefore, this study investigates the relationship between coffee drinking habits, screen time activities, and student sleep quality in the new normal era since 2020 and continues to this day (since COVID-19, the learning system is via online and anywhere, mostly done in cafes). until now, still using gadgets. At UPNVJ, there is an electronic platform for the learning process, and it continues to this day (since COVID-19, the learning system is via online and anywhere, mostly done in cafes). until now, still using gadgets. At UPNVJ, there is an electronic platform for the learning process so that students are required to use gadgets such as cellphones or laptops in accessing learning materials, and this has led to an increase in a sedentary lifestyle.

## Methods

This research utilized a cross-sectional study design, which was conducted from November to January 2022. The population of this study was all active students of the Faculty of Health Sciences UPN Veteran Jakarta, which amounted to 1,614 students. The sample number used in this study amounted to 267 students based on the Proportionate Stratified Random Sampling technique. The inclusion criteria of this study are active students Faculty of Health Sciences UPN Veteran Jakarta in 2021. The dependent variable of this study is sleeping pattern quality, measured by the Pittsburgh Sleep Quality Index (PSQI) questionnaire. According to Setyowati & Chung (2020), the PSQI index is valid for Indonesian adolescent sleep quality measurement (Setyowati & Chung, 2021). Because of the data being un-normally distributed, the cutoff using median value, if the total score is  $<31$ , then the sleep pattern is good, and if the total score is  $\geq 32$ , then the sleep pattern is bad.

The independent variables in this study consisted of coffee consumption (light or heavy) and screen

time (moderate or excessive). The cut-off on the coffee consumption variable was determined by looking at the median value, which is 9. So it can be said that light coffee consumption if the total score on the questionnaire is  $\leq 8$  and poor coffee consumption the total score is  $\geq 9$ , which is measured by the frequency of consuming coffee (1-3 cups or  $> 3$  cups), the type of coffee consumed (black coffee, mixed coffee or other types of coffee drinks), the dose of coffee used (1 tea spoon, 2 tsp, 3 tea spoon or 1 pack) and the time of consuming coffee (morning, afternoon, evening or night). Cut off Screen-time based on media value is moderate if the total score on the questionnaire is  $< 12$ , and for excessive screen-time, the total score is  $\geq 13$ .

This study used univariate to bivariate analysis. In univariate analysis, we use analysis to see the distribution and frequency of the variables studied, and chi-square for bivariate analysis to see the relationship of independent variables to the dependent variable.

## Results

This research found that based on PSQI score measurements, as many as 143 students (53.6%) experienced poor sleep patterns, while respondents who suffered from good sleep patterns numbered as many as 124 students (46.4%). Most respondents are female (80.5%) and come from 6 study programs. Most students have heavy coffee consumption habits (56.2%) and excessive screen time activity (57.3%) (see Table 1).

**Table 1. Respondent Characteristics, Coffee Consumption, Screen Time and Sleep Quality Score**

Respondent Characteristics	n	%
Gender		
Male	52	19.5
Female	215	80.5
Study Program background		
Nursing Profession	16	6.0
Public Health	82	30.7
	56	21.0
Nutrition	22	8.2
Physiotherapy	23	8.6
Nursing Diploma	68	25.5
Nurse bachelor Program		
Coffee Consumption		
Light	117	43.8
Heavy	150	56.2
Screen time		
Moderate	114	42.7
Excessive	153	57.3
Sleep Quality		
Good	124	46.4
Poor	143	53.6

Description: n = number of samples / frequencies

The percentage of students who consume heavy coffee is greater in having poor sleep patterns, namely 92 students (61.3%), compared to students who consume light coffee, as many as 51 students (43.6%). The chi-square test on light coffee consumption showed a p-value of 0.006, which means  $p < 0.05$ . These results show a correlation between coffee consumption and sleep patterns. From the statistical test results, the value of POR is = 2.053 (95% CI: 1.256 - 3.356). So it can be said that students who consume heavy coffee have a 2.053 times greater risk of having poor sleep patterns compared to students who consume light coffee.

The research obtained that most students of the Faculty of Health Sciences UPN Veteran Jakarta do excessive screen time. The statistical test resulted in a p-value of 0.018; POR value of 1.863 (95% CI: 1.140 - 3.044), which means that there is a significant correlation between screen-time and sleep patterns. Based on its nature, screen time is categorized as interactive screen time and passive screen time (see Table 2).

**Table 2. Association of Respondent's Gender, Coffee Consumption, and Screen Time Activity**

Respondent's Gender, Coffee Consumption, and Screen Time Activity		Sleep Quality		Chi square
		Good	Bad	
Gender	Male	32 (61.5%)	20 (38.5%)	0.141
	Female	92 (42.8%)	123 (57.2%)	
Coffee consumption	Light	66 (56.4%)	51 (43.6%)	0,006 (POR:2,05; CI:1.26—3.36)
	Heavy	58 (38.7%)	92 (61.3%)	
Screen time activity	Moderate	63 (55.3%)	51 (44.7%)	0,018 (POR:1,863 CI:1.14 – 3.04)

This research found that based on PSQI score measurements as many as 143 students (53.6%) experienced poor sleep patterns, while respondents who suffered from good sleep patterns as many as 124 students (46.4%). Most respondents are female (80.5%) and comes from 6 study program. Most students have heavy coffee consumption habits (56.2%) and excessive screen time activity (57.3%) (seen Table 1). Marelli et al., (2021) study in Italy found that the prevalence of sleep disorders in college students had increased significantly during the COVID-19 pandemic before 24% to reaching 40%, while administrative staff before the COVID-19 pandemic experienced sleep initiation difficulties of only 15% now increased to 42% (Marelli et al., 2021).

Sleep problems have a clear correlation with mental health, psychiatric illness, and disorders related to anxiety and mood. In addition, it was found that spending a lot of time on the Internet is associated with poor sleep quality and may further lead to increased psychological distress (i.e., stress, anxiety, and depression) among young adults. Poor use of the internet can also negatively affect circadian rhythms

causing insomnia as well as circadian rhythms leading to insomnia as well as other sleep disorders. As a result of the COVID-19 pandemic, there has been a decrease in face-to-face social interactions and an increase in time spent indoors, resulting in time spent indoors, resulting in an increased reliance on social media and reliance on social media and online entertainment platforms for social interaction, which affects which also affects one's sleep patterns (Tahir et al., 2021).

Sleep quality is a significant factor in academic performance among college and university students. A study by Paudel et.al (2022) found that poor sleep quality is associated with lower academic performance among non-depressed university students (Paudel et al., 2022). Another study by Hershner (2020) found that sleep quality is associated with academic performance among first-year medical students (Hershner, 2020). Therefore, college and university students must be concerned about their sleep quality to improve their academic performance.

Coffee consumption has a significant correlation with sleep quality because the caffeine in coffee has a stimulating effect on the central nervous system and metabolic system. Coffee consumption can lead to sleep disturbances. According to Drake et.al (2013) research, there was severe sleep disturbance regarding the 400 mg caffeine consumption 30 minutes before bedtime. Lifestyle influences have encouraged students to the consumption of caffeinated products, especially coffee and energy drinks (Drake et al., 2013).

Similarly, a nationally representative study in the United States found that regular caffeine use decreased subjective sleep quality and increased sleep latency (Chaudhary et al., 2016). However, the effects of caffeine on sleep can depend on the timing and amount of consumption (Weibel et al., 2021).

Caffeine can have both positive and negative side effects on body metabolism processes. A study by Oktaria (2019) among 13 men and 11 women found that 20% of consumers suffered from heart palpitations, 5.7% of consumers suffered from headaches, 10% of consumers suffered from insomnia, 5.7% suffered from tremors, 2.8% suffered from anxiety, and 4.2% experienced nausea and vomiting (Oktaria, 2019).

According to Liveina (2014), there are a variety of alibis for individuals to consume coffee or caffeine-containing beverages, among others, not sleeping the night before, habit or to increase energy, before exams the night before, habit or to increase energy, before exams or completing assignments, recreational and others or completing assignments, recreational and others. Another reason is to reduce drowsiness while driving or to improve mood (Liveina, 2014).

This study also found that 57.3% of students have excessive screen time activities. Higher education learning during the COVID-19 pandemic is conducted online. Therefore, it can increase the use of screen-time in students, namely mobile phones, tablets and computers or laptops. The gadgets are not only used for learning activities, but are used for other activities such as entertainment (Tasya et al., 2021).

In the past year, there has been an increase in the availability and use of electronic media such as mobile phones, TVs, laptops and video games. use of electronic media such as mobile phones, TVs, laptops, and video games. Screen-time is the time spent in front of a screen. One of the activities that can disrupt sleep patterns is screen time. This can occur if screen time is done > 2 hours per day (Julia, 2017). Screen

time with excessive time allocation, namely  $\geq 2$  hours per day will cause sleep disturbances in the form of shortened sleep time, impaired individual sleep quality, shortened sleep time, shortened sleep time, and shortened sleep time. shortening, impaired individual sleep quality, delayed sleep time, and other sleep disorders. other sleep disorders.

The results showed that most students of the Faculty of Health Sciences UPN Veteran Jakarta do excessive screen time. The statistical test resulted in a p-value of 0.018; POR value of 1.863 (95% CI: 1.140 - 3.044), which means that there is a significant correlation between screen-time and sleep patterns. Based on its nature, screen time is categorized as interactive screen time and passive screen time. Some hypotheses state that screen time that is (chatting, surfing the internet, playing video games) will have a greater influence in reducing sleep time when compared to passive screen time (watching television or films) (Istiqomah & Lisiswanti, 2017).

The results of the study are also in line with a study conducted by Su et.al (2022) that students' screen time for both academic and non-academic purposes increased during both school closures and after schools' reopening compared to the pre-pandemic time (So et al., 2022). In line with Balbina (2021), who reports that most respondents with low levels of gadget use—26 people (89.6%)—had good sleep quality, whereas just a tiny percentage of respondents with low levels of gadget use—3 people (10.3%)—had poor sleep quality. On the other side, 21 respondents (87.3%) with high levels of device use reported having poorer-than-average sleep. 21 individuals (87.5%). According to the analysis's findings, there is a substantial association between kids at Citra Bangsa Christian Elementary School in Kupang 30's quality of sleep and their usage of gadgets, with a p value of 0.000 (p 0.05) indicating this (Balbina, 2021).

As for what is crucial to be carried out so that students can regulate themselves from addiction to internet use, namely by making a schedule for using the internet and must be able to control according to the needs of adolescents where internet usage should not be allowed until late at night so that it can improve adolescents' sleep patterns become good (Diarti et al., 2017).

## Limitations

This study did not examine the serving type of coffee consumed by respondents, so it could not explain the effect of coffee consumption based on the type of coffee and its dose.

## Conclusion

There is a significant relationship between coffee consumption and screen time with sleep quality among health sciences faculty at the college. Therefore, controlling coffee consumption and screen time activities is necessary for good sleep quality. This study recommended that university management reduce screen time for their students.

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A.A.; writing—review and editing, A.A & R.W.; visualization, N.A.; supervision, A.A.; project administration, N.S.; funding acquisition, N.S. All authors have read and agreed to the published version of the manuscript.”

## Declarations

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

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