

# Correlation of Sleep Hygiene Index with Grade Point Average in Surabaya, Indonesia's Medical Students

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## Abstract

### Background and objective

Sleep hygiene are behaviours that are believed to promote improved quantity and quality of sleep, measured through the use of sleep hygiene index. Students who achieve their sleep needs are more academically successful, as reflected by their GPA. This study aims to identify and analyze the correlation of sleep hygiene with the grade point average value.

### Methods

This study used an observational research design with cross-sectional data collection methods to find the correlation of sleep hygiene index with grade point average value. Sample collection was done by random sampling technique on medical university student's class of 2019. The study was conducted from September 2022 to December 2022. The data obtained were analyzed through SPSS, to find the correlation of sleep hygiene with grade point average value.

### Results

There were 160 students, mostly of which are 21-year-olds, female, and Muslims. Across the many different sociodemographic background, moderate sleep hygiene index was the most dominant sleep hygiene index. After analysis, it was found that sleep hygiene correlates with grade point average ( $\rho = -0.372$ ).

### Conclusion

Sleep hygiene correlates with grade point average. Poor sleep hygiene is correlated with lower GPA value, and vice versa with better sleep hygiene correlating with higher GPA value. students should aim to change any poor sleeping hygiene bearing in mind that poor sleep hygiene does have a correlation on academic achievement, reflected through their grade point average.

Keywords: sleep hygiene; grade point average; correlation; medical students

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## 1. Introduction

A poor quality of sleep is a distressing and worrying condition that can disturb the academic performance of medical students. One of the important variables that may affect the quality of sleep is sleep hygiene practices [1]. A study done in Ethiopia involving 576 medical students was done to assess the prevalence of poor sleep hygiene practices. Among the result it was found that 48.1% of the respondents still have poor sleep hygiene practices [2]. For medical students who will likely work long hours practicing numerous medical procedures or spend a considerable amount of time in studying, a lack of sleep can significantly alter their performance.

Students who reported sleeping less than six hours in a day had a 0.5 lower GPA compared to students who sleep nine plus hours a night [3]. The surveys administered to college students at a university in the Midwest focused on actual sleep quantity compared to perceived sleep needs. Individuals who slept less than their perceived needs had a GPA of 2.9 +/- 0.7 and students who slept the amount of the perceived needs had a GPA of 3.2 +/- 0.6. Another significant finding showed that delayed and irregular sleep shows a GPA of 3.1 +/- 0.7, whereas a regular sleep cycle maintained a higher GPA of 3.6 +/- 0.5. Researchers were able to correlate that every individual has unique sleep needs and students who achieve their perceived needs are more academically successful, as reflected by their GPA [3].

As such assuring a good night sleep is important and one of the ways to do so is performing a good sleep hygiene practice. As stated by the National Sleep Foundation [4], "Paying attention to sleep hygiene is one of the most straightforward ways that you can set yourself up for better sleep". The degree of sleep hygiene can be measured using the Sleep Hygiene Index, a self-report measurement designed to assess the practice of sleep hygiene behaviors [5].

Many research to find the effect of sleep to the academic performance of medical student has been done all around the world, but there has been little work exploring the subject of sleep hygiene itself. This research aims to better understand the sleep hygiene practices of medical student and how it correlates with their academical performance.

## 2. Materials and Methods

### 2.1. Design and participants

This study used an observational research design with cross-sectional data collection methods to find the correlation of sleep hygiene index with grade point average value. Sample collection was done by random sampling technique on medical university student's class of 2019. The study was conducted from September 2022 to December 2022. The data obtained were analyzed through SPSS, to find the correlation of sleep hygiene with grade point average value.

### 2.2. Procedures

This study used primary data obtained from the sleep hygiene index and self-reported GPA questionnaire along with self-reported demographic data consisting of age, gender, and religion. The data of the respondents was collected through an online manner as the Covid-19 pandemic was still ongoing when the research was underway. The questionnaire is optimized to open only on 7 am to 7 pm to ensure that the respondents is filling the questionnaire while they are still active and focused so they will provide an accurate and reliable data. The respondents are also offered an offline guidance and accompaniment should they require any further assistance during the filling of the questionnaire.

## 3. Research Results

### 3.1. Sociodemographic Characteristic of Research Subjects

Table 1. Sociodemographic Characteristic

Variable	Category	Frequency (n)	Percentage
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Age	19 years old	4	2,5%
	20 years old	30	18,8%
	21 years old	101	63,1%
	22 years old	24	15%
	23 years old	1	0,6%
Gender	Male	60	37,5%
	Female	100	62,5%
Religion	Islam	130	81,3%
	Catholic	9	5,6%
	Protestant	8	5%
	Christianity	9	5,6%
	Buddha	2	1,3%
	Hindu	2	1,3%

The subjects of the research were in the age range of 19 - 23 years old with most of them, namely 101 out of 160 people (63.1%), being in the age of 21 years old. Meanwhile the mean age of the subject is 20.93 years, with the lowest age being 19 years, and the highest age being 23 years.

Through the analysis it was also found that the respondents of the research mostly consisted of female respondents, totaling to a number of 100 people (62.5%), while on the other hand, male respondents only consisted of about 60 out of 160 people (37.5%).

Most of the subject of this research were Muslims, with as many as 130 people (81.3%). While the rest of the subject are of various different religion, which are Catholic, consisting of 9 people (5.6%), Protestant, consisting of 8 people (5%), Christianity, consisting of 9 people (5.6%), and Buddha and Hindu consecutively consisting of 2 people (1.3%).

### 3.2. Sleep Hygiene Index of Research Subjects

Table 2. Sleep Hygiene Index Characteristic

Variable	Category	Frequency (n)	Percentage
Sleep Hygiene Index	Poor	23	14.38%
	Moderate	124	77.5%
	Good	13	8.12%

The results of the analysis showed that the level of sleep hygiene in 160 respondents mostly had a moderate level of sleep hygiene (score 28-40), namely 124 people (77.5%). Meanwhile, the amount of people that had a good level of sleep hygiene (score of 13-27) amounted to 13 people (8.12%) while the amount of people with poor sleep hygiene (score of 41-65) add up to 23 people (14.38%).

### 3.3. Grade Point Average (GPA) of Research Subjects

Table 3. GPA Characteristic

Variable	Category	Frequency (n)	Percentage
Grade Point Average	3.25 – 3.50	22	13,75%
	3.51 – 3.75	77	48,125%
	3.75 – 4.00	61	38,125%

According to the analysis, the level of GPA in 160 respondents mostly had GPA ranging from 3,51 - 3,75, which consisted of 77 people (48,125%), followed by GPA ranging from 3,75 - 4,00 consisting 61 people out of 160 (38,125%) and lastly, the least prominent GPA score is GPA ranging from 3,25 - 3,50 which consisted of only 22 out of 160 people (13,75%).

### 3.4. Correlation of Sleep Hygiene Index and Grade Point Average

Table 4. Correlation of SHI and GPA

Correlation		
Pearson correlation		GPA
SHI	Correlation coefficient	-0.372
	Significance (2-tailed)	0.00
	N	160

The correlation analysis between Sleep Hygiene Index and GPA was conducted parametrically with the Pearson correlation test method because the data collected have met the Kolmogorov-Smirnov normality test with a significance result of more than 0.05.

The test result shows a pearson correlation of -0.372 which indicates a negative correlation with a p value of less than .001 ( $<<0.05$ ), a degree of significance (5%) which indicates a significant correlation. Therefore, it can be said that Sleep Hygiene Index negatively correlate with GPA value. Which means that as Sleep Hygiene Index increases in value, GPA will decrease in value and vice versa. In other words, poor sleep hygiene is correlated with lower GPA value, and vice versa with better sleep hygiene correlating with higher GPA value

## 4. Discussion

This research is dominated by 21-year-olds, which means that most of the respondents in this study had entered the early adulthood stage of development. The results of this study are not much different from previous studies such as the average age of 20.49 in Saudi University (2019) and 21.69 at Tehran University (2018) [6,7]. College students' need of sleep according to the stage of early adult growth and development, namely 7-9 hours of sleep a night, are often unmet as a consequence of social life that has little time for personal things, such as meeting these sleep needs. This is also driven by the fact that upon entering early adulthood, emotional development in the form of self-achievement and the drive to be beneficial to the surrounding environment are often times prominent as a form of self-actualization. As such, at this stage of development, college students tend to have poor sleep hygiene [8]. Other than that, it has also been found that sleep Hygiene in college students is also worse when compared to Sleep Hygiene in a non-clinical adult sample [9]. This may be due to the fact that older adults may be more health conscious than younger adults in order to prevent disease and increase their lifespan [10]. Besides sleep itself, college students also tend to have poor sleep hygiene because they may prioritize their lectures, lessons, and social activities at the expense of their good sleep hygiene or because of their poor knowledge of the importance of good sleep hygiene [11].

Studies have also reported that college students will opt to sacrifice sleep in order to go to bed late, replace sleep with caffeinated substances, or even forego sleep for technology use, all of which are examples of a poor sleep hygiene suggesting that sleep might not be a priority for college students [12].

There were comparatively more female respondents than male respondents in this research. This is in conjunction with the number of medical students' class of 2019 who are made up of mostly female, with a ratio of around 3: 2. A number of sleep characteristics may vary based on gender, including sleep quality, sleep duration, sleep latency, and sleep hygiene. Some studies have shown that women tend to have higher sleep quality, shorter sleep duration, and longer sleep latency; despite this, women tend to report overall more sleep-related complaints compared to men [13]. However, other studies have found that women reported poorer sleep quality [14] and sleep hygiene [10], and some studies have found no gender differences in sleep at all [15]. Gender also plays an important role in human development and behaviors and could even promote academic progress. Studies conducted across the world among the students studying in different levels found a significant gender difference in academic performance where female students outperform their male counterparts [16, 17]. As female students tend to have a more appropriate study habits as opposed to male students such as favoring to study two weeks before final examinations, and delaying less of their studies [18].

The analysis of this research has found that the majority of the respondents were Muslims, this finding is considerably different with the findings of Navarro-Prado et al. [19] where 54,9% of the respondents were Christians. This may be due to the fact that the majority of citizen in Indonesia is of the religion of Islam [20]. Over the past two decades, a rapidly growing body of research has documented important links between religiousness and the things that pertain our health, including sleep. Individuals who experience religious doubts may be kept awake by feelings of guilt and remorse, recognizing that such doubts run counter to religious teachings. The negative thoughts and ruminations over this form of spiritual strain and its implications may give rise to feelings of psychological distress, including depressed effect and anxiety. It is also possible that religious doubts can result in feelings of powerlessness, hopelessness, worry and fear, which may in turn trigger the release of stress hormones (epinephrine and cortisol) that promote mental and physiological arousal [21, 22] and thus may make states of relaxation and sleep more difficult to attain [23, 24]. To further add the notion, a number of studies find support that people who are religious will be prone to be more optimistic, and more optimistic people tend to have fewer worries [25], and that people who have fewer worries tend to enjoy better sleep quality [26]. Which, simply put can mean that people who are religious will be more hopeful about the future which makes them tend to rest easier because they are less likely to worry about how their lives will turn out.

Most of the respondents of this research had a GPA score that ranges from 3,51 - 3,75 (48,125%). The results of this study are not that much different with a research that was conducted on medical students in Mataram University Indonesia [27], in which 46,85% of the recorded students there had a GPA score of 3,5 - 4,00. Learning outcomes are the realization of a person's competence after going through the learning process. Factors that can affect learning outcomes include psychological and physical. One of the most important physical factor to consider that plays a significant role in learning is a student's sleep. This is especially true as sleep can affect a person's physical and psychological well-being [28, 29]. When a person lacks sleep, it will affect the ability to learn, remember, pay attention and solve problems. Drowsiness during the day which is also a direct result of lack of sleep can also affect the learning process which will have an impact on low test scores.

The finding of this study has found that Sleep Hygiene Index negatively correlates with GPA value. Which means that as Sleep Hygiene Index increases in value, GPA will decrease in value and vice versa with higher value of Sleep Hygiene Index indicates a poorer Sleep Hygiene Index. To sum it up, the finding of this study

has found that Sleep Hygiene correlate with GPA with the correlation being the poorer the Sleep hygiene, the lower the GPA will be with the same can be said with the better the sleep hygiene, the higher the GPA will be.

This finding is supported by Sorenson [30] that stated that Sleep hygiene is linked to academic performance, where the better the college students' sleep hygiene, the better their grade point average (GPA). The link between poor sleep hygiene and traditional college students' academic performance may be explained in a way that a lack of quality and quantity of sleep can lead to decreased concentration, fatigue, and poorer grades [31]. Connecting poor sleep hygiene to underperformance on exams and assignments has also been linked to mental health concerns with individuals having sleep difficulties experiencing depression symptoms more frequently than non-clinically diagnosed students [32].

## 5. Conclusion

- Moderate sleep hygiene was found in 77.5% of respondents, while the remaining 14.38% had poor sleep hygiene and 8.12% had good sleep hygiene. Aspects that contributed greatly to the poor sleep hygiene of the respondents were usage of the respondent's bed, pre-bedtime activities, and irregular sleep schedule. While aspects that contributed to the good sleep hygiene are minimal sports activities before bed, sufficient bedroom comfortability, and minimal consumption of alcohol, cigarettes, and caffeine.
- The GPA value of most of the respondents ranges from 3,51 - 3,75, which consisted of 77 people (48,125%). The remaining 38.125% has a GPA ranging from 3,75 - 4,00, and 13,75% has a GPA that ranges from 3,25 - 3,50.
- Sleep Hygiene Index have a significant correlation with a negative direction and a moderate level of correlation ( $p$ -value = 0.006, Spearman's rho = -0.558). Which means that as Sleep Hygiene Index increases in value, GPA will decrease in value and vice versa with higher value of Sleep Hygiene Index indicates a poorer Sleep Hygiene Index

## 6. Suggestion

Further research could be carried out regarding matters that have not been found or have not been detailed in this study, such as causes of sleep problems, campus life, life background, stressors that are being experienced by students, as well as aspects of sleep health, psychology, and other relevant matters.

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