The Effect of Staying Up Late on Food Consumption Patterns and Nutritional Status of Nutrition Students at the Faculty of Psychology and Health, UIN Sunan Ampel Surabaya

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Abstract: Staying up late has become a common phenomenon among college students. As many as 40% of adolescents in Indonesia do not sleep 8 hours or more every night. The causes of this habit are diverse, one of which is academic demands in the form of assignments or entertainment games. This habit affects the decline in adolescent health, especially food consumption patterns and nutritional status. This study was conducted to analyze the direct and indirect effects of staying up late on food consumption patterns and nutritional status. This study used a cross-sectional design with a sample of 33 students selected using purposive sampling. Data were collected using questionnaires to assess the habit of staying up late and food consumption patterns, while nutritional status was determined through anthropometric measurements based on Body Mass Index (BMI). Data analysis was performed using path analysis. The results showed that staying up late had no significant effect on dietary patterns ($p = 0.705$), but had a very significant effect on nutritional status ($p = 0.000$) with a contribution of 39.1%. Meanwhile, dietary patterns did not significantly affect nutritional status ($p = 0.752$). Thus, it can be concluded that night owl habits are directly related to the nutritional status of students, while dietary patterns do not act as mediators in this relationship.

1 INTRODUCTION

In society, the habit of staying up late into the night or early morning is often found among teenagers. This habit of staying up late seems to have become a routine activity for teenagers. During the transition from childhood to adulthood, many physical changes generally occur, such as hormonal and fatty tissue changes, muscle mass changes, and changes in the amount of nutrition needed for growth, (Lailiyah et al., 2024). Adolescents face nutritional problems due to the acceleration of their growth and development, which requires more energy and nutrients. Adolescent growth is greatly influenced by their nutritional needs. All adolescent functions can be disrupted if their nutritional intake is not met. In addition, changes in adolescents' lifestyles and eating habits, such as the tendency to follow trends, sometimes result in dietary adjustments that are not in line with their energy and nutrient needs. The nutritional needs of adolescents must be adjusted to sufficient physical activity to prevent nutritional problems, (Nur, n.d.). Staying up late is a phenomenon often practiced by adolescents and is a habit of not sleeping at night and then sleeping in the morning until noon, which has an impact on the decline in adolescent health (Zahrani, 2022). As many as 40% of adolescents in Indonesia do not sleep 8 hours or more each night, (Fadhilah et al., 2023).

According to the World Health Organization (WHO), normal sleep for adolescents is around 7-8 hours. However, in everyday life, staying up late has become a habit and routine activity for adolescents, especially college students. This activity is generally done to complete college or school assignments, work overtime, or even do things that are less beneficial, such as playing online games, playing cards or guitar, and other things, (Wulandari et al., 2016).

Teen sleep patterns greatly affect their health, with staying up late being a very common problem and even a major factor in declining teen health. According to the Indonesian Ministry of Health's Book on Prevention and Control of Non-Communicable Diseases (P2PTM), adequate sleep must meet the requirements for good sleep quality and quantity. Adequate sleep offers numerous benefits, such as boosting the immune system, improving memory, and preventing various diseases, (Zahrani, 2022).

Previous studies have explained the relationship between staying up late and general nutritional status. The purpose of this study is to examine the direct and indirect effects of staying up late on the nutritional status of adolescents, with dietary patterns as a mediator, particularly the habit of staying up late that is common among university students. This refers to a reality that is often found among students majoring in Nutrition at UIN Surabaya.

2 METHOD

This study used a cross-sectional design to examine how staying up late affects nutritional status and food consumption patterns. The research sample consisted of 33 students from the Nutrition Study Program who were selected using purposive sampling based on specific inclusion criteria, namely being aged 18-24 years and having a habit of staying up late (sleeping after 11 p.m. at least 3 times/week). Data were collected using a structured questionnaire that had been tested for validity and reliability to measure

night owl habits (independent variable) and food consumption patterns (intermediate variable), while nutritional status (dependent variable) was determined through anthropometric measurements to calculate Body Mass Index (BMI) according to WHO classification. Furthermore, the data were analyzed using path analysis to determine the direct and indirect effects of the independent variables on the dependent variable through the intermediate variable.

In conducting this study, the researcher used three instruments tailored to the needs. These instruments included a questionnaire designed by the researchers themselves to measure the habit of staying up late. The purpose of this questionnaire was to determine the intensity of the habit of staying up late among the research subjects. The data was collected using a categorical scale with three levels of habit of staying up late, namely high, moderate, and low.

The next instrument was used to measure food consumption patterns. This questionnaire focused on the frequency of consumption of various types of food consumed by the research subjects. The data scale used was divided into three categories, namely very often, often, and rarely. Furthermore, anthropometric techniques are used to measure nutritional status directly. To measure the nutritional status of respondents, researchers use digital scales to measure body weight and microtoise to measure the height of respondents. With that, the measurement results can then be analyzed to determine the nutritional status of respondents in three categories, namely deficient, normal, and excessive.

3 RESULT

The results of this study indicate that staying up late is a major risk factor for the nutritional status of nutrition students, with its impact influenced by the food consumption patterns of nutrition students. Below are the results of the descriptive analysis of the research data:

Table 1: Distribution of Respondents Based on Gender

No	Respondents	Frequency (f)	Percentage (%)
1	Male	4	12
2	Female	29	88
	Total	33	100

Based on Table 1 above, it shows that there were 29 female respondents (88%) and 4 male respondents (12%).

Table 2: Distribution of Respondents Based on Age

No	Respondents	Frequency (f)	Percentage (%)
1	18 – 20	31	93.93
2	21 – 22	2	6.07
3	23 – 25	0	0
	Total	33	100

Source: primary data

Based on Table 2 above, it shows that respondents aged 18-20 years old accounted for 93.93% or 31 students. Students aged 21-22 years old accounted for 2 students (6.07%).

Table 3: Distribution of Respondents Based on Staying Up Late Habits

No	Respondents	Frequency (f)	Percentage (%)
1	Low Night Owl Habit	3	9.10
2	Moderate Night Owl Habit	9	27.27
3	High Night Owl Habit	21	63.63
	Total	33	100

Source: primary data

Based on Table 3 above, it shows that respondents have a high habit of staying up late with a percentage of 63.63% consisting of 21 students. There are 9 students (27.27%) who have a moderate habit of staying up late and 3 students (9.10%) who have a low habit of staying up late.

Table 4: Distribution of Respondents Based on Nutritional Status

No	Respondents	Frequency (f)	Percentage (%)
1	Malnutrition	4	12.2
2	Normal	20	60.6
3	Overweight	9	27.2
	Total	33	100

Source: primary data

Based on Table 4 above, it shows that respondents have normal nutritional status with a percentage of 60.6% consisting of 20 students. Students with poor nutritional status number 4 students with a percentage of 12.2% and students with excessive nutritional status number 9 students with a percentage of 27.2%.

Table 5: Distribution of Respondents Based on Food Consumption Patterns

No	Respondents	Frequency (f)	Percentage (%)
1	Very often	8	24.2
2	Often	15	45.5
3	Rarely	10	30.3
	Total	33	100

Source: primary data

Based on Table 5 above, it shows that respondents who are Nutrition Study Program students have a very frequent food consumption frequency with a percentage of 18.2% consisting of 6 students. Students with frequent food consumption frequency consist of 13 students with a percentage of 39.4% and students with moderate food consumption frequency consist of 14 students with a percentage of 42.4%.

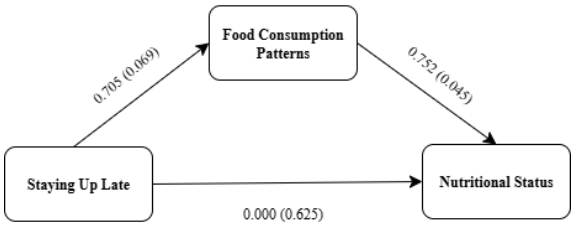

Figure 1. Hypothesis Test Results Diagram

Based on the analysis conducted, it was found that the habit of staying up late (X) has no significant effect on food consumption patterns (M). This is based on the results of $\beta = 0.077$, SE = 0.201, and $p = 0.705$ ($p > 0.05$). The magnitude of the effect of Staying Up Late (X) on Food Consumption Patterns (M) is 0.48% (obtained from $R^2 = [0.069]^2 = 0.0048$ or 0.48%). It can be concluded that the two variables do not have a significant effect.

Further analysis shows that the habit of staying up late (X) has a very significant effect on nutritional status (Y). This is based on the values $\beta = 0.580$, SE = 0.132, and $p = 0.000$ ($p < 0.01$). The magnitude of the direct effect of Staying Up Late (X) on Nutritional Status (Y) is 39.1% (obtained from $R^2 = [0.625]^2 = 0.3906$ or 39.1%). It can be concluded that both variables have a positive and significant effect, where the higher the intensity of Staying Up Late (X), the higher the Nutritional Status (Y) in the context of undesirable changes (such as an increase in Body Mass Index).

The analysis also shows that Food Consumption Patterns (M) do not have a significant effect on Nutritional Status (Y). This is based on the results of β = 0.037, SE = 0.118, and p = 0.752 (p > 0.05). The magnitude of the effect of Food Consumption Pattern (M) on Nutritional Status (Y) is 0.20% (obtained from $R^2 = [0.045]^2 = 0.0020$ or 0.20%). The results of the analysis of the effect of Staying Up Late (X) on Nutritional Status (Y) with Food Consumption Patterns (M) as a mediator remain significant with a value of β = 0.580, SE = 0.132, and p = 0.000 (p < 0.01).

Table 6: Direct and Indirect Effects

Relationship	Coefficient of Influence
Total	0.628
Diprect	0.625
Indirect	0.003

The table above shows that the magnitude of the effect between staying up late (X) on food consumption patterns (M) and nutritional status (Y) is 0.628. The data in the table also shows that the direct effect between staying up late (X) on nutritional status (Y) has a value of 0.625. The data in the table also shows that the indirect effect of staying up late on nutritional status, as mediated by food consumption patterns (M), has an effect of 0.003. This indicates that the mediating effect that occurs through food consumption patterns in the relationship between staying up late and nutritional status is very low.

4 DISCUSSION

The results of the path analysis conducted in this study indicate that there is a significant relationship between students' nutritional status, dietary patterns, and staying up late. The study shows that staying up late has a very significant direct effect on nutritional status (β = 0.580, p = 0.000), while the role of food consumption patterns as a mediator in this study has a very weak indirect effect (0.003). The habit of staying up late is defined as not sleeping or staying awake at night, i.e., after 11 p.m., (Putri, 2024). The habit of staying up late indicates that students sleep less than 8 hours a day or remain active and awake until late at night or even early morning. The habit of staying up late causes a person to have suboptimal sleep duration for their age. This is included in the factors that influence sleep duration and quality, (Nurlela et al., 2023).

The habit of staying up late ideally affects the duration of a person's sleep, which in turn affects sleep quality. If sleep quality is not met, the body will not be able to function optimally during activities. During sleep, the body goes through several stages, such as light sleep, deep sleep, and Rapid Eye Movement (REM) sleep, (Milayanti et al., 2022). Each stage of sleep has its own function, namely repairing tissue, supporting mental development, and improving memory, (P2PTM, 2024). When we sleep, our bodies undergo a recovery process that is very good for restoring our stamina and putting us in the best condition. As many as 40% of adolescents in Indonesia do not sleep 8 hours or more every night. Hormone levels such as leptin and ghrelin are affected by poor sleep quality. This causes a decrease in leptin and an increase in ghrelin production, which can increase appetite and disrupt the body's balance, thereby affecting food intake, (Fadhilah et al., 2023).

In addition, lack of sleep also affects metabolism and hormonal changes that can lead to obesity. Hunger and appetite increase due to

increased ghrelin and decreased leptin hormones, which can also increase food intake because there is more time to eat. The hormonal changes that occur are involved in an increase in Body Mass Index (BMI), (Mardiana et al., 2020). Teenagers who lack sleep will tire more easily, which means they engage in less physical activity. In situations like this, fat accumulation can occur rapidly as a result of calorie accumulation, which can lead to weight gain in adolescents. Sleep deprivation in adolescents also causes mental and physical illnesses or both, which slow down recovery and will persist in the future, (Gunarsa & Wibowo, 2021).

In this case, nutrition students stay up late for various reasons, both academic demands and personal entertainment, with an average sleep duration of 5-6 hours. Lack of sleep is associated with several changes in physiological functions in the body, including increased ghrelin and cortisol, decreased leptin levels in circulation, and disturbances in carbohydrate metabolism. The hormone ghrelin is associated with increased hunger and decreased consumption of fat reserves in the body, thereby increasing hunger and inhibiting the use of fat reserves. On the other hand, insufficient sleep duration results in low leptin levels, which makes it more difficult to suppress hunger and reduces the stimulation of energy expenditure, (Purnamasari et al., 2021). Insufficient sleep also causes a decrease in growth hormone, which regulates glucose absorption in cells. This also promotes lipogenesis and glycogenesis, leading to body fat accumulation, thereby increasing body mass index (BMI), (Simanoah et al., 2022).

According to this study, even though students have a high habit of staying up late, 60.6% have normal nutritional status. This is in line with research conducted by Sulistiyani (2012), sleep quality affects nutritional status, but most respondents who have poor sleep quality have normal nutritional status. Students with a habit of staying up late are more likely to engage in higher levels of activity. This can be attributed to several influencing factors, such as metabolic homeostasis and behavioral factors. This is in line with research by Sumbarwoto et al., (2022) which shows that people with a habit of staying up late tend to have higher levels of physical activity as a form of neuroendocrine regulation against the metabolic effects of sleep deprivation. Although hormonal changes occur, they are not always followed by a significant increase in energy intake due to the physiological mechanisms that are still functioning well at a young age, (Azzahra & Lufiana, 2024).

Furthermore, the habit of staying up late is closely related to changes in eating patterns, particularly an increase in the frequency and type of consumption at night. Being awake during biological hours that should be used for rest can stimulate the desire to consume food, especially foods high in calories, sugar, and fat, (Fadhilah et al., 2023). Research on students in Indonesia shows that the habit of staying up late is often accompanied by night eating syndrome, where 63.5% of respondents admitted to consuming unhealthy snacks after 9 p.m. at a frequency of ≥3 times/week, (Sitoayu et al., 2021). Excessive energy consumption at night, beyond physiological needs, has the potential to significantly contribute to weight gain and overweight status, (Lailiyah et al., 2024).

The results of the study show that the role of food consumption patterns as a mediator in

this study has a very weak indirect effect (0.003). Based on in-depth observations, students tend to rarely consume food while staying up late. However, students tend to have infrequent meals while staying up late, but when they do eat, they choose high-calorie foods and caffeinated beverages as instant energy sources. Thus, although meal frequency patterns do not change much, the quality of food consumed has the potential to have a negative impact on long-term health, (Fitrah, 2024). This study also shows that eating patterns do not significantly affect nutritional status. This is in line with research conducted by Febytia & Dainy (2023) which shows that students' sleep patterns and physical activity affect their nutritional status. The types of food consumed by students during all-nighters tend to be high in calories, but their impact on nutritional status is not always significant if not accompanied by poor sleep patterns in the long term. This is also related to research findings showing normal nutritional status among students, as students who stay up late often only snack or drink coffee infrequently, so the impact on BMI tends to be small. Additionally, sufficient physical activity can help maintain energy balance despite the habit of staying up late.

5 CONCLUSIONS

Based on the results of the study, staying up late has a significant direct effect on the nutritional status of students majoring in Nutrition at UIN Sunan Ampel Surabaya. This indicates that the higher the intensity of staying up late, the higher the tendency for changes in nutritional status, as indicated by an increase in Body Mass Index (BMI). However, dietary patterns were not found to be a significant mediator in the relationship between the habit of staying up late and nutritional status. The indirect effect through dietary patterns as a mediator was very weak. The majority of students with high sleep deprivation habits have normal nutritional status. This indicates that there are other factors influencing the impact of sleep deprivation on metabolism, such as high physical activity and good physiological regulation capabilities, despite hormonal changes due to bad sleep quality and duration.

Based on the findings of this study, it is recommended that students increase their awareness of the importance of time management and adequate sleep (7-8 hours) to maintain metabolic balance and prevent potential nutritional problems in the future, even though their nutritional status is currently considered normal. For future researchers, it is recommended to develop other mediator variables such as physical activity levels and stress, and to use a larger and more balanced sample to strengthen the generalization of the results.

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