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Factors Contributing to Students' Sleep Quality at SMKN 1 Narmada in 2024

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ABSTRACT
Sleep quality deterioration is a prevalent and increasing global issue among adolescents, who are particularly vulnerable to poor sleep. This condition can disrupt psychophysiological balance. This study aimed to determine the factors contributing to sleep quality among students at SMKN 1 Narmada in 2024. A cross-sectional design with proportionate stratified random sampling was employed, involving 84 students. The dependent variable was sleep quality, while independent variables included age, gender, health status, stress, coffee consumption, smoking, environment, and screen time. Data were processed descriptively and presented in frequency distribution tables. Results indicated that most respondents (72.6%, n = 61) had poor sleep quality. Significant contributing factors to sleep quality were health status (ρ = 0.046), stress (ρ = 0.027), coffee consumption (ρ = 0.030), and screen time (ρ = 0.000). In contrast, age (ρ = 0.421), gender (ρ = 0.258), smoking (ρ = 0.713), and environment (ρ = 0.178) showed no significant relationship. Multivariate analysis identified screen time as the most dominant factor (Exp(β) = 7.546). The study concludes that health status, stress, coffee consumption, and screen time are significantly associated with students' sleep quality, with screen time being the most influential. It is recommended that students limit screen time to less than 10 hours per day to mitigate the risk of poor sleep quality.

KEYWORDS Sleep Quality; Student; Factors

INTRODUCTION

Sleep is one of the basic physiological needs of humans, which restores the body's energy, benefiting physical and mental health as well as individual coping (Hutagalung et al., 2022). According to Maslow's theory (1970), humans have five basic needs: physiological needs, the need for security, the need to be loved, the need for self-esteem, and the need for self-actualization (Hasibuan, 2020). Physiological needs are considered very important because when someone's physiological needs are not met, they cannot fulfill other needs (Yulia Martha F, 2017).

Sleep is a condition during which a decline or loss of reaction to the environment occurs, but the individual can still be awakened with sufficiently strong stimulation (Caesarridha, 2021). One third of human life is spent sleeping. Although most people find sleeping easy, some have difficulty sleeping (Susanti, 2015). Sleep quality is defined as a condition where a person is satisfied with their sleep and shows no signs of sleep disturbance (Wicaksono, 2019). If someone doesn't sleep enough, changes occur in body metabolism and hormones (Putri et al., 2019). Decreased sleep quality is a common problem increasing worldwide every year.

Based on the 2022 National Sleep Foundation report, 40% of young adults in 26 countries experience sleep problems (National Sleep Foundation, 2022).

The prevalence of poor sleep quality in the United States shows 46% of young adults experience poor sleep quality, with only 10% prioritizing sleep (Rohmah & Yunita, 2020). A study by Tekcan et al. (2020) found that 53% of 212 high school teenagers in Türkiye have poor sleep quality. Research in Nepal found that 39.1% of adolescents aged 15-19 have poor sleep quality (Gautam et al., 2021).

Research in Indonesia by Baso et al. (2019) and Tarlemba et al. (2018) found that 43% of teenagers and 69.8% of adults experience sleep quality problems. Surveys show that between 15% and 35% of adults and adolescents experience sleep quality disorders (Budyawati et al., 2019). Keswara et al. (2019) also found 64.7% of teenagers have poor sleep quality. Of 196 parents in Dangiang Village, Kayangan District, North Lombok Regency, Hasibuan found that 30 (15.2%) experienced poor sleep quality, 148 (74.7%) moderate sleep quality, 16 (8.1%) light sleep quality, and only 2 (2.0%) had good sleep quality (Hasibuan & Hasna, 2021). Additionally, research by Rai & Sutiari (2022) on 110 Health Service employees in West Nusa Tenggara Province showed that 76 had poor sleep quality and 34 experienced good sleep quality.

Teenagers are the age group most often experiencing poor sleep quality. Their lifestyle involves busy activities at school, with peers, outside school, and the growing use of internet technology. This lifestyle causes late sleeping due to watching films, livestreams, using cell phones and laptops late at night, playing video games, and internet use. The development of internet platforms such as YouTube, WhatsApp, Instagram, and online games contributes to sleep disorders in teenagers. Teenagers spend excessive attention on social media, causing addiction to unproductive activities (Jumilia, 2020).

Potter & Perry (2011) in Murti, Tri (2022) stated that factors influencing sleep quality are divided into internal and external factors. Internal factors include age, gender, health status, stress, medication consumption, and food/calorie intake. External factors include environment and smartphone use. Research by Aulia (2022) with 190 respondents found several factors influencing sleep quality, such as physical activity, academic stress, environment, habits before sleeping, screen time, coffee consumption, and smoking. Also, Sundara et al. (2020) at SMKN 1 Narmada found that out of 40 student respondents, 18 (45%) had a medium level of online gaming, 10 (25%) high, and 4 (10%) very high (Sundara et al., 2020).

Preliminary studies conducted on December 9, 2023, revealed from the principal of SMKN 1 Narmada that many students often arrive late to school without specific records due to fluctuating patterns. Additionally, a counseling teacher noted that some subject teachers report students sleeping during class or being absent. This is evident from frequent absences marked as “A” (Alpa) during certain lessons. To support this study, researchers gave the Pittsburgh Sleep Quality Index (PSQI) to 10 students; 2 (20%) had good sleep quality, and 8 (80%) had poor sleep quality. Direct interviews with these students revealed that the most dominant reason for poor sleep quality was playing on cell phones. Six out of 10 students mentioned cell phone use as a cause of late-night sleep.

According to the Indonesian Ministry of Health (2018), good sleep duration for teenagers is 8.5 hours/day. If sleep needs are unmet, sleep disturbances may occur, affecting sleep quality.

Poor sleep quality disrupts psychophysiological balance. Physiological effects include decreased daily activities, fatigue, weakness, decreased stamina, and unstable vital signs. Psychological effects include depression, anxiety, and lack of concentration (Febrianty, 2018).

Dwi Putri (2017) states that poor sleep quality negatively impacts academics by reducing oxygen intake to the brain and impairing ability to concentrate. Thus, it is crucial for teenagers to get enough sleep and rest. Lack of sleep leads to depression, poor focus, and decreased academic achievement (Jumilia, 2020). Sundara et al. (2020) at SMKN 1 Narmada found student motivation mostly at the medium level (19 students, 47.5%), low motivation in 5 students (12.5%), very low motivation in 7 students (17.5%), and high motivation in only 3 students (7.5%). This is linked to excessive time spent on cell phones playing online games, resulting in poor sleep quality and decreased study concentration at school.

Decreased academic achievement due to poor concentration gradually affects teenagers' futures, as they are the nation's next generation. Based on this, researchers are interested in conducting research about the factors that contribute to students' sleep quality at SMKN 1 Narmada.

METHOD

The type of research used was observational research, which was analytical in nature and employed a cross-sectional study design. The purpose of using a cross-sectional study design was that it could examine causes and effects simultaneously. Ordinal and nominal data types in the independent variables were analyzed using the Chi Square test. The population of this study consisted of 516 students from class X. The sample used in this research was selected by proportional stratified random sampling. Data were collected through direct interviews using questionnaires. The data were processed descriptively and presented in the form of frequency distribution tables. The data analysis techniques used in this research included univariate, bivariate, and multivariate analysis. The independent variables included age, gender, health status, stress, coffee consumption, smoking, environment, and screen time. Meanwhile, the dependent variable was sleep quality. The relationship between each independent variable and the dependent variable was analyzed using the Chi Square test, while the dominant factor was determined using logistic regression.

RESULT AND DISCUSSION

Respondent Characteristics

Below we will explain the general characteristics of respondents which include the distribution of respondents according to age, gender, health status, stress, coffee consumption, smoking, environment and screen time.

Table 1. Distribution of Responses Based on Characteristics of Age, Gender, Health Status, Stress, Coffee Consumption, Smoking, Environment and Screen Time among students at SMKN 1 Narmada, February 23, 2024 (n=84)

Characteristics Respondent	Category	Amount	Percentage (%)
Age	15 years old	14	16,7
	16 years old	40	47,6
	17 years old	29	34,5
	19 years old	1	1,2
Gender	Man	30	35,7
	Woman	54	64,3
Health Status	Healthy	64	76,2
	Sick	20	23,8
Stress	Mild Stress	10	11,9
	Moderate Stress	70	83,3
	Severe Stress	4	4,8
Coffee Consumption	Consume coffee	38	45,2
	Don't consume coffee	46	54,8
Smoke	Smoke	9	10,7
	Do not smoke	75	89,3
Environment	Comfortable	69	82,1
	Uncomfortable	15	17,9
Screen Time	Low	22	26,2
	High	62	73,8

Table 1 above shows that the age of most respondents was 16 years old, namely 40 respondents (47.6%) with the number of women dominating, namely 54 respondents (64.3%). Most of the respondents were in good health, namely 64 respondents (76.2%) and most experienced stress in the moderate stress category, namely 70 respondents (83.3%). The majority of respondents also do not consume coffee every day, namely 46 respondents (54.8%) and 75 respondents (89.3%) do not smoke. The respondent's environment is dominant in the comfortable category, namely 69 respondents (82.1%) and the respondents' use of screen time is in the high category, namely 62 respondents (73.8%).

Respondent's Sleep Quality

The distribution of respondents based on sleep quality is described as follows.

Table 2. Distribution of Respondents Based on Sleep Quality at SMKN 1 Narmada, February 23 2024 (n=84)

Sleep Quality	Amount	Percentage (%)
Good	23	27,4
Bad	61	72,6
Total	**84**	**100**

Based on table 2 above, it shows that the sleep quality of respondents is dominantly in the poor category, namely 61 respondents (72.6%).

Relationship Between Age and Sleep Quality of Respondents

The relationship between age and respondents' sleep quality is described in the following table.

Table 3. Distribution of Chi-Square Test Results for the Relationship between Age and Sleep Quality, February 23 2024 (n=84)

Age	Sleep Quality				Amount	%
	Good	%	Bad	%		
15 years old	4	17,4	10	16,4	14	16,7
16 years old	11	47,8	29	47,5	40	47,6
17 years old	7	30,4	22	36,1	29	34,5
19 years old	1	4,4	0	0	1	1,2
Amount	23	100	61	100	84	100
OR = 1,058				*ρ value* = 0,421		

Based on table 3 above, it shows that 29 out of 40 respondents (47.5%) aged 16 years had poor sleep quality, 22 out of 29 respondents (36.1%) aged 17 years had poor sleep quality and As many as 10 out of 14 respondents (16.4%) aged 15 years had poor sleep quality. Based on statistical tests, it is known that there is no significant difference between age and sleep quality (ρ>0.05). Respondents aged 17 years had an opportunity (OR) of 1.058 to experience poor sleep quality compared to those aged 15 years, 16 years and 19 years.

Relationship between gender and sleep quality among respondents

The relationship between gender and respondents' sleep quality is described in the following table.

Table 4. Distribution of Chi-Square Test Results for the Relationship between Gender and Sleep Quality, February 23, 2024 (n=84)

Gender	Sleep Quality				Total	%
	Good	**%**	**Bad**	**%**		
Man	6	26,1	24	39,3	30	35,7
Women	17	73,9	37	60,7	54	64,3
Total	23	100	61	100	84	100
OR =0,54				*ρ value* = 0,258		

Based on table 4 above, 24 out of 30 respondents (39.3%) male had poor sleep quality and 37 out of 54 respondents (61.7%) female had poor sleep quality . Based on statistical tests, there is no significant difference between gender and sleep quality (ρ>0.05). Female respondents have an opportunity (OR) of 0.544 times to have poor sleep quality compared to men.

Relationship between health status and respondents' sleep quality

The relationship between health status and respondents' sleep quality is described in the following table.

Table 5. Distribution of Chi-Square Test Results of the Relationship between Health Status and Sleep Quality, February 23, 2024 (n=84)

Health Status	Sleep Quality				Total	%
	Good	**%**	**Bad**	**%**		
Healthy	21	91,3	43	70,5	64	76,2
Sick	2	8,7	18	29,5	20	23,8
Total	23	100	61	100	84	100
OR = 4,395				*ρ value* = 0,046		

Based on table 5 above, 43 out of 64 respondents healthy health (70.5%) with poor sleep quality status experienced

and 18 out of 20 respondents (29.5%) with sick health status experienced poor sleep quality. Based on statistical tests, it is known that there is a significant difference between health status and sleep quality (ρ≤0.05). Respondents who were sick had a 4,395 chance of experiencing poor sleep quality compared to those who were healthy.

Relationship between stress and respondents' sleep quality

The relationship between stress and respondents' sleep quality is described in the following table.

Table 6. Distribution of Chi-Square Test Results of the Relationship between Stress and Sleep Quality, February 23, 2024 (n=84)

Stress	Sleep Quality				Total	%
	Good	%	Bad	%		
Mild	6	26,9	4	6,5	10	11,9
Moderate	17	74,0	53	86,9	70	83,3
Severe	0	0	4	6,6	4	4,8
Total	23	100	61	100	84	100
OR = 4,790				*ρ value* = 0,027		

Based on table 6 above, 4 out of 10 respondents (6.5%) who experienced mild stress had poor sleep quality, while 53 out of 70 respondents (86.9%) who experienced moderate stress had poor sleep quality and As many as 4 out of 4 respondents (6.6%) who experienced severe stress had poor sleep quality. Based on statistical tests, it is known that there is a significant difference between stress and sleep quality (ρ≤0.05). Respondents who were moderately stressed were 4,790 times more likely to experience poor sleep quality compared to those who experienced mild stress.

Relationship between coffee consumption and respondents' sleep quality

The relationship between coffee consumption and respondents' sleep quality is described in the following table.

Table 7. Distribution of Chi-Square Test Results of the Relationship between Coffee Consumption and Sleep Quality, February 23, 2024 (n=84)

Coffee Consumption	Sleep Quality				Total	%
	Good	%	Bad	%		
Consume Coffee	6	26,1	32	52,4	38	45,2
Don't Consume Coffee	17	73,9	29	47,5	46	54,8
Total	23	100	61	100	84	100
OR = 0,320				*ρ value* = 0,030		

Based on table 7 above, 32 of the 38 respondents (52.4%) who consumed coffee had poor sleep quality and 29 of the 46 respondents (47.5%) who did not consume coffee had poor sleep quality. Based on statistical tests, it is known that there is a significant difference between coffee consumption and sleep quality (ρ≤0.05). Respondents who consumed coffee were 0.320

times more likely to experience poor sleep quality compared to those who did not consume coffee.

Relationship between smoking and respondents' sleep quality

The relationship between smoking and the quality of respondents' sleep is described in the following table.

Table 8. Distribution of Chi-Square Test Results of the Relationship between Smoking and Sleep Quality, February 23, 2024 (n=84)

Smoking	Sleep Quality				Total	%
	Good	%	Bad	%		
Smoke	2	8,7	7	11,5	9	10,7
Do not smoke	21	91,3	54	88,5	75	89,3
Total	23	100	61	100	84	100
OR = 0,735				*ρ value* = 0,713		

Based on table 8 above, 7 out of 9 respondents (11.5%) who smoked had poor sleep quality and 54 out of 75 respondents (88.5%) who did not smoke had poor sleep quality. Based on statistical tests, it is known that there is no significant difference between smoking and sleep quality (ρ>0.05). Respondents who smoke are 0.735 times more likely to experience poor sleep quality compared to non-smokers.

Relationship between environment and sleep quality of respondents

The relationship between the environment and the quality of respondents' sleep is described in the following table.

Table 9. Distribution of Chi-Square Test Results of the Relationship between Environment and Sleep Quality, February 23, 2024 (n=84)

Environment	Sleep Quality				Total	%
	Good	%	Bad	%		
Comfortable	21	91,3	48	78,7	69	82,1
Uncomfortable	2	8,7	13	21,3	15	17,9
Total	23	100	60	100	84	100
OR = 2,844				*ρ value* = 0,178		

Based on table 9 above, there were 48 out of 69 respondents (78.7%) with a comfortable environment with poor sleep quality and 13 out of 15 respondents (21.3%) with an uncomfortable environment with poor sleep quality. Based on statistical tests, it is known that there is no significant difference between the environment and sleep quality (ρ>0.05). Respondents who have an uncomfortable environment are 2,844 times more likely to experience poor sleep quality compared to respondents who have a comfortable environment.

Relationship between screen time and respondents' sleep quality

The relationship between screen time and respondents' sleep quality is described in the following table.

Table 10. Distribution of Chi-Square Test Results of the Relationship between Screen Time and Sleep Quality, February 23, 2024 (n=84)

Screen Time	Sleep Quality				Total	%
	Good	%	Bad	%		
Low	13	56,5	9	14,8	22	26,2
High	10	43,5	52	85,2	62	73,8
Total	23	100	61	100	84	100
OR = 7,511				*ρ value* = 0,000		

Based on table 10 above, 9 out of 22 respondents (14.8%) with low screen time use (<10 hours/day) had poor sleep quality and 52 out of 62 respondents (85.2%) with screen time use high time (≥10 hours/day) has poor sleep quality. Based on statistical tests, it is known that there is a significant difference between screen time and sleep quality (ρ≤0.05). Respondents with high screen time use (≥10 hours/day) were 7,511 times more likely to experience poor sleep quality compared to respondents with low screen time use (<10 hours/day).

Multivariate Analysis

Multivariate analysis aims to obtain the best model in determining sleep quality determinants. In this modeling, it is tested together. Model selection was carried out in stages by entering all significant independent variables (ρ<0.05) or independent variables with ρ<0.25 into the model, then variables that had insignificant ρ values were removed again in stages.

Table 11. Logistic Regression Test Results for Variables Health Status, Stress, Coffee and Screen Time with Sleep Quality, February 23, 2024 (n=84)

	B	Wald	Sig.	Exp (β)
Step 1				
Health Status	1,320	2,154	0,142	3,743
Stress	1,491	3,241	0,072	4,440
Coffee Consumption	-0,941	2,249	0,134	0,390
Environment	0,902	0,989	0,320	2,465
Screen Time	2,037	10,517	0,001	7,670
Step 2				
Health Status	1,172	1,747	0,186	3,227
Stress	1,567	3,696	0,055	4,790
Coffee Consumption	-1,050	2,891	0,089	0,350
Screen Time	2,020	10,634	0,001	7,536
Step 3				
Stress	1,846	5,489	0,019	6,336
Coffee Consumption	-1,030	2,858	0,091	0,357
Screen Time	2,021	11,005	0,001	7,546

Based on the analysis process carried out, there are 2 significant variables, namely stress and screen time. Of these two variables, the largest OR or Exp (β) value is found in the screen time variable, namely 7.546 times, so it can be concluded that the most dominant variable that contributes to the quality of students' sleep at SMKN 1 Narmada is screen time.

Analysis

Sleep Quality

The results of the research that has been carried out show that the majority of respondents' sleep quality is in the poor category, namely 72.6%. Meanwhile, 27.4% of respondents experienced good sleep quality.

The results of this research are in line with research conducted by Murti (2022) which stated that of 296 students there were 57.8% of students who had poor sleep quality, while 42.2% of students had good sleep quality. Apart from that, the results of research from Simpatik & Dhanny (2023) regarding the relationship between sleep quality and obesity in adolescents also stated that most respondents had poor sleep quality (83.9%).

According to researchers, the high number of students who experienced poor sleep quality in this study was caused by most respondents being female students. Research conducted by Gunawan (2020), found that women experienced more sleep disorders than men (96.7%). This is also supported by the results of research by Murti (2022) which states that women are a risk group who more often experience poor sleep quality. Female students were found to be 1,846 times more likely to have poor sleep quality than male students.

Physiological and psychological differences between men and women have an impact on sleep quality. Based on physiological factors, when women experience menstruation hormonal changes can cause feelings of anxiety and depression which affect sleep quality. A decrease in the hormone's progesterone and estrogen in women, which have receptors in the hypothalamus, can affect circadian rhythms and sleep patterns. Each woman has different general symptoms. There are several symptoms that women often experience, including stomach cramps or pain in the lower part of the stomach which usually spreads to the back and lower thighs. The pain feels like being stabbed and lasts 1-2 days (Susanti, 2017).The pain you feel will definitely interfere with your daily activities, including sleeping and resting. Based on a psychological perspective, women are more vulnerable to stressors. This causes sleep problems such as insomnia and poor sleep quality in women (Lee et al., 2020).

Apart from that, the use of screen time is one of the factors that influences a person's sleep quality. Screen time in this case is the accumulation of time a person spends looking at gadget screens and electronic devices. Research conducted by Aulia (2022) stated that the highest screen time was in the mobile phone category with an average usage of 7.35 hours/day. High screen time on smartphone use leads to accessing social media and online games (Kumala et al, 2019). Excessive duration of smartphone use can also affect sleep hours and can reduce sleep quality. Based on research from Gunawan (2020), information was obtained that the sleep disorders experienced were due to an addiction to watching Korean dramas. Female students often spend time watching Korean dramas late at night. This can cause poor sleep patterns.

The Relationship Between Age and Sleep Quality of Students at SMKN 1 Narmada

The results of the research that has been carried out show that most respondents are aged 16 years (47.6%). Of the 16 year old respondents, 72.5% had poor sleep quality. Based on statistical tests, there is no significant difference between age and sleep quality ($\rho>0.05$). Respondents aged 16 years had an opportunity (OR) of 1.058 times to experience poor sleep quality compared to those aged 15 years, 17 years and 19 years.

This is in line with research conducted by Haibanissa et al., (2022) which stated that there was no significant difference between adolescent age and sleep quality. This is because the quality of sleep changes as the child gets older. As children progress through adolescence, their need for sleep does not decrease, but their opportunity to sleep may be influenced by social schedules, activities and academics. School schedules in the morning, extracurricular activities, homework, and social time spent with peers or on the internet make it difficult for teenagers to get enough sleep (Hockenberry, Wilson & Rodgers, 2017).

According to researchers, there is no significant difference in age and quality of sleep because the characteristics of the respondents in this study are homogeneous, namely teenagers.

The Relationship Between Gender and Sleep Quality of Students at SMKN 1 Narmada

Based on the results of research that has been conducted, as many as 61.7% of female respondents have poor sleep quality, while 39.3% of men have poor sleep quality. Based on statistical tests, it is known that there are no significant differences between genders and sleep quality ($\rho>0.05$). Female respondents have an opportunity (OR) of 0.544 times to have poor sleep quality compared to men.

This is in line with research conducted by Tristianingsih & Handayani (2021) which states that there is no significant relationship between gender and sleep quality. The results of the analysis by Yip et al (2020) also stated that there was no relationship between gender and sleep quality, but descriptively women experienced more poor sleep quality.

According to the National Sleep Foundation in Berman, Synder & Frandsen (2022), lack of sleep-in women tends to be due to hormonal factors such as menstruation. A decrease in the hormones estrogen and progesterone occurs in the hypothalamus so that it can affect the circadian rhythm in women. As well as psychological changes due to a decrease in estrogen, such as uncontrolled emotions, women tend to experience sleep disturbances (Sari & Riyadi, 2020). This is in line with the results of research conducted by Siregar et al, (2022) which states that there is a significant relationship between the menstrual cycle and sleep quality in female students with a ρ value of 0.005 ($\rho<0.05$). According to researchers, women tend to have poor sleep quality because they are more susceptible to stressors and mood swings, which can result in poor sleep quality.

The Relationship Between Health Status and Sleep Quality of Students at SMKN 1 Narmada

Based on the results of research that has been conducted, as many as 70.5% of respondents with healthy health status experienced poor sleep quality, while 29.5% of respondents who were sick experienced poor sleep quality. Based on statistical tests, it is known that there is a significant difference between health status and sleep quality ($\rho\leq0.05$). Respondents who were sick had a 4,395 chance of experiencing poor sleep quality compared to those who were healthy.

Based on the results of this study, the majority of respondents who were sick had gastritis (65%), asthma (20%) and anemia (15%). This is in line with research conducted by Jusuf & Yunus (2022) which states that there is a significant relationship between sleep patterns and the incidence of gastritis in students from the Department of Public Health, Gorontalo State University, Class of 2018.

In adolescents, problems usually arise regarding food intake, especially not being used to eating breakfast for various reasons, for example fear of being late for school**.** This is in accordance with research conducted by Syaf'ii, (2019) which shows that there is a relationship between eating habits and the incidence of gastritis. Individuals must maintain eating habits according to the recommendations, namely breakfast, lunch and dinner and must get used to eating regularly.

According to researchers, someone who is sick or has a history of illness will certainly experience sleep disorders more easily than someone who is healthy or has no history of illness. These sleep disorders are caused by symptoms of illness that can appear at any time, including when going to or while sleeping.

The Relationship Between Stress and Sleep Quality of Students at SMKN 1 Narmada

Based on the results of research that has been conducted, as many as 86.9% of respondents who experienced moderate stress had poor sleep quality, while 6.5% and 6.6% of respondents who experienced mild stress and severe stress had poor sleep quality. Based on statistical tests, it is known that there is a significant difference between stress and sleep quality ($\rho \leq 0.05$). Respondents who were stressed were 4,790 times more likely to experience poor sleep quality compared to those who experienced mild stress.

This is in line with research conducted by Murti (2022) which states that there is a significant relationship between stress levels and sleep quality in students at SMA Negeri 33 Jakarta. Apart from that, previous research from Jumilia (2020) stated that as many as 92.1% of teenagers with poor sleep quality experienced moderate stress and 75% experienced severe stress.

The quality of a person's sleep can be influenced by several psychological and physiological factors. One of the factors that most often influences psychology is stress. Stress in adolescents often occurs during the growth and development period so that major changes occur in all aspects, so that these changes can cause pressure in adolescents which can cause stress. Stress is one of the causes of sleep disorders because when stress occurs there is an increase in the hormones nepinephrine, norepinephrine and cortisol which affect the central nervous system and cause a state of wakefulness and increase the alertness of the central nervous system. This can also affect sleep quality (Ratnaningtyas, 2019).

According to researchers, the stress experienced by students is caused by feeling worried about grades, academic workload, sadness, and pressure in studying. This worry can make it difficult for someone to sleep.

The Relationship Between Coffee Consumption and Sleep Quality of Students at SMKN 1 Narmada

Based on the results of research that has been conducted, as many as 52.4% of respondents who consume coffee have poor sleep quality, while 47.5% of respondents who do not consume coffee have poor sleep quality. Based on statistical tests, it is known that there is a significant difference between coffee consumption and sleep quality ($\rho \leq 0.05$). Respondents who do not consume coffee will have a 0.320 times lower risk of experiencing poor sleep quality compared to respondents who consume coffee. This is in line with research conducted by Widhawati & Arpiani (2023) which states that there is a significant relationship between

coffee consumption habits and students' sleep quality. Research conducted by Rohmah in 2021 also showed that students who consumed coffee had a 0.54 times risk of experiencing poor sleep quality compared to students who did not consume coffee.

Based on this research, it also shows that of the total number of respondents who consume coffee, there are 89.5% who consume 1-3 glasses of coffee/day (<400 mg) while 40.5% of respondents consume ≥3 glasses of coffee/day (≥400 mg). mg). This is in line with research conducted by Agung et al., (2022) which stated that the majority of respondents consumed low coffee (1-3 cups/day), namely 65%, while respondents who consumed heavy coffee (≥3 cups/day) were 35%. A dose of caffeine of around 200-300 mg or around 2-3 cups a day when consumed, is able to provide a psychostimulant effect or the ability to increase brain activation in humans. This can increase alertness, reduce drowsiness and fatigue, and can improve thought processes (Dharmadi et al, 2021). Caffeine can have negative effects if consumed in excess. Caffeine with amounts ≥400 mg has the risk of causing bone and calcium disorders, cardiovascular disorders, mental disorders such as anxiety, depression, headaches, insomnia and bad mood (Wikoff, 2017).

Based on this research, the types of coffee consumed by respondents were black coffee (36.8%), instant coffee (34.2%), cappuccino (26.3%) and energy drinks (2.6%). The caffeine content in coffee has benefits when consumed in certain doses. The type of coffee that contains high caffeine is of course pure black coffee without adding any mixtures such as sugar, milk, creamer and other ingredients (Nurhayati et al., 2021).

Apart from that, based on the results of this study, most respondents consumed coffee in the afternoon or evening (65.8%). This is in line with research conducted by Putri (2022) which stated that most respondents in her research said that the duration of lack of sleep was caused by the habit of staying up late and the influence of coffee consumption which is usually drunk to prevent drowsiness when doing tasks at night. Caffeine in coffee is known to have a half-life of 3-10 hours, where half of the amount of caffeine consumed will be lost in the bloodstream and peak levels in the body are 30-60 minutes. So, to avoid the effects of caffeine which can interfere with sleep, the levels consumed should be within certain limits and at the right time, i.e. not consumed in the afternoon or evening (Ferdinand, C., & Olivia, S, 2018). According to researchers, the habit of consuming coffee regularly can cause dependence and the caffeine in coffee makes a person restless and sleepy, making it difficult to sleep. Conditions like this can certainly affect a person's sleep quality.

The Relationship Between Smoking and Sleep Quality of Students at SMKN 1 Narmada

Based on the results of research that has been conducted, as many as 11.5% of respondents who smoke have poor sleep quality, while 88.5% of respondents who do not smoke have poor sleep quality. Based on statistical tests, it is known that there is no significant difference between smoking and sleep quality (ρ>0.05). Respondents who do not smoke have a 0.735 times lower risk of experiencing poor sleep quality compared to those who smoke.

This is in line with research conducted by Aulia (2022) which stated that there was no relationship between smoking habits and sleep quality in students with a ρ value of 0.788 (ρ>0.05). The results of this study also obtained an OR of 1.360, which means that students

who have a heavy smoking habit have a 1.360 times risk of experiencing poor sleep quality when compared to students who are non-smokers.

The results of this research are also in line with research conducted by Siahaan & Malianti (2022) which states that there is no relationship between smoking habits and adolescent sleep patterns. In contrast to research conducted by Tharida et al., (2020) stated that there is a relationship between smoking behavior and disturbed sleep patterns with a ρ value of 0.007 ($p \leq 0.05$).

Cigarettes have significant health effects because they contain 4,000 chemicals with 200 types that have the potential to cause cancer. The main smoke from the burning tip of a cigarette contains toxic substances. Among these toxic compounds include carbon monoxide, benzopyrene, ammonia, water, carbon dioxide, particulates, tar, nicotine, nitrogen oxide, hydrogen cyanide, formaldehyde, phenol, and many more (Wahyudi, 2021).

Cigarettes have bad effects on health, such as heart problems, breathing, malignancy, mental and other disorders. The younger someone starts smoking, the longer they smoke, increasing the chance of developing the disease. In the results of this study, of the 9 respondents (10.7%) who smoked, it was found that the average length of time the respondent had smoked was ≥ 1 year with the average age at which respondents started smoking at 14 years with a minimum age of 13 years and a maximum of 17 years. This means that they started smoking when they were still in junior high school. This is because teenagers in the transition period are trying out new things for their self-identity and also those aged 15-19 years have a high curiosity influenced by environmental factors such as peers. According to Wahyudi and Ramadanti (2019), in general smoking behavior in adolescents will increase according to their developmental stage, which is characterized by increasing frequency and intensity of smoking, and has resulted in nicotine dependence.

From the results of this study, it was found that 7 out of 9 respondents who smoked most of the cigarettes they consumed were in the light smoker category because they consumed 1-9 cigarettes/day and as many as 5 light smoker respondents had poor sleep quality. Meanwhile, 2 respondents were heavy smokers because they consumed ≥10 cigarettes/day. The two respondents who were heavy smokers had poor sleep quality. According to Tharida (2020), the more cigarettes consumed, the greater the risk of experiencing insomnia because when a smoker smokes more cigarettes, more nicotine enters the body, which causes the sympathetic and parasympathetic nerves to tighten. As a result, hormone dopamine increases and makes a person feel fresh and not sleepy.

Apart from that, 4 respondents who smoke consumed white cigarettes, 4 respondents consumed kretek cigarettes and 1 respondent consumed rolled cigarettes. According to Yuliarti (2015), white cigarettes reduce the toxic levels in cigarettes compared to other types of cigarettes, thereby reducing the risk of exposure to substances contained in cigarettes, one of which is nicotine. According to researchers, smoking habits have no significance on sleep quality because almost most respondents do not smoke. In addition, the majority of respondents in this study were female (64.3%) whereas in Indonesia in general the majority of men smoke.

The Relationship Between the Environment and the Sleep Quality of Students at SMKN 1 Narmada

Based on the results of research that has been conducted, as many as 21.3% of respondents with uncomfortable environments experienced poor sleep quality, while 78.7% of respondents with comfortable environments had poor sleep quality. Based on statistical tests, it is known that there is no significant difference between the environment and sleep quality ($\rho>0.05$). Respondents who have a comfortable environment have a 2.844 times lower risk of experiencing poor sleep quality compared to respondents who have an uncomfortable environment.

This is in line with research conducted by Murti (2022) which stated that there was no significant relationship between environmental conditions during sleep and sleep quality among students at SMA Negeri 33 Jakarta. This research is also supported by the results of research from Aulia (2022) which states that there is no relationship between environmental factors and a person's sleep quality.

A comfortable sleeping environment is what every individual wants. According to Potter and Perry (2012), comfort factors, a quiet room atmosphere, light during sleep, good room ventilation, room cleanliness, air temperature and the environment around the room can influence the quality of a person's sleep. When someone feels disturbed by these things, it will be more difficult for someone to start sleeping, which can lengthen sleep latency and shorten sleep duration (Budyawati, 2019).

Based on the research results, it was found that 85.7% of respondents slept with the room lights turned off. This is in line with research by Hidayat et al., (2024) that as many as 81.4% of respondents stated that sleeping without lights made the quality of sleep feel better, more comfortable and restful. Sleep comfort needs to be considered in order to improve sleep quality. The hormone melatonin is a hormone that can influence the sleep and wakefulness cycle. Light can interfere with the production of hormone melatonin. The less the hormone melatonin is produced, the less sleepy you feel. This can cause insomnia or difficulty sleeping (Hidayat et al., 2024).

Based on the research results, it was found that 69% of respondents could not fall asleep if there was noise and 84.5% of respondents had a completely quiet bed at night. This is in line with Aulia's (2022) research that as many as 71.6% of respondents in her research lived in areas of the house that did not cause noise. Environmental noise is considered the main cause of sleep disorders, after internal problems such as stress. When a person enters the first sleep phase in a noisy environment, it can influence a person to start falling asleep (Ningsih, 2020).

Based on the theory of Potter and Perry (2012) which states that if someone is not used to sleeping with other people, it can make someone wake up or disturb their sleep. This is supported by the results of research that has been carried out that 91.7% of respondents can fall asleep even if they are alone.

Based on the results of this study, it was found that 78.6% of respondents cleaned their beds before going to bed. Cleaning the bed before sleeping is included in sleep hygiene. Sleep hygiene is the habits and behavior that a person does before sleeping (Ifana, 2017). It is known that bed cleanliness can affect sleep quality. This is because the cleanliness of the bed makes a person feel comfortable, causing a person to sleep soundly (Soamole, 2017).

According to researchers, there is no significant relationship between the environment and sleep quality because when a person enters the stage of excessive sleepiness, a person will

fall asleep easily without paying attention to the surrounding environment. Apart from that, the majority of students who have poor sleep quality are students who have a comfortable sleeping environment (78.7%), so researchers assume that there are other factors that influence poor sleep quality.

The Relationship Between Screen Time and Sleep Quality of Students at SMKN 1 Narmada

Based on the results of research that has been conducted, 85.2% of respondents with high screen time use (≥10 hours/day) have poor sleep quality, while 14.8% of respondents with low screen time use (<10 hours/day) have poor sleep quality. the bad one. Based on statistical tests, it is known that there is a significant difference between the environment and sleep quality (ρ≤0.05). Respondents with high screen time use (≥10 hours/day) had a 7.511 chance (OR) of experiencing poor sleep quality compared to respondents with low screen time use (<10 hours/day).

This is in line with research conducted by Aulia (2022) which states that there is a significant relationship between screen time and sleep quality in students. Apart from that, there are also research results from Murti (2022) which state that there is a significant relationship between the duration of smartphone use and sleep quality among students at SMA Negeri 33 Jakarta in 2022 (ρ value <0.05).

Excessive screen time has the potential to disrupt the cardiovascular rhythm through the emission of blue light which suppresses the release of the hormone melatonin. Melatonin is a hormone that helps the body to facilitate sleep every night (Milena et al., 2019).

According to research conducted by Milena et al. (2019), excessive use of mobile phones at night can cause sleep disorders in teenagers. Sleep can be affected by the use of telecommunications and other screen media, such as passive media, such as television, and interactive media, such as cell phones, computers, laptops, or video games. According to Cabre Riera (2019), the light emitted by electronic devices can affect the cardiac rhythm and can disrupt, delay or divert sleep time.

According to researchers, the quality of sleep among students has not been met properly in this study, because the majority of students have high screen time usage, namely ≥10 hours/day so that the screen is not used for sleeping, especially at night. The use of screen time among students at SMKN 1 Narmada predominantly uses cellphones. Using a smartphone for too long, especially at night, can disrupt a person's sleep patterns. Blue light from cellphone screens can not only damage the eyes, but can also make it difficult for someone to sleep.

The Dominant Factors That Influence Students' Sleep Quality at SMKN 1 Narmada

Multivariate analysis in this study showed that screen time is the most dominant independent variable that influences students' sleep quality, where the screen time variable has the smallest significant ρ value (ρ≤0.05) so it can be concluded that screen time is the most dominant variable. on the sleep quality of students at SMKN 1 Narmada with a value of ρ value = 0.001 and OR = 7.546, meaning that the use of screen time has a 7.546 times greater chance of causing poor sleep quality in students.

This research is in line with research conducted by Hablaini (2021) which states that there is a relationship between screen time and sleep quality. This research also obtained results that the highest screen time was for the cellphone category with an average usage of 7.35

hours/day. Screen time is one of the factors that affects a person's sleep quality. Screen time in this case is the accumulation of time students spend looking at gadget screens and electronic devices. In Indonesia itself, a person's behavior is also influenced by increasing screen time and use of technology (Amelia, 2021). High screen time on smartphone use leads to accessing social media and online games (Kumala, 2019).

Another factor that causes high screen time can be related to poor sleep quality because of LED light (Light-emitting diodes). The blue light emitted by electronic screens resembles sunlight so that the melanopsin photoreceptors or dyes in the eyes react as if using an electronic screen is considered daytime. This causes the pineal gland in the brain to stop releasing the hormone melatonin and disrupts the circadian rhythm, resulting in withdrawal syndrome or a delay in a person's sleep phase. Hormone melatonin itself plays an important role in regulating the sleep cycle. It is known that exposure to light in electronic media, even for a short duration, can inhibit the hormone melatonin by 1.9-2.7 times so that it will have a big impact on a person's sleep quality (Diantoro, 2021).

According to researchers, screen time is the most dominant factor influencing students' sleep quality, especially smartphone use, because the use of gadgets or smartphones has now become a lifestyle for almost all groups, including teenagers. Teenagers tend not to be able to stay away from smartphones. A person's addiction to smartphones will make him feel that smartphones can provide pleasure and reduce anxiety which results in someone using smartphones excessively and not wanting to be separated from smartphones, thus affecting sleep quality. According to a survey, 91% of internet users are teenagers aged 15-19 years (Untari, 2019). The results of this research also state that the age of the respondents ranges from 15-19 years, which is included in the teenage category.

CONCLUSION

The research findings indicate that health status, stress, coffee consumption, and screen time are significantly related to students' sleep quality at SMKN 1 Narmada, while age, gender, smoking, and environmental factors show no such relationship. Among these, screen time emerged as the dominant factor influencing sleep quality. Future research could explore interventions to reduce screen time and investigate how such changes might improve sleep quality and overall well-being in students.

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