Internet Addiction and Sleep Quality in Students of SMA Negeri (Public Senior High School) 9 Manado

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Keywords	ABSTRACT
Internet Addiction, Sleep Quality, High School Students.	Sleep is vital for cell regeneration and repair in the human body. Adequate sleep, typically 7-8 hours per day, is crucial for adolescents, as its deficiency can impact various aspects of their lives including physical health, academic performance, school activities, and concentration. However, numerous factors, such as internet addiction, can disrupt sleep quality. Internet addiction, characterized by excessive and uncontrollable internet usage, is particularly prevalent among adolescents and has been linked to sleep disturbances. This study aimed to investigate the relationship between internet addiction and sleep quality among students at SMA N 9 Manado (Public Senior High School). Employing quantitative research methods and correlation analysis, data were collected from 110 active students at SMA N 9 Manado using quota sampling techniques. The Internet Addiction Test (IAT) and the Pittsburgh Sleep Quality Index (PSQI) were utilized as measurement scales. Statistical analyses including the Kolmogorov-Smirnov test, one-way ANOVA test, and Pearson's Product-Moment correlation coefficient were performed. The findings revealed a significant positive correlation ($r = 0.533$, $p < 0.05$) between internet addiction and sleep quality among students at SMA N 9 Manado, indicating that higher levels of internet addiction were associated with poorer sleep quality. This underscores the need for interventions aimed at reducing internet addiction among students, with an emphasis on fostering self-awareness regarding internet usage behaviors. Such interventions hold promise for improving the sleep quality and overall well-being of adolescents.

INTRODUCTION

Sleep is a process needed by the human body to form new cells and repair damaged cells (Natural Healing Mechanism). The time used for sleep by humans can be about a quarter to one-third of the time in one day (Bollu & Kaur, 2019; Grandner, 2022; Hauri, 2021). Humans who have good sleep quality will have a good impact on the body; for example, they are not easily affected by the disease, can maintain mental balance, and can improve health; stress can have a bad impact on the lungs, cardiovascular, endocrine, and so on (Crivello et al., 2019; Kohyama, 2021; Montesinos et al., 2018; Zhang et al., 2019). Adequate sleep must be fulfilled, especially in adolescents, because it can affect the level of learning productivity; if adolescents do not have enough sleep, it will have an impact on concentration while studying at school, can worsen body health, can increase stress, forgetful, skin looks older, less focus when driving, and can cause obesity problems (Ministry of Health, 2018).

According to Aymerich (2021), adolescence is a stage in which individuals are aged 11 to 18. During this period, adolescents feel physical changes characterized by puberty, which is a gradual process of internal and external change and hormonal changes, including sexual hormones (Uyun & Warsah, 2021). Longitudinal studies by Santos (2021) show that the tendency to daytime napping

increases by mid-puberty. In other words, although the amount of nightly sleep adolescents consume does not decrease during puberty, their midday increases significantly by mid-puberty and remains at that level (Han et al., 2022; Tarokh et al., 2019). Therefore, adolescents need enough sleep so that their bodies can develop and grow perfectly. Universally, everyone's sleep needs are not the same.

Normal sleep patterns in adolescence are around 7-8 hours/day (Gariépy et al., 2019). If sleep quality is not met properly or is disturbed, this can affect the needs of other adolescents (Altena et al., 2020; Meltzer et al., 2021; Wang & Boros, 2021). Such as, one of them is related to physical such as health factors that have an impact on learning achievement, for example when adolescents lack sleep will appear laziness in learning, the results of a survey of a sleep study in England found that lack of sleep tends to be 3 times greater in experiencing impaired concentration, 2 times suffering from fatigue, and experiencing mood disorders (Blake et al., 2018; Okano et al., 2019).

One of the activities of adolescent students is studying at school. According to Yuniarsih (2022), learning activities involve a person in the form of attitudes, thoughts, and attention in learning activities as support for the success of the teaching and learning process so that benefits are obtained from these activities. In the learning process, sleep quality is important, especially in memory formation, which strengthens incoming memory into long-term memory (Putra & Dharmadi, 2018).

According to Niemi (2020), students often sleep late and wake up faster due to school demands, so students often feel sleepy at school. Vazsonyi (2021) suggests that poor sleep quality and lack of sleep occur in adolescents. This is because often, the quality of adolescent sleep is less fulfilled. As a result, adolescents have different sleep patterns than other ages. Hoyt (2018) states that adolescents today face obstacles during sleep, such as lack of sleep. This is because teenagers prefer to be in front of cellphone screens, television, and computers. Also, half of the students' sleep quality was affected by using the internet for chat. Playing online games and watching movies before going to bed (Kawabe et al., 2019; Kolhar et al., 2021; Lin et al., 2019).

Based on the results of a World Health Organization survey (WHO, 2018) 81% of adolescents' sleep quality is poor. Researchers conducted interviews to map the phenomenon of sleep quality and internet addiction; researchers interviewed 3 high school students in February 2023. Researchers have found that sleep quality in high school students is poor. They often sleep late at night, around two to three o'clock in the morning, because they access the internet and must wake up at seven in the morning to carry out their responsibilities as students, namely school. They often play on mobile phones, laptops, and even computers, and most of them access social media, online games, and TikTok applications, this they have done for quite a long time, about 6 to 10 hours a day in the last few months and make their sleep quality not good or they sleep only three to four hours, whereas they should sleep for seven to eight hours per day. Researchers also get information when they are studying at school, they are often sleepy and not focused on doing learning at school.

Through mapping the phenomenon that researchers conducted on students of SMA Negeri 9 Manado regarding the phenomenon of internet addiction and sleep quality, the results of 16 respondents, namely SMA Negeri 9 Manado students who actively use mobile phones in accessing the internet such as opening social media and playing online games with an average use of mobile phones for 15-20 hours a day obtained 68.8%. While the average use of 5-10 hours of mobile phone use a day gets results of 31.3%. The results obtained by researchers, seen in the average use of mobile phones for 15-20 hours a day are higher, so these results are in line with those described by Ching (2017) that the use of mobile phones and the internet that spends more than 40 hours to 80 hours is categorized as internet users who experience internet addiction and exceed the normal use limit of mobile phones.

Research conducted by Lombogia (2018) found a picture of poor sleep quality in high school students. As many as 62.4% of students had poor sleep quality, and 37.6% of students had good sleep quality. This is similar to a study conducted on 153 high school students, and the results found that

69.3% of students had poor sleep quality. From these two results, it can be concluded that the sleep quality of high school students is poor.

Research conducted by Lombogia, (2018), it was found that 62.4% of students had poor sleep quality, so it can be said that the results of this study showed that many high school students had poor sleep quality. This is the same as the results of research conducted in high schools in Sumatra, which found that 69.3% of students had poor sleep quality. From these two results, it can be concluded that the quality of sleep in high school students is poor.

According to Buysse et al. (1988), sleep quality is a condition experienced by an individual to produce freshness and fitness after waking up. Buysse et al. (1988) suggests seven aspects of sleep quality, among others; first, subjective sleep quality is a brief evaluation of the individual's sleep quality that is assessed subjectively to determine whether his sleep is very good or bad. The second is sleep latency, which measures a person's sleep latency from how he processes falling asleep. Third, sleep disorders, see if any sleep disturbances occur, such as sleep-wake patterns that change and eventually affect the habits of the individual. Fourth, sleep duration measures the duration of sleep from when a person falls asleep until he wakes up early in the morning without being distracted from waking up in the middle of the night. Fifth, efficient sleep habits, calculates the efficiency of individual sleep habits, i.e. by dividing the total hours of sleep and the amount spent in bed. Sixth, the use of sleeping pills, the use of sleeping pills containing sedatives to overcome sleep problems, and seventh, sleep dysfunction during the day, there are visible changes in mood during the day, namely dysfunction that shows individuals are less enthusiastic and not excited.

Sleep quality has both positive and negative impacts. The body can receive a positive impact when the sleep duration is met. All the body's vital functions will be reduced, activity at the metabolic rate will be lowered, body cells can be repaired, and energy can be restored throughout the sleep process. Not only that, but the brain can also integrate new knowledge and form new associations when a person sleeps; this makes the mind will be fresher (Eide & Eide, 2023; Perks & Turner, 2019). Sleep quality that is not considered can hurt body health (Baek et al., 2020; Lee & Oh, 2022). As a result of poor sleep quality will affect and cause negative things, among others, vulnerable to problems such as physical health, problems in memory and education, dangerous obesity problems, and mental health problems (Nowowiejska et al., 2021; Zavitsanou & Drigas, 2021). Poor sleep quality is a condition where someone does not maintain sleep patterns; good sleep patterns are very meaningful. Poor sleep quality is when an individual does not pay attention to his sleep patterns. Paying attention to good sleep patterns is very important, but to regulate good sleep patterns is a person must go to bed earlier to wake up earlier too. Everyone needs to keep their biology in line with their daily routine to limit activities that make them awake at night so that it can help the effectiveness of sleep hours because if someone lacks sleep in the long term, it can cause brain damage, even death ((Woods & Scott, 2016)

According to Utami & Anggorowati, (2019) found that two factors affect internet addiction, namely, sleep quality and caffeine consumption. Internet addiction or internet addiction is a person's inability to be able to control internet use and spend more time using the internet which can lead to psychological and social problems (Berte et al., 2021; Nopiana et al., 2022). Perdew, (2014) proves internet addiction can cause physical problems such as dry eyes, back pain, poor hygiene, irregular diet and sleep patterns. According to Caplan, in (Mawardah, 2019) sees technology addiction as a behavioral addiction; Internet addiction shows the characteristics of the core components of addiction, namely salience, mood modification, tolerance, withdrawal, conflict, and relapse.

The rapid development of technology and data and the emergence of progress can facilitate people's lives. The development of technology and data in modern times has become a common problem due to the revolution that affects the method of relating to each human being. The interaction change

resulting from the social interaction revolution can be tried directly. Still, it can also be tried indirectly through electronic communication media such as the internet (Goldsmith, 2017).

Research conducted by Thomas (2021) Their research showed no significant relationship between internet addiction and sleep quality. Research conducted by Lin et al. (2019) shows a significant negative relationship between internet addiction and sleep quality. This means that the higher the internet addiction, the lower the quality of sleep, on the other hand, if the internet addiction is low, the higher the quality of sleep.

The purpose of this study is to investigate the relationship between internet addiction and sleep quality among high school students, particularly focusing on students of SMA Negeri 9 Manado. This research is prompted by the prevalent phenomenon of teenagers engaging in late-night internet activities, such as gaming and social media browsing, at the expense of adequate sleep. Prior studies have yielded conflicting findings regarding the association between internet addiction and sleep quality, necessitating further examination, especially within the context of high school adolescents. Therefore, the study aims to clarify the impact of internet addiction on sleep quality among this demographic, shedding light on the potential consequences of excessive internet usage on their well-being and academic performance.

METHODS

This quantitative study uses correlation analysis to investigate the relationship between internet addiction and sleep quality in students of SMA Negeri 9 Manado. The independent variable in this study was internet addiction (X), while the dependent variable was sleep quality (Y). The population that is the focus of the study is students of SMA Negeri 9 Manado. The sampling technique used is non-probability with quota sampling technique, where samples are taken from the population of SMA Negeri 9 Manado students who meet the age criteria of 14-18 years. The identified population was 2,130 students, and the sample taken amounted to 241 students, with an error rate of 10%.

Data in this study were collected using a psychological measurement scale in the form of a questionnaire or Likert scale. Two measuring tools were used: (1) the Internet Addiction Test (IAT), which measures internet addiction with 20 question items, and (2) the Pittsburgh Sleep Quality Index (PSQI), which measures sleep quality with 19 question items. Both scales have passed validity and reliability tests, with results demonstrating the feasibility of their use.

Testing of measuring instruments is carried out to ensure the reliability and validity of each scale. The internet addiction scale (IAT) obtained an Alpha Cronbach reliability of 0.965. In contrast, the sleep quality scale (PSQI) resulted in an Alpha Cronbach reliability of 0.920 on the first round and 0.943 on the second round after several items were retested. After data collection, the analysis is carried out using statistical methods. The data will be tested for normality and linearity using the Kolmogorov-Smirnov test and one-way ANOVA. Next, correlation analysis used Pearson Product Moment to determine the relationship between internet addiction and sleep quality. Data analysis will be performed with the help of IBM SPSS Statistics 25.0 for Windows software.

RESULTS
Descriptive Statistical Results

Table 1. Internet Addiction Scale Categorization

No	Interval	Category	F	Percentage
1	73.5 ≤ x ≤ 100	Tall	15	14%
2	46.8 ≤ x ≤ 73.4	Keep	66	60%
3	20 ≤ x ≤ 46.7	Low	29	26%
Sum			**110**	**100%**
Min = 20 ; Max = 100 ; Mean = 55.56 ; SD = 14,351				

The results of the descriptive statistical data in Table 2 show 110 participants, with a minimum score of 20 to a maximum score of 100 with a standard deviation of 14.351 and an average value of 55.56 for the internet addiction variable. Data shows that the level of internet addiction from 110 participants is divided into three categories, namely high, medium, and low. Thus, internet addiction owned by SMA Negeri 9 Manado students is mostly in the medium category, with a percentage of 60%.

Table 2. Sleep Quality Scale Categorization

No	Interval	Category	F	Percentage
1	33 ≤ x ≤ 48	Good	7	6%
2	17 ≤ x ≤ 32	Enough	73	66%
3	0 ≤ x ≤ 16	Bad	30	28%
	Sum		**110**	**100%**
	Min = 4 ; Max = 47 ; Mean = 21.33 ; SD = 7.635			

The results of the descriptive statistical data in table 3 showed that there were 110 participants, having a minimum score of 4 to a maximum score of 47 with a standard deviation of 7.635, with an average value of 21.33 for sleep quality variables. Data shows that the quality level of 110 participants is divided into three categories, namely good, sufficient, and bad. Thus, the quality of sleep possessed by SMA Negeri 9 Manado students is mostly in the fairly good category, with a percentage of 66%.

Table 3. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
AddictionInternet	110	20	100	55.56	14.351
Sleep Quality	110	4	47	21.33	7.635
Valid N (listwise)	110				

Assumption Test Results
Normality Test

Table 4. One-Sample Kolmogorov-Smirnov Test

		Internet Addiction	Sleep Quality
N		110	110
Normal Parameters[a,b]	Mean	55,56	21,33
	Std. Deviation	14,351	7,635
Most Extreme Differences	Absolute	0,116	0,060
	Positive	0,116	0,060
	Negative	-0,052	-0,035
Test Statistics		0,116	0,060
Asymp. Sig. (2-tailed)		.001c	.200c,d

From the results of the normality test above, the results of the internet addiction variable are 0.116 with significance = 0.001 (> 0.05) and for the results of the sleep quality variable is 0.060 with significance = 0.200 (> 0.05), which means that the two variables are normally distributed.
Linearity Test

Table 5. Internet Addiction and Sleep Quality Linear Test on SMA Negeri 9 Manado students

ANOVA Table

			Sum of Squares	Df	Mean Square	F	Sig.
Sleep Quality * Internet Addiction	Between Groups	(Combined)	3658,985	50	73,180	1,602	0,041
		Linearity	1807,913	1	1807,913	39,576	0,000
		Deviation from Linearity	1851,072	49	37,777	0,827	0,752
	Within Groups		2695,233	59	45,682		
	Total		6354,218	109			

From the results of the linear test above from the two variables: internet addiction (X) and sleep quality (Y). A linearity test result 0.827 was obtained with significance = 0.752 (> 0.05). It can be concluded that the relationship between variables (X) internet addiction and (Y) sleep quality in SMA Negeri 9 Manado students are linear.

Hypothesis Test Results

Table 6. Test the hypothesis of Internet Addiction and Sleep Quality in students of SMA Negeri 9 Manado

Correlations			
		Internet Addiction	Sleep Quality
Internet Addiction	Pearson Correlation	1	.533**
	Sig. (2-tailed)		0,000
	N	110	110
Sleep Quality	Pearson Correlation	.533**	1
	Sig. (2-tailed)	0,000	
	N	110	110

In the hypothesis test, a significant positive relationship result was obtained, obtaining a Pearson correlation value of 0.533 with sig = 0.000 (>0.05). It also has a positive relationship because, in Pearson, the correlation is positive.

Discussion

This study obtained results that showed that the hypothesis was the opposite. This is different from the initial hypothesis that said that there was a negative relationship between internet addiction and sleep quality. Still, in this study, there was a positive relationship between internet addiction and sleep quality in students of SMA Negeri 9 Manado based on statistical calculations. The results of hypothesis testing obtained a correlation of 0.533 with a significant level of 0.000 (>0.05).

This is in line with research conducted by Lombogia, Kairupan, and Dandu (2018), which states a positive relationship between internet addiction and sleep quality in high school students. In the study, they also wrote that in Indonesia itself, there have been many studies conducted to determine whether there is a relationship between internet addiction and sleep quality. Similar to research conducted by Habut, Manafe & Wungouw, (2021) there is a relationship between internet addiction and sleep quality,

it is also explained that internet addiction is one of the factors that affect sleep quality, therefore their research obtained results that show a positive relationship between the two variables.

Internet addiction does affect the quality of a person's sleep; someone who has a behavior that is at risk of experiencing Internet addiction will have difficulty leaving activities so that they can be online even at night. This is in line with the factor of duration of using the internet or lack of control according to. This can cause a person to be unable to control himself in using the internet so that it can cause increased time when playing the internet. When it cannot be controlled, it will affect the quality of sleep, such as lack of sleep duration at night, and can cause sleep dysfunction or drowsiness during the day. Researchers use These interrelated aspects of the theory (Buysse et al., 1988; Young, 1998).

Currently, the internet is difficult to separate from humans because now almost everyone needs the internet to do something such as do assignments, carry out online learning, and much more. Therefore, so many young people access the internet every day; the internet today is no longer a reason to prohibit young people from accessing the internet for too long because, as I explained earlier, everything is now digitalized, so must use the internet. This is in line with what Habut, Manafe, and Wangouw (2021) said that someone will access the internet every day because of the intensity of studying and doing tasks and because lifestyle requires a long duration when accessing the internet.

Indeed, addiction is one of the factors that affect the quality of one's sleep. Still, the good and bad quality of one's sleep is not only influenced by sleep quality but also influenced by other factors such as lifestyle factors. A person's lifestyle can reflect the quality of his sleep. The lifestyle of everyone is different; some have a good lifestyle, such as frequent exercise, and some are bad, such as consuming drinks containing alcohol and others can cause the individual to disturb their sleep, but someone who exercises excessively too often can reduce the quality of their sleep as well (Ningsih & Permatasari, 2020).

Furthermore, there are environmental factors; this factor is the factor that most people experience when discussing sleep quality because with the individual environment will be affected by people who are there, for example, invited to gather until night, experience noise around the room that can inhibit sleep faster to have good sleep quality, the air temperature in the bedroom is too hot, Rooms that are not neat, dirty rooms and rooms that are uncomfortable to sleep in will greatly affect the good and bad quality of one's sleep. This aligns with what was said by Ningsih &; Permatasari, (2020) when the environment is uncomfortable, noisy, dirty, and too hot, individuals will be disturbed by this, which causes them to experience sleep disturbances.

The last is the psychological stress factor; this factor is one of the three that affect the quality of one's sleep because when someone experiences psychological stress, the quality of his sleep will be disturbed by it, a person cannot sleep comfortably because he thinks of problems or so on that disturbs the mind at that time therefore the quality of sleep becomes not good, (Ningsih & Permatasari, 2020). It can be concluded from the explanation that the researcher has conveyed that why even when individuals experience high internet addiction and good sleep quality is because other factors affect the individual when sleeping, be it a comfortable environment, having a good lifestyle or not having severe psychological stress the individual can have good sleep quality, Because internet addiction today is also one of the needs of adolescents to carry out daily activities, so even though the individual experiences internet addiction, he still gets good quality sleep because it is influenced by other factors as well.

The limitations and shortcomings in this study were that researchers had difficulty collecting data or distributing questionnaires to students to fill out and to fellow researchers to distribute to their friends who were still in high school. The researcher had difficulty when he wanted permission to go to school because the principal at that time was on duty so he was not at school when the researcher came to give a research permit from the faculty. Therefore, researchers experienced delays in disseminating questionnaire data to students and quickly collecting participants of SMA Negeri 9 Manado students.

Researchers also find it difficult to find subjects who will fill out the questionnaire because many of the students have been instructed by the teacher to fill it out but do not. Therefore, researchers have difficulty finding participants and students who fill out their questionnaires. Some fill out not according to their choice, so because the teacher forces them to fill it out, they fill it out quickly without looking at the questions.

Researchers have conducted interviews with several participants who have filled out questionnaires; researchers want to know whether participants filled in seriously or only the important ones have filled out, so the answers do not match what they experienced. In the first participant answered the questionnaire the most did not match the answers at the time of the interview; for the internet addiction scale of 20 questions, 16 questions the answer was different from what he answered in the questionnaire, and for the sleep quality scale of 16 questions, the 10 answer questions were different from what he answered in the questionnaire. The second participant answered the questionnaire not according to his answers at the time of the interview; for the internet addiction scale of 20 questions, 17 questions differed in answers between the questionnaire and at the time of the interview, and for the sleep quality scale of 16 questions there were 13 questions whose answers were different as well.

Then for the third participant answered the questionnaire mostly differently from his answer at the interview; for the internet addiction scale of 20 questions, there were 17 different questions answered when in the questionnaire and at the interview, and for the sleep quality scale of 16 questions 12 of which were different answers when interviewed and in the questionnaire Furthermore for the fourth participant, He answered in the questionnaire and at the interview just like the previous three subjects, he also had several different answers to the answers he chose in the questionnaire and answers at the time of the interview, for the Internet addiction scale of 20 questions, 7 questions different from the answers in his questionnaire. In comparison, for the sleep quality scale of 16 questions, there are 11 questions whose answers differ from those in the questionnaire. From the interview results above, it can be concluded that participants did not answer according to the circumstances that happened to them but answered those that did not match their circumstances. By re-interviewing the study participants, researchers can find out whether participants choose answers that match what they experienced and can validate their clear and correct answers.

CONCLUSION

Based on the research findings, it was observed that there exists a significant positive relationship between internet addiction and the sleep quality of SMA Negeri 9 Manado students, contrary to the initial hypothesis. This indicates that internet addiction does indeed impact the sleep quality of these students. Furthermore, it is noted that aside from internet addiction, various other factors such as lifestyle, environmental conditions, and academic stress may also influence sleep quality. Thus, it is evident that multiple factors contribute to the quality of sleep among SMA Negeri 9 Manado students.

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