

THE RELATION BETWEEN SCREEN TIME AND SLEEPING QUALITY TO OBESITY INCIDENCE IN FEMALE ADOLESCENTS IN BANTUL DISTRICT DURING COVID-19 PANDEMIC

HUBUNGAN *SCREEN TIME* DAN KUALITAS TIDUR DENGAN KEJADIAN GEMUK PADA REMAJA PUTRI DI KABUPATEN BANTUL SELAMA PANDEMI COVID-19

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Abstract: *The prevalence number of obesity nutritional status in Bantul district in 2018 was 13.32%. The status in adolescents is caused by various factors such as poor sleeping quality which increases screen time exposure in adolescents. The study is to investigate the relation of screen time and sleeping quality to obesity incidence in female adolescents in Bantul district. The study used quantitative method with case control design. The samples in the study were 13 – 18 years old female adolescents in Bantul district taken randomly by using Cluster Random Sampling technique based on sub-district resulted in 288 female adolescent data consisting of 73 groups of case and 215 control groups. The instruments of the study were questionnaire of respondents' characteristics, QueST questionnaire, PSQI questionnaire, and antropometri measurement and the data were analyzed by using Chi-square. The result of the study showed that there was no significant relation between screen time and obesity incidence in female adolescents in Bantul district ($p = 0.967$; $OR = 1.12$; $95\%CI = 0.634-1.978$) and there was no significant relation between sleeping quality and obesity in female adolescents in Bantul district ($p = 0.672$; $OR = 0.98$; $95\%CI = 0.551-1.756$). The study concludes that there is no significant relation between screen time and sleeping quality and obesity incidence in female adolescents in Bantul district during Covid-19 pandemic.*

Key word: *female adolescents, obesity, screen_time, sleeping_Quality*

1. INTRODUCTION

Obesity problem in female teenagers still becomes a prevalent problem faced by Indonesian people. This is proven by data from the National's Basic Health Research (RISKESDAS) stating that the prevalence of obesity status (IMT/U) in female teenagers aged 13-15 saw an increase from 8.3% to 11.7%, as well as those aged 16-18 with an increase from 5.7% to 11.4% (Kementerian Kesehatan RI, 2013b)(Kementerian Kesehatan RI, 2018a). The prevalence of obesity status of female teenager in several provinces in Indonesia, among others in the Special Region of Jogjakarta, tended to rise. In the said province, the obesity status of female teenagers aged 13-18 went up as many as 3.85%. Bantul Regency had the highest number of obesity in the Special Region of Jogjakarta province, with an increase of 13.32% for the prevalence of obesity status in female teenagers in 2018 (Kementerian Kesehatan RI, 2013a)(Kementerian Kesehatan RI, 2018b).

Sexual maturity starts from the age of 11 to 20. Throughout this age range, there are various problems that negatively affect teenagers' health and nutrition which can lead to malnutrition (Rahayu & Fitriana, 2020). Malnutrition in teenagers is influenced by two factors, namely internal and external factor. Some of the external factors leading to

obesity are the frequency of exercise, sleep duration, and screen time duration (Pramudita & Nadhiroh, 2017). Other factors causing obesity are food consumption, eating habit, sex, age, parents' knowledge of nutrition, parents' education level, parents' occupation, and parents' income level (Suharsa & Sahnaz, 2016).

In the COVID-19 pandemic era, a lot of institutions such as offices and schools have to temporarily close. Therefore, it makes every activity be carried out at home. The pandemic forces students to conduct online learning at home. Online learning can affect teenagers' physical activity of which trend tends to decline compared to when students conduct face-to-face learning. The decline of physical activity is proven with the habit of teenagers to stay in front of TV screen or other digital gadgets such as smart phone and laptop. Based on the previous research conducted in China, almost 80% students experienced more screen exposure during the covid-19 pandemic. 44.6% of the total students spent their time and got screen exposure for more than 5 hours a day for online learning, and 49.9% of the total students got screen exposure for 1-2 hours for entertainment (Guo et al., 2021). A study conducted in University of Pattimura, Maluku, taking university students as the subjects of the study, showed that 76.7% university students typically used their smart phone more than 4 hours a day (Latupono et al., 2021). Based on a research (Astiti et al., 2013), it was found that in Jogjakarta, there were 65% cases having screen exposure duration for more than 2 hours, and 40% of control group having screen exposure duration for less than 2 hours. According to the research, (Bruni et al., 2015) the screen exposure prevalence for female students was higher than the screen exposure for male students with the percentage of 69.7% and 53.5% respectively.

Sleep quality also influences teenagers' diet pattern and nutritional status. Teenagers' sleep quality tends to decrease. This is proven by a research in China explaining that there were sleep deprived students as many as 38.5%, while 2.1% of them actually got too many sleeping hours. This was caused by teenagers' irregular diet pattern, anxiety over current condition, and disruption in both physical and social activity during stay-at-home policy that led to excessive use of electronics (Guo et al., 2021). Teenagers use gadgets and electronics mostly for studying, playing games, watching TV, and doing tasks. The screen time activity itself can have an impact on teenagers' health. A poor sleep pattern which is caused by the excessive use of electronics and an irregular diet can affect teenagers' nutritional status from excessive nutrition even to obesity (Istiqomah & Lisiswanti, 2017). Another effect caused by irregular sleep pattern is the risk of developing depression, stress, heart disease, hypertension, stroke, diabetes, breast cancer, irregular hormonal cycle, and imbalanced metabolism (Hasiana, 2015). Based on the background, the researcher of this research was keen on examining more deeply about "The Relationship between Screen Time and Sleep Quality with Obesity Incidents in the Female Teenagers in Bantul Regency during the COVID-19 Pandemic".

2. METHODS

The design of this research is a quantitative research with an approach on case control. The research was conducted on January 2022 in eight schools in Bantul Regency. Samples were taken by the technique of Cluster Random Sampling, which obtained the sample of 288 people: consisting of 73 female students as the case group, and 215 female students as the control group. The inclusion criteria were the nutritional status of female teenager based on IMT/U on the Z-score $>+ 1SD$, the status of being registered as active students, female teenagers aged 13-18 years, and the willingness to participate as respondents during the research by signing the informed consent. The

instruments of the research employed in this research were the PSQI questionnaire, the QueST questionnaire, digital scales, microtoise, and the *Anthro Plus* 2007 application from WHO.

The data collection method employed in this research was using primary and secondary data. The primary data were taken in the form of g-form consisting of informed consent, the data of respondents' characteristics, the PSQI questionnaire, and the QueST questionnaire, while the secondary data were taken offline, consisting of the number of the students' data for each class. The analysis of the data on STATA-13 employed chi-square statistical test with the confidence level ($\alpha=0.05$), *Confidence Interval* (CI) as much as 95%, with $P<0.05$ showing the relationship between screen time and sleep quality with obesity incidents in female teenagers, while $P>0.05$ showing no relationship at all. The preliminary stage in this research was proposing the ethics of the research, the test of the validity and the reliability of the questionnaire, the calibration of the anthropometry measurement, and processing the permit with the school. The activity of the research comprised of filling out the PSQI and QueST questionnaire, as well as measuring body weight and height.

3. RESULTS

The result of univariate analysis of the respondents' characteristics based on the groupings was as follows:

Table 1. The Distribution of Respondents' Characteristic Frequency

Respondent's Characteristics	Case		Control	
	Number (n)	Percentage (%)	Number (n)	Percentage (%)
Age Group				
13-15 years old	38	52.1	99	46.1
16-18 years old	35	47.9	116	53.9
Father's Occupation				
Unemployed	2	2.7	9	4.19
Civil Servant/Army/Police	13	17.8	25	11.6
Private Company/ Priest	24	32.9	64	29.8
Entrepreneur	9	12.3	31	14.4
Teacher/Lecturer	2	2.7	1	0.47
Uneducated/Driver/E mployed/Farmer	23	31.5	85	39.5
Maternal Education Level				
Uneducated/Element ary School	2	2.7	17	7.91
Junior High School	7	9.6	36	16.7
Senior High School/Vocational School	38	52.1	108	50.2
Associate/Undergrad uate/Master's Degree	26	35.6	54	25.1
Total	73	100	215	100

Based on Table 1, it is shown that the respondents' characteristic in terms of age is mostly female teenage students aged between 13-15 years old in the case group (52.1%), while in the control group it is mostly female teenage students aged between 16-18 years old (53.9%). The occupation of the father in the case group is mostly Private Company/Priest (32.9%), while in the control group it is mostly Laborer/Driver/Employee/Farmer (39.5%). The education level of the mother both in the case group (52/.1%) and the control group (50.2%) is mostly Senior High School/Vocational School.

Table 2. The Preview of Screen Time and Sleep Quality during The Covid-19 Pandemic

Variable	Case	Control	Cut off point	Description
Sleep quality	6,8 hours/day	6,7 hours/hari	≤ 5	Poor
Screen time	3,0/ hours/day	2,9 hours/hari	≤ 2	High

Based on Table 2, the average of sleep quality and screen time during the covid-19 pandemic is higher than the cut off point before the covid-19 pandemic, with 6.8 hours per day for sleep quality in the case group, and 3.0 hours per day for screen time.

Table 3. The Relationship between Screen Time and Obesity in Female Adolescent

Screen Time	Case		Control		P-value	OR 95% CI
	(n)	(%)	(n)	(%)		
High	29	39.7	86	40	0.967	1.12 (0.634-1.978)
Low	44	60.3	129	60		

Based on Table 3.2, the chi-square test result demonstrates that there is no significant relationship between screen time and obesity incidents in teenagers in Bantul Regency during the COVID-19 pandemic (shown in $p=0.967$ ($p>0.05$)). Meanwhile, the result of the Odds Ratio (OR) analysis shows that female teenagers exposed to high amount of screen time are 1.12 times more at risk of obesity status (95%CI = 0.634-1.978).

Table 4. Hubungan Kualitas Tidur dengan Status gizi Remaja

Sleep Quality	Case (Obese)		Kontrol (Non-Obese)		P-value	OR 95% CI
	(n)	(%)	(n)	(%)		
Buruk	34	46,5	94	43,7	0,672	0,98 (0,551-1,756)
Baik	39	53,5	121	56,3		

Based on Table 4, the chi-square test result shows no significant relationship between sleep quality and obesity incidents in female teenagers in Bantul Regency during the COVID-19 pandemic ($P=0.672 > 0.05$). Based on the Odds Ratio (OR) analysis, the result demonstrates that female teenagers having poor sleep quality are 0.98 times more at risk of experiencing obesity (95%CI = 0.551-1.756).

4. DISCUSSION

Obesity incidents occurred more frequently in female teenagers aged 13-15 (52.1%). This finding was parallel with the result of the research from Jogjakarta's RISKESDAS in 2018 showing that teenagers in their early teenage years (13-15 years old) were more prevalent in developing obesity (13.32%) (Kementerian Kesehatan RI, 2018b). This was also in line with a research conducted (Syahfitri et al., 2017), which showed

that the obesity status was higher for pre-teen age of 12 years old (27%). The reason is that in early teenager years, female teenagers have a quicker rate of growth compared to their male counterpart. This is due to the preparation for reproductive maturity (Syahfitri et al., 2017).

In the case group, there is a portion of 32.9% of the teenagers having fathers working as private company workers. Parental occupation can pose an effect on the family's economic and social status, in which economic status also correlates with the ability to afford and provide sustenance, which is not only filling but also nourishing. The middle economic status of a family forces teenagers to barely fulfill their sustenance need, which will lead to their nutritional status (Suhartini & Ahmad, 2018). Based on the percentage of maternal education, most of the mothers are Senior High School/ Vocational School graduates. In the research (Estu & Wahyuni, 2018) the level of parental education only contributed 8.0% on the nutritional status of teenagers, which was more influenced by other factors e.g., sustenance intake, infectious diseases, food security, upbringing pattern, health services, and less supporting environment.

a) Screen time

The result of the chi square showed there was no significant relationship between screen time and obesity incidents in female teenagers $p=0.967$ ($p >0.05$). Meanwhile, the result from the Odds Ratio (OR) test demonstrated that female teenagers exposed to more than 2 hours screen time per day were 1.12 more at risk of developing obesity than those exposed to 2 hours or less of screen time per day. However, it was statistically insignificant (95%CI = 0.877-3.716). Based on the research conducted (Anandita et al., 2019)], the recommended screen time duration before the COVID-19 pandemic was two hours or less per day for children and teenagers. Therefore, the duration of screen time more than two hours a day can be described as high, same as the research conducted (Guo et al., 2021) Meanwhile, the result of this research stated that the average of screen time of female teenagers in the COVID-19 pandemic era was 3 hours per day. Compared to the duration of screen time before the pandemic, it was categorized as high because it was more than two hours per day. This is because nowadays learning process is still done in hybrid learning (both online and offline) so that most of the screen time is spent for browsing the social media, learning online, and watching movie, as pictured in Figure 1.

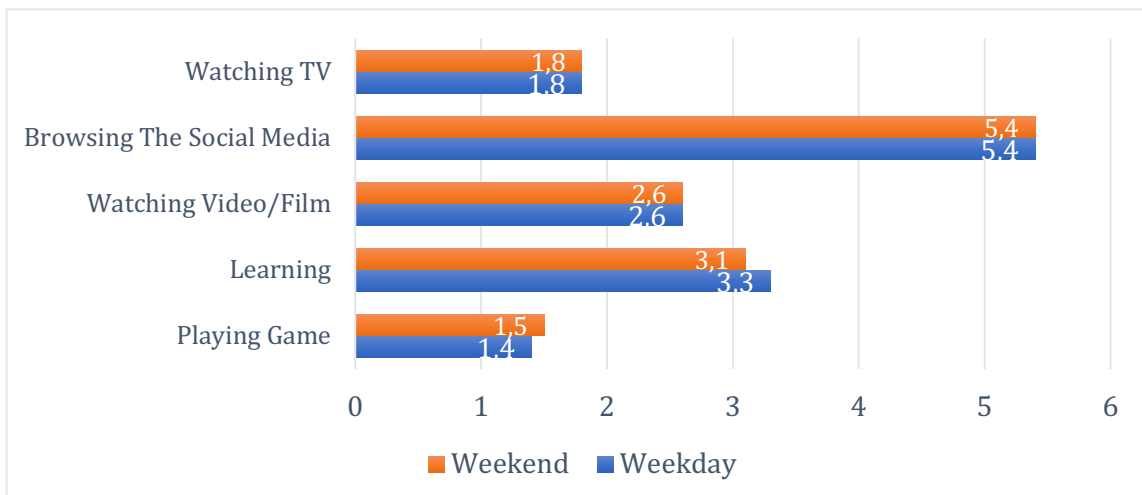


Figure 1. Weekend and Weekday Screen Time Activities

This is supported with the situation during the COVID-19 pandemic in which face-to-face meeting duration at school is limited to only several hours, which leads to teacher giving more homework to the students and the students becoming more exposed to gadget's screen. Besides, teenagers have more indoor activities that are limited to their home, and most of them use their gadgets to browse the social media. This research result was in line with the research result conducted (Andriani & Indrawati, 2021) in which the chi-square test result showed that there was no significant relationship between screen time duration and obesity incident in eleventh-grader female students in SMAN 1 Bojonegoro ($p=0.605$). However, this research contrasted with the research conducted (Utami et al., 2018) which revealed that there was a significant relationship between screen time and obesity, and the subjects with high screen time were 2.6 more at risk of developing obesity. This research result was also different from the result of the research conducted (Anandita et al., 2019). which demonstrated that from the relationship between screen time and nutritional status, it was proven that there was a statistically significant relationship ($p<0.05$). This was because the 27.3% of the respondents with high screen time had poor diet which did not meet the dietary suggestion, so it had an impact on the respondents' nutritional status.

The difference between this research result and the previous research result was that in the obesity incidents in Bantul, most of the female students got normal nutritional status with imbalanced respondent numbers. During the COVID-19 pandemic, all of the female teenagers conducted on-line learning at home, which automatically affected their screen time, which showed an increase from their usual activity. More than a half of the teenagers with normal nutritional status and obesity showed the same amount of screen time, which was less than the average screen time during the COVID-19 pandemic (>3 hours/day). Therefore, the influence of screen time towards obesity incidents was not quite significant because more than a half of the female teenagers had lower duration of screen time.

b) Sleep Quality

This research explained that there was no significant relationship between sleep quality and obesity incidents in female teenagers ($p=0.672$), while from the result of the Odds Ratio test analysis (OR) it can be seen that the female teenagers who had experienced poor sleep quality 0.98% were more likely to develop obesity compared to the teenagers who had good sleep quality (95%CI = 0.551-1.756). An explanation to this is that in the COVID-19 pandemic, teenagers have more activities at home. It causes the higher duration of screen time exposure, which furthermore decreases the sleeping duration for teenagers to below the recommended level. This leads to predominantly poor quality of sleep for teenagers. In this research, it was shown that the sleep quality during the pandemic was better than the sleep quality before the pandemic, which consisted of 6.8 hours per day. The average of sleep quality in this research showed better quality compared to the research (Şimşek & Tekgül, 2019) in which the score of sleep quality was more than 5 hours a day before the COVID-19 pandemic. The finding in this research that illustrated how sleep quality and obesity incident in female teenagers did not correlate with each other could be caused by other kinds of factors such as diet, stress, genetic, etc. However, the data about those other factors were not considered and collected in this research.

The result of this research was also parallel with the research (Nabawiyah et al., 2021) which stated that there was no correlation between sleep quality and nutritional status in Gontor Putri I. This was caused by the data collection in the boarding school. In the

boarding school, the students were obliged to go to bed at 10 PM. However, the result of this research did not go in line with the research conducted (Amalia & Istianah, 2021) which demonstrated that there was a correlation between sleep quality and nutritional status ($p=0.009$ ($p<0.05$)). Different from the result of the research (Yusnira & Lestari, 2021) showing that there was a correlation between sleep quality and overweight incident in the students of SMK Negeri 1 Bangkinang (Bangkinang State Vocational School 1), the students having poor quality of sleep were 4 times more at risk of developing obesity than the students having good quality of sleep.

5. CONCLUSION

The total number of female teenagers in this research is 288 students, in which 25.3% of them show obesity status. Even though statistically in this research there is no significant relationship between screen time and sleep quality with obesity incidents in female teenagers during the pandemic, the average score for screen time is relatively high, which is more than three hours a day and the sleep quality belongs to poor category, which is 6.8. Based on the conclusion, it is hoped that the pandemic situation does not become a trigger of obesity in female teenagers which is caused by wrong sleep pattern and excessive screen time exposure.

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