

## CORRELATION OF GADGETS ADDICTION WITH SLEEP QUALITY IN 4<sup>th</sup> – 6<sup>th</sup> GRADE STUDENTS AT SDN 01 SRIGADING LAWANG IN 2019

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### ABSTRACT

*The use of digital technology has increased rapidly. In Indonesia, gadget use by children has become very high and requires special attention. Many effects may occur due to gadget use, one of which is sleep quality disturbance. This study aims to analyze the correlation between gadget addiction and sleep quality in children grades 4-6 SDN 01 Srigading Lawang. This research is an analytic observational study with a cross-sectional design in a population of 4-6th graders of SDN 01 Srigading Lawang. A total of 126 students over 130 students were included. Data were collected using two questionnaires, which are Smartphone Addiction Scale and The Pittsburgh Sleep Quality Index, and tested using RxC Contingency. Gadget addiction has a significant correlation with sleep quality with a weak correlation. Children with mild levels of addiction to gadgets had a potential of 2,013 times to have good sleep quality, compared to children with moderate levels of addiction. In contrast, children with severe levels of addiction to gadgets were at risk 12.04-fold to have poor sleep quality compared to the mild level of addiction. There is a significant correlation with a weak correlation between gadget addiction and sleep quality in children grades 4-6 SDN 01 Srigading Lawang.*

### ARTICLE HISTORY

Received: May 26, 2020  
Revised: July 21, 2020  
Accepted: July 30, 2020  
Published: August 30, 2020  
(Online)

doi:  
10.20473/jcmphr.v1i2.21699

### KEYWORDS

gadget addiction, children, sleep quality

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### INTRODUCTION

In the era of globalization, children are one of the largest groups of technology consumers<sup>1</sup>. The use of digital technology by children has increased rapidly in the last decade. This incident raises a fundamental question of whether it can provide positive or negative things. According to George and Odgers (2015)<sup>2</sup> the problem is no longer related to whether children use digital technology but rather to how, why,

and what effect it gives. The influence of this phenomenon needs special attention, especially for children aged 0-17 years because in that age range the characters are formed.

The negative impact of excessive use of gadgets can affect several aspects of physical and mental health, such as refractive errors in the eyes, speech or language delays, attention deficits, anxiety disorders, negative impacts on character

development, as well as negative impacts on sleep quality which can be a source of problems. Other problems, this phenomenon deserves special attention.<sup>3,4</sup> Especially in terms of decreased sleep quality, which is a fundamental need to optimize bodily functions during childhood, the decreased production of the hormone melatonin due to exposure to light and electromagnetic waves from gadgets will damage circadian rhythms which can damage sleep patterns and sleep quality and quantity. Exposure to accumulated electromagnetic waves can also cause changes in blood flow to the brain and electrical activity of the brain that can keep a person awake.<sup>4</sup>

Impacts such as decreased cognitive function, worsening ADHD symptoms, cardiometabolic disorders, depression, aggressive behavior, and delinquent behavior are effects that cannot be underestimated.<sup>1,5,6</sup> Daytime fatigue and decreased performance of children at school are also serious consequences.<sup>7</sup> The description above is the basis for conducting research on the correlation between gadget addiction and sleep quality in school children in grades 4-6 at SDN Srigading 01 Lawang.

## MATERIALS AND METHODS

This study used an observational analytic design and a *cross-sectional study design*. Observations were made only once and the independent variable (gadget use) and the dependent variable (sleep quality) were collected at the same time. The sample in this study were all school children in grades 4 - 6 SD at SDN

Srigading 01 Lawang, Srigading Village, Lawang District, Malang Regency in 2019. The research sample was taken based on the inclusion and exclusion criteria.

The inclusion criteria in this study were students who used a gadget with the type of gadget in question, namely *smartphones*, laptops, tablets, and *cellphones*. The exclusion criteria in this study were students who consumed caffeine, had dinner more than 9:00 p.m., had neuropsychiatric disorders, had chronic diseases such as asthma and atopic dermatitis, were routine and were taking drugs such as antihistamines, decongestants, anti-arrhythmias, beta-blockers, corticosteroids, anti-convulsants, anti-depressants, and sedatives.

Sampling in this study used *total sampling technique*. The collected data were reviewed, presented descriptively, and presented in tabular form. The instruments used in this study were a *smartphoneaddiction* questionnaire using a Likert scale and a PSQI (*The Pittsburgh Sleep Quality Index*) questionnaire. Analysis of the correlation between gadget addiction and sleep quality was performed using the contingency RxC correlation ( $\alpha = 0.05$ ).

## RESULTS

The research subjects were all students in grades 4 - 6 SDN 01 Srigading Lawang, totaling 130 people and the total subjects who met the inclusion and exclusion criteria were included in the study as research subjects. A total of 4 people were excluded because 2 people were absent on the day of data collection and 2 people left

early. The final total sample was 126 people who met the inclusion criteria.

Based on table 1 bellow, the sample of this study was dominated by male gender 65 people (51.6%). The percentage of respondents aged 10 years was 35.7% (45 respondents) and 11 years old 27% (34

respondents). The 12 year age category has a percentage of 37.3% (47 respondents). Activities that are often carried out were watching videos (32.8%) and playing games (29.5%). The percentage of the average duration of the respondents in using the gadget at most for 1-6 hours is 86.5% (109 people).

**Table 1. The distribution of the characteristics of the research subjects**

Number	Demographic Characteristics	Categories	Total	%
1	Gender	Male	65	51.6
		Female	61	48.4
		Total	126	100
2	Age	10 years old	45	35.7
		11 years old	34	27
		12 years old	47	37.3
		Total	126	100
3	Activities that are often done	Chatting	36	19.6
		Social media	15	8.2
		Playing games	54	29.5
		Browsing	3	1.6
		Watching video	60	32.8
		Others	15	8.2
	Total	126	100	
4	Duration of using the gadget in a day	< 1 hour	17	13.5
		1-6 hours	109	86.5
		Total	126	100

**Table 2. Distribution of gadget use and sleep quality**

Number	Variable	Level	n	%
1	Gadget Addiction	Mild	12	9.5
		Moderate	112	88.9
		Severe	2	1.6
		TOTAL	126	100
2	Sleep quality	Good	62	49.2
		Poor	64	50.8
		TOTAL	126	100

Table 2 describes the results of the research conducted describing addiction to gadgets in grade 4-6 SDN 01 Srigading Lawang at the most moderate level, namely as many as 112 people (88.9%). Meanwhile, the

quality of sleep that was mostly found was poor quality with 64 students (50.8%).

**Table 3. Cross-tabulation of correlation between gadget addiction and sleep quality**

Gadget Addiction	Sleep quality				Total		p-value	Correlation coefficient
	Good		Poor		n	%		
	n	%	n	%				
Mild	11	91.7	1	8.3	12	100	0.004	0.286
Moderate	51	45.5	61	54.4	112	100		
Severe	0	0	2	100	2	100		
Total	62	49.2	64	50.8	126	100		

Table 3 above showed that the highest number of gadget addiction correlations with sleep quality is as many as 61 people (54.5%). The results of the RxC Contingency statistical test showed that there was a significant correlation ( $p = 0.004$ ) between the level of gadget use and

the sleep quality of children in grades 4-6 SDN 01 Srigading Lawang, by setting the degree of significance  $\alpha = <0.005$  then  $H_0$  was rejected and  $H_1$  was accepted. The strength of correlation ( $r = 0.286$ ) indicates a weak degree of correlation.

**Table 4. Correlation between gadget addiction and sleep quality**

Gadget Addiction	Sleep Quality		RR	95%CI	p-value
	Good	Poor			
	n (%)	n (%)			
Mild	11 (91.7)	1 (8.3)	2.013	1.545	0.002
Moderate	51 (45.5)	62 (54.5)		2.623	
Moderate	51 (45.5)	61 (54.5)	0.545	0.460	0.199
Severe	0 (0)	2 (100)		0.645	
Mild	11 (91.7)	1 (8.3)	0.083	0.013	0.003
Severe	0 (0)	2 (100)		0.544	

The category of mild-moderate gadget addiction, respondents who were classified as mild-level gadget addiction, have 2.013 times the potential to have a good sleep quality compared to respondents who are classified as moderate-level gadget addiction (RR = 2.013, 95% CI = 1.545-2.623,  $p\text{-value } \alpha = 0.002$ ). The category of mild-severe gadget addiction showed that respondents classified as severe gadget addiction have 12.04 times the potential to have poor sleep quality than respondents who were classified as mild-grade addiction (RR = 0.083, 95% CI = 0.013 - 0.544,  $p\text{-value } \alpha = 0.003$ ). Meanwhile, in the medium-heavy category of gadget addiction, it could be seen that the  $p\text{-value}$  is more than  $\alpha = 5\%$ , which means there was no significant correlation.

The characteristics of the subjects in this study indicate that the largest gender is male. The results of this study were following with the research of Badri., *et al.* (2017)<sup>8</sup> namely the presentation of boys who often use gadgets as much as 85.83% of the total sample. This is due to several factors, including interest in online games, searching for electronic stores, and simply looking at internet pages.<sup>9</sup>

This study illustrated that the majority of the research subjects were 12 years old. The results of this study were following with the profile data of SDN 01 Srigading where the largest age range is between 6-12 years old with 219 people and 12 years old being the largest age category. Today's adolescents (10-18 years) prefer to spend their free time using *smartphones* compared to outside activities such as sports. Research by Park, *et al.* (2014)<sup>10</sup> showed that the psychological state of adolescents is relatively unstable because they are still in the process of finding their identity so that when self-actualization is less than optimal, many teenagers use *smartphones* as a stress

## DISCUSSION

### Data on demographic characteristics of respondents

coping medium. Social learning theory says that adolescents learn by observing what other people do. They learn through observation (also called modeling or imitates), then cognitively present other people's behavior and even take that person's behavior. This process can be a trigger for addiction to *smartphone* users.

This study also showed the activities that are often carried out by research subjects, namely watching videos which are mostly carried out by male research subjects. Boys are more likely to upload videos online and use video-sharing apps. Men tend to use their gadgets to play video games and access to video sites like YouTube. Meanwhile, women more often share videos and communicate, such as *chatting*.<sup>11</sup>

This study showed the duration required for research subjects to use the gadget in a day. From the data above, the majority of research subjects spent 1-6 hours. The results of this study are inconsistent with the results of research conducted by Saifullah (2017)<sup>12</sup> at SDN Gadingrejo II Pasuruan, 48% of the total sample spent duration more than 12 hours using gadgets. This is because the research locations are different, namely in rural areas. According to the CDC, the average primary school child spends about 8 hours a day using the gadget. As we get older, the use of gadgets also increases. Using a gadget that is too long can affect long-term vision problems.<sup>13</sup> The duration of *smartphone* use, which initially ranges from 1-2 hours or 3-5 hours, if the satisfaction you get from usage time is usually felt to be insufficient, then the duration of use will be increased so that it

can cause *smartphone* addiction in teenagers.<sup>14</sup>

### **Distribution of gadget use and sleep quality**

This research showed that out of 126 students, the highest level of gadget addiction is the moderate level of gadget addiction as many as 112 students (88.9%). In line with research conducted by Saifullah (2017)<sup>12</sup> students at SDN 02 Gadingrejo obtained a moderate percentage of gadget addiction as much as 51.4% and low-level gadget addiction as much as 48.6% and 84.3% of the students obtained disturbances in sleep patterns.

Another study conducted by Hidayat & Mustikasari (2014)<sup>15</sup> which was conducted on RIK UI students regarding *smartphone* addiction with sleep quality, found the average total addiction value of respondents to *smartphones* assessed using the SAS questionnaire, namely 48.1 or including moderate level addiction. Another study by Hisyam., *et al* (2018)<sup>16</sup> found that in Makassar State University students 41.5% medium level gadget addiction and 32.8% low-level gadget addiction. The high level of gadget addiction can be caused by many things, such as exposure to the gadget from an early age, the frequency of using the gadget that is getting more frequent, the convenience that is obtained from using the gadget.<sup>17</sup>

The same table illustrates that 62 out of 126 students of SDN Srigading 01 Lawang have good sleep quality and 64 of 126 students have poor sleep quality. Sleep quality is a person's satisfaction with the sleep experience, integrating aspects of sleep

initiation, sleep maintenance, sleep quantity, and refreshment upon awakening. Sleep quality assessment can be seen from 7 components, namely: subjective sleep quality, *sleep latency* which is the time it takes to start sleeping, sleep duration, sleep efficiency, sleep disturbances, use of drugs that can stimulate sleepiness, and activity dysfunction during the day.

Based on this research based on the PSQI (*Pittsburgh Sleep Quality Index*) questionnaire, it was found that students who had bad sleep quality were more than students who had good sleep quality, but the difference was not too significant. This is probably due to all respondents using gadgets, of which the number of samples is not large enough so that it is not able to provide a picture of a significant difference. Then this is also influenced by the characteristics of respondents who live in rural areas, in rural areas the use of gadgets, especially *smartphones*, laptops, and *tablets* is still low. However, the frequency and duration of use of gadgets is almost the same as in urban communities, so the impact of using gadgets on poor sleep quality is very likely to occur in rural communities.<sup>18</sup>

The results of this study were supported by research conducted by Jarmi (2017)<sup>19</sup> on students of SMP Negeri 1 Banda Aceh which stated that 49 people out of a total of 92 people (53.3%) of research respondents had poor sleep quality and 43 people (46.7%) of respondents have good sleep quality, in the study the differences obtained were not too big. Many factors influence sleep quality, but lifestyle factors that have been shown to influence sleep

regulation of children and adolescents include use of modern technology that causes exposure to light and stimulates staying awake at night, consumption of substances that raise awareness (e.g., caffeine) which affects the physiological regulation of consciousness and sleep; mealtime, aspects of the physical environment (eg, air quality) that hinder sleep; and cultural norms that place a low priority on sleep.

### **The correlation between gadget addiction and sleep quality**

This study found that there is a significant correlation between gadget addiction and sleep quality with a weak degree of correlation. In this study, the results also showed that there was a significant correlation between mild-moderate and light-heavy category gadget addiction with sleep quality, where respondents who were classified as mild-level gadget addiction had a greater potential to have good sleep quality than the moderate category. Likewise, respondents who are addicted to severe gadgets have a higher risk of having poor sleep quality than those with mild addiction. This is probably because in the light category the duration of exposure with the gadget is shorter than the moderate and heavy categories, this is following with the pathophysiological theory where exposure to light and electromagnetic waves generated by gadgets can reduce the production of the hormone melatonin so that it will interfere with circadian rhythms

which results in reduced quality. sleep, the longer the exposure to the gadget or the higher the level of addiction of the respondents in this study will certainly have an impact on the poor quality of sleep. Besides exposure to accumulated electromagnetic waves can also cause changes in blood flow to the brain and electrical activity of the brain that can keep a person awake.<sup>4</sup>

The moderate-to-severe addiction category showed no significant correlation, this is because the results of the study, the data of respondents with a very low level of severe addiction, so it is not easy to find whether there is a correlation between the level of addiction in the moderate category and the quality of sleep when compared to the heavy category. Many factors cause the low data of respondents by weight category, the first is in terms of the application of the use of gadgets where respondents tend to use gadgets as a means to watch online videos rather than playing online games. In a study conducted by the journal Psychology by Anggraini, F in 2015, it was stated that playing online *games* had the highest contribution to the incidence of internet *gaming disorder* and had the highest level of addiction compared to other gadget use applications. Another thing that can cause the low category of children with severe addiction is that the ratio of outdoor physical activity in rural children compared to urban children has a significant difference, where rural children have a longer duration of physical activity outdoors, as the output of The more adequate duration of physical activity means that the fitness level of rural children is better than urban children so that in their daily life, rural children are not only limited

to playing gadgets to fill their spare time which will affect lower levels of addiction. This is supported by research by Ratna., *et al.* on rural and urban children in Banyumas district, it was stated that elementary school students in rural areas had a longer duration of physical activity outside than urban children.

This research is in line with research conducted by Fuller in 2017 which stated that children who use gadgets at bedtime are 2.5 times more likely to have poor sleep quality in the form of feeling tired and unwell when they wake up in the morning.<sup>1</sup> It is also in line with research conducted by Hysing in 2015 which stated that the accumulated time of exposure to electronic equipment screens in a day has a 2.7-fold risk of experiencing a decrease in sleep duration to under 5 hours.<sup>20</sup> This is reinforced by research conducted by Moattari in 2017, which states that there is a correlation between addiction to gadget use and sleep disorders.<sup>4</sup>

## CONCLUSION

The results study of the correlation between the level of gadget use and the quality of sleep in school children in grades 4-6 SDN 01 Srigading Lawang, it can be concluded that found to be of poor quality. There was a significant correlation between the level of gadget use and the sleep quality of grade 4-6 SDN 01 Srigading Lawang with the strength of the correlation showing a weak degree of correlation. Further research is needed with a larger sample size and multicentre to obtain a more meaningful correlation between the level of gadget use and sleep quality in school children. Research with an older sample

can be carried out so that the questionnaire filling process is easier.

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