

## The Relationship Between Gadget Usage and Adolescents Eye Health

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### ABSTRACT

Changes in people's lifestyles cause an increasing need for practical communication media, namely gadgets. Teenagers are very susceptible to experiencing negative effects from excessive use of gadgets, where exposure to gadget screens can cause health problems, especially in the eyes. This study aims to determine the relationship between the use of gadgets with eye health in adolescents. This research uses quantitative methods. The research is conducted in SMP Negeri 3, 6, 7, 8, and 9 Denpasar. The data gathering was conducted from July 23 until August 19, 2020. The technique for determining the minimum sample size is the estimation of the proportion in a simple random sample with absolute precision. Bivariate analysis with chi-square test showed p-value = 0.000. There is a relationship between gadget use and the eye health on teenager informants. There is a positive and significant relationship between the use of gadgets with eye health in adolescent.

Keywords: adolescent; eye health; gadget usage

### INTRODUCTION

The development of an increasingly rapid era makes human life easier, both in the fields of information, education and social. Shifts in people's lifestyles are in line with technological advances that cause demands for practical communication media. (Rahmawati et al., 2018), states that the era of globalization in the field of telecommunications and transportation is marked by the very fast growth of communication media. Parents and early teens become users of digital media in various forms, such as computers, gadgets, game devices and the internet (Fatmawati, 2019). Digital technology that exists in electronic devices introduces various interesting applications or features that can make it easier for early teens to communicate and exchange information (Ningrum, 2017).

Digital communication technology in the form of a device is the most unique and interesting phenomenon in its use. Devices are easy to carry, do not know age and class and have many functions that are growing, so they are often referred to as populist technology (Makawi, 2016). The results of a survey by Yahoo and Taylor Nelson Sofres (TNS) Indonesia show that the largest smartphone users in Indonesia are those aged between 13-19 years. Around 53% of these teenagers use smartphones to access the internet without parental supervision (Claretta & Arianto, 2018). The gadgets in this study put more emphasis on smartphones and tablets. Data from a 2014 survey in the United States shows that smartphone ownership at the age of 13 to 15 years has increased from 35% to 55% and tablet ownership has doubled from 18% to 37% (Sativa, 2017). In Indonesia, 48.19% of devices used to access the internet are gadgets and the highest users are at the age of 13-18 years, which is 75.50% (APJII, 2017).

Teenagers are very vulnerable to experiencing the negative effects of excessive use of gadgets. Exposure to screen devices can induce the release of the hormone dopamine which plays an important role in the formation of dependence or addiction (Wicaksono, 2020). The presentation of each application with various colors and characters on the device is very interesting, causing teenagers to enjoy using gadgets for a long time and excessively (Desiningrum, 2017).

Staring at a gadget screen for long periods of time can put additional pressure on the eyes and nervous system. When looking at the gadget for a long time and continuously with a low frequency of blinking, it can cause the eyes to feel tired, resulting in dry eyes. The normal use of gadgets in teenagers in 1 day is no more than 5 hours. Radiation that is stared at by the eye for too long will be passed on and captured by the cornea and then forwarded to the eye lens which makes the eye lens cause a decrease or disturbance in vision (Hartanti, 2020).

Based on a preliminary study conducted by researchers at a public junior high school in Denpasar, it showed that 100% of students had a smartphone. The intensity of using gadgets for two to three hours is around 39.7%, using

devices for four to five hours is 35.9%, about 16.4% of adolescents using devices for more than six hours. Based on this, the researcher considers it necessary to know the use of gadgets in adolescents and their impact on eye health in early adolescents at public junior high schools in Denpasar. The purpose of this study was to determine the relationship between the use of gadgets with eye health in adolescents.

## METHOD

This study uses quantitative methods. The sample in this study were junior high school students with an age range of 13 to 16 years. Samples were taken randomly by means of class lottery. The number of samples used was 345 students. The research sites are in SMP Negeri 3, 6, 7, 8 and 9 Denpasar. Data collection was carried out on July 23 to August 19, 2020. The instrument used in this study was a questionnaire. The results of the test of the behavioral variable in the use of gadgets are known that each question item has a value above 0.5. Meanwhile, the minimum standard of measuring instruments is said to be valid if the value is  $> 0.30$  (Darmawan, 2013), so that each item of the measuring instrument used by the author has met validity. Data analysis used bivariate analysis. The statistical test used is Chi-Square/Fisher; S Exact because the independent and dependent variables are categorical.

## RESULT

### Overview of Device Use in Early Teenagers, Frequency of Early Teenagers Behavior in Gadget Use and Frequency on Health Impact

Table 1. Overview of Device Use in Early Teenagers, Frequency of Early Teenagers Behavior in Gadget Use and Frequency on Health Impact

Characteristics	f	%
Age		
13 years	31	9.0
14 years	268	77.7
15 years	46	13.3
Sex		
Male	204	59.1
Female	141	40.9
The purpose of using gadgets		
Phone	9	2.6
Browsing	60	17.4
Media Social	246	71.3
Game	30	8.7
Time spent of using gadgets		
0-5 hours	155	44.9
6-11 hours	176	51.0
12-20 hours	14	4.1
Wearing glasses		
No	265	76.8
Yes	80	23.2
Total	345	100.0

The table above shows that 246 people (71.3%) using gadget for media social, 176 people (51%) and spent the time 6-11 hours for using gadgets, but 265 people (76.8%) no wearing glasses.

## The Relation Between using Gadget and Informants' Eye Health

Table 2. The Relation Between using Gadget and Informants' Eye Health

Gadget use	Eye Health		p-value
	Unaffected (%)	Affected (%)	
Not using gadget	47 (47.0)	53 (53.0)	0.000
Using Gadget	0 (0.0)	245 (100.0)	
Total	47	298	

The table above shows that teenagers informants who using gadget also have an impact on eye health, shown by 245 people (100%). The results of bivariate analysis using chi square test and obtained  $p=0.000$ . Because the  $p < \alpha$  (0.05), it is suspected that there is a relationship between gadget use addiction and the eye health on teenager informants.

## DISCUSSION

The results showed that there was a relationship between gadget use addiction and eye health of adolescent informants ( $p=0.000$ ). The behavior of using gadgets that are not good will have a bad impact on the health of adolescents, both physically and psychologically.

The following is one of the diseases caused by uncontrolled use of gadgets, which damage the eyes, with eyes that will feel sore after staring at the screen for too long and can affect the vision of teenagers in the long term. Consultant surgeon and ophthalmologist at Luton & Dunstable University Hospital, Allon Barsam said early teens who stare at cellphone screens all day may develop nearsightedness as they mature. There are also studies that show that smartphone users are at risk of using glasses more quickly (Nur, 2016). Eye disorders can occur due to Computer Vision Syndrome which is a temporary condition caused by focusing the eyes on the computer screen in a continuous and uninterrupted period characterized by symptoms of headache, blurred vision, neck pain, red eyes, fatigue, eye strain, eye irritation, double vision, vertigo and difficulty focusing the eyes (Aggarwal, 2013).

The results showed that adolescent behavior in the use of gadgets, which was about 86.4% of adolescent informants felt the impact of using gadgets on the eyes. Online learning in this pandemic era causes an increase in the screen time of its users. Screen time is the amount of time spent each day staring at the gadget screen. This increase in screen time causes various health problems, especially eye health. Blue light radiation causes damage to the retina (phototoxicity). Blue light is the emission from the screens of digital devices, such as televisions, laptops, smartphones, tablets, and other gadgets. This causes not a few teenagers to wear glasses, both those who have visual impairments and those who use anti-radiation glasses. More than 90% of gadget users experience visual symptoms such as eye fatigue, blurred vision, double vision, dizziness, dry eyes, and eye discomfort when seeing near or far after using gadgets for a long time (Pratama, 2022).

The habit of using gadgets for a long time is a bad habit. This will have a negative impact on the sense of sight. Staring at a screen for long periods of time can put added pressure on the eyes and nervous system. When staring at a gadget screen continuously with a low blinking frequency can cause the eyes to become dry because they are not wetted by tears (Pratama, 2022).

Chusna (2017) states that the negative impacts of using gadgets are eye damage, lack of closeness between parents and early teens, lack of sensitivity to the surrounding environment and significant behavioral changes (Chusna, 2017). In addition, the negative impact of using gadgets is the effect of radiation, where excessive use of gadgets can have a negative impact on health, has the potential to affect adolescent attitudes and behavior if there is no control from teachers and parents and create an unhealthy social environment that can lead to social jealousy. Between teenagers who have the latest models of gadgets and those who only have standard models (Positive and Negative Impacts of HP for Students, 2018). Florencia (2020) states that early teens who are addicted to gadgets will experience physical and psychological health problems, namely depression, anxiety, lack of empathy, eye fatigue and poor sleep quality (Florencia, n.d.).

There is a relationship between the use of gadgets and eye health problems in children (Wicaksono, 2020). Tafiayah stated that there is a relationship between the use of gadgets and a decrease in eye visual acuity. The use of gadgets is one of the factors that decrease visual acuity in children. Based on the results of the study, there is a relationship between the duration of playing video games with visual acuity. Children who play video games of abnormal

duration (more than 2 hours / day) have 3 times the chance of experiencing visual acuity disorders than children who play video games of normal duration (Tafiyah et al., 2021).

### CONCLUSION

There is a positive and significant relationship between gadget used and eye health in adolescent. If you use gadgets too often, it will affect your eye health.

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