



The Effects of Smartphones/Gadgets Use on Senior High School Students in Padang City

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Abstract

Edited by: Sasho Stoleski
Citation: Wahyudi E, Saam Z, Nofrizal N, Juandi J, Thamrin T. The Effects of Smartphones/Gadgets Use on Senior High School Students in Padang City Open Access Maced J Med Sci. 2023 Feb 16; 11(E):249-256. <https://doi.org/10.3889/oamjms.2023.11395>
Keywords: Smartphone/gadget; Vision; Hearing; Social relations
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Received: 03-Jan-2023
Revised: 26-Jan-2023
Accepted: 06-Feb-2023
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Funding: This research did not receive any financial support
Competing Interests: The authors have declared that no competing interests exist
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AIM: This study aims to examine the effect of smartphone use on health and socio-economics aspects of students in the city of Padang.

METHODS: The population was 11,429 senior high school students in Padang. Samples were taken by accidental sampling as many as 210 students (35 students in each senior high school). The analysis used in this research used correlation analysis between behavioral related to using smartphones and gadgets and health and socio-economic variables.

RESULTS: The results showed that the effect of using smartphones/gadgets on vision and hearing health was influenced by the duration of use of more than 4 h 17 min with a continuous use of not more than 2 h. The use of smartphones/gadgets that exceeded these rules caused visual impairment, hearing loss, and weakens students' social relationships.

CONCLUSION: Healthy and ergonomic behaviors in using smartphones/gadgets for senior high school students in Padang City were in the duration of use not more than 4 h 17 min, with a continuous use of <2 h. The negative effects of using smartphones/gadgets on high school students exceeding the healthy and ergonomic behaviors time limit were hearing loss and visual impairment.

Introduction

Information and technology are developing rapidly. All kinds of information can be obtained easily through various technological media [1]. One of these technological developments is gadgetry. The demands of the times and the benefits of gadgets make most parents introduce gadgets to their children from an early age [2]. Gadgets are not only used by adults, but children also have the same interests [3].

According to The Asian Parent Insights (2014), the reason parents allow their children to use gadgets is to introduce them to technology, provide entertainment, and make children calmer. Furthermore, parents revealed that children sometimes ask them to buy gadgets or sometimes force their parents to lend their gadgets. However, in reality, in everyday life, parents themselves lend gadgets to children when parents feel tired or when parents want to rest [4].

Based on a survey on The Asian Parent Insights (2014) on 5 countries namely Singapore, Thailand, The Philippines, Malaysia and Indonesia, from 3,917 children aged 3–8 years from 2,714 parents in Southeast Asia have their own gadgets. About 98% of children aged 3–8 years use gadgets. 67% of them

use gadgets belonging to their parents, 18% of them use gadgets belonging to relatives or family, and 14% use personal gadgets. Data from The Ministry of Communication and informatics and UNICEF stated that Indonesia was in the fifth rank of gadget users in the world in 2014. Judging by the type of age, the highest percentage of children and adolescents was 79.5%. Around 55% of children have seen violent and pornographic images. 35% of children said they were contacted by unknown persons. About 28% of children experienced fraud [5].

Gadgets have a risk of damaging health such as excessive anxiety and excitement, depression, sleep disorders and pornography. Furthermore, it may lead to affecting the quality of human resources. The use of gadgets for too long can make children sleep deprived or experience sleep disorders cause physical fatigue and disrupt students' learning activities so that it affects their academic achievement [6].

In West Sumatra, especially in the city of Padang, the use of gadgets has reached various age groups, from children, teenagers, to adults. The use of gadgets is not only found at home, but also in schools, public places, even shopping centers. Based on statistical data [7] in West Sumatra, 59.44% of the population owns/masters' gadgets. A total of 29.63% of

them are residents aged 5 years and over and have accessed the internet. Of the most frequently used types of devices, gadgets occupy the top position as much as 86.02%, laptops 31.06%, computers 28.95%, and other medias 0.65%.

According to Tiara [8], most parents have negative attitudes towards the use of gadgets in children. This negative attitude of indifference to the limits of using gadgets for children will make them use their gadgets more often so that it will increase the risk of using gadgets in children.

Family is the first school for children. Children will be able to avoid and stay away from negative influences that come to their ways if parents can play as role models for their children. The more often children watch their parents use gadgets, the greater the child's interest in using gadgets will be [9].

Based on the results of observations and interviews of researchers on high school students in Padang related to the use of cell phones, it was found that students use smartphones in non-ergonomic conditions. For example, they use smartphones when driving. They clamp smartphones on their helmet. They use them while sleeping or walking. In addition, female students use smartphones that are clipped to the ears. This happens because they are addicted to using cellphones. That is why students always use smartphones/gadgets wherever they are and under any circumstances. Smartphones owned by teenagers are generally used to play games, to listen to music, and to browse on social media like Facebook, WhatsApp, Line, and Instagram. They do it either in a short period of time or long time.

The purpose of this research is to examine the effect of smartphone use on health and socio-economics aspects of students in the city of Padang.

Methods

Research design

Type of research which had been conducted was survey research. Survey research is research that takes primary data in the form of behavioral data on smartphone use. Data collection techniques were interviews and direct tests on the influence of smartphone/gadget use on predetermined sample objects. In the validity test, the product moment correlation technique formula can be used. The r value with a significance level (α) of 5% with $n = 30$ is 0.361, so this research instrument can be said to be valid with r count >0.361 . This research method was used to answer the formulation of the problem in question, namely the influence of smartphone uses on social behavior and eye/ear health among students.

Sample collection criteria

The population in this study included all senior high school students in Padang as many as 11,429 students from State Senior High School Number 1–16. Data in this study were used to see the effect of smartphone use on social behavior and eye/ear health. The data consisted of the number of smartphones used, intensity of use per day, and using students' smartphones in the city of Padang with questionnaires measuring instrument. After measuring through questionnaires, then the categorization was carried out. For students who were in the heavy category, the measurement was continued with audiometry and Snellen chart. The data of the number of smartphones used by students were taken to analyze the behavior of using smartphones/gadgets among students. The data of the intensity of smartphones daily use were taken to see the factors that influenced the effects of using smartphones by students.

Sampling in this study is part of the population determined from the best senior high schools and less favorite senior high school clusters. Based on the clusters, there were 6 senior high schools, namely SMA 1, SMA 3, SMA 5, SMA 6, SMA 8, and SMA 10. Samples were taken by using accidental sampling in each school that became the research target as many as 35 male and female students with a total sample of 210. Of the 210 total samples were re-netted to see the behavior and intensity of smartphones used. For the results obtained more than 4 h, a measurement was carried out because it was in the heavy category with a total sample of 93 students.

There were two kinds of data collections techniques used in this study. They are interview and direct test techniques. For behavioral data on smartphone use, the data collection technique was interview technique. While, direct test technique on predetermined sample objects was applied for data on the influence of smartphone use.

Data analysis

The data collected in this study were primary data about the influence of smartphone use by using a direct test technique on a predetermined sample object. The data analysis technique was carried out with the aim of answering the formulation of the problem and the research hypothesis. This study analyzed the data in accordance with the objectives and research hypothesis by using statistics with the Chi-square test. Validity test was done by using product moment correlation, and reliability test was carried out by using Cronbach Alpha. Data analysis testing in this study was done using simple linear regression test, multicollinearity test, linear test, and autocorrelation.

Behavioral data analysis of smartphone use was done by using a combination of principle component

analysis to determine the most dominating component and bivariate analysis with Chi-square test to determine the significant difference of the total variables that have been compiled.

Data analysis of the effect of smartphone use on health was held using correlation analysis between the dominant variable of students' life behaviors (the dependent variable) and the variable of the influence of smartphone use on students' visions and hearings to illustrate that there was a correlation or an influence of vision and hearing on the behavior of smartphone use among senior high school students.

Results

The effects of smartphones/gadgets use on health and behavior

Effects on hearing (ears)

The effects of smartphones/gadgets use on hearing loss are shown in Table 1.

Table 1: Effect of smartphones/gadgets use on hearing loss

S. No	Effects of ear health	A	O	S	R	n
1	Ears feel hot	4	11	41	55	99
		1.9	5.2	19.5	26.2	47.1
2	Feel tired easily	19	35	65	54	37
		9	16.7	31	25.7	17.6
3	Ears feel itchy	4	13	32	60	101
		1.9	6.2	15.2	28.6	48.1
4	Feeling of hearing loss	4	16	41	59	90
		1.9	7.6	19.5	28.1	42.9
5	Feeling of headache	15	48	65	53	29
		7.1	22.9	31	25.2	13.8
6	Experiencing persistent headaches	9	20	40	60	81
		4.3	9.5	19	28.6	38.6
7	Feeling unwell/depressed	9	25	54	63	59
		4.3	11.9	25.7	30	28.1

A: Always, O: Often, S: Sometimes, R: Rarely, N: Never

Based on Table 1, it can be seen that some students experience the influence of the use of smartphones/gadgets on hearing impairments. A total of 7.1% (15 students) felt headaches in the "Always" category. As many as 1.9% (4 students) always felt hot ears, itchy ears and impaired hearings. About 4.3% (9 students) always felt a prolonged headache and felt unwell/depressed.

While in the "Often" category, 5.2% (11 students) felt hot ears, 16.7% (35 students) felt tired easily, 6.2% (13 students) felt itchy ears, 7.6% (16 students) felt hearing impaired, 22.9% (48 students) felt headaches, 9.5% (20 students) felt a prolonged headache, and 11.9% (25 students) felt unwell as a result of using smartphone gadgets.

From the research data, it was found that there were too many negative effects on the health of the ears. Some students stated that when using smartphones/gadgets, their ears always felt hot and their heads felt dizzy. Other students also added that they also often felt headaches and itchy ears when

using smartphones/gadgets. In addition, some others also claimed that sometimes they had bad feelings and felt tired easily. These situations happened due to the excessive duration of using smartphones/gadgets.

The effects of long duration use of smartphones/gadgets on hearing impairments are shown in Table 2.

Table 2: Effects of long duration use of smartphones/gadgets toward hearing power disorders

S. No	Duration of use	Measurement and examination results		Amount
		Normal	There is disturbance	
1	<4 h and continuously <2 h	117	0	117
		55.7	0	55.7
2	>4 h and continuously >2 h	71	22	93
		33.8	10.5	44.3
Total		188	22	210
		89.5	10.5	100

Based on Table 2, it was found that there were 10.5% (22 students) who experienced hearing problems as a result of using smartphones/gadgets for a long period of time and for continuous duration.

The effects of excessive smartphones/gadgets use on students' visions

The effect of excessive use of smartphones/gadgets on students' visions is shown in Table 3.

Table 3: Effects of excessive smartphones/gadgets use on students' visions

S. No	Effect on eyes	A	O	S	R	n
1	Blurred vision	22	44	31	44	69
		10.5	21	14.8	21	32.9
2	Colors appear faded	7	24	26	43	110
		3.3	11.4	12.4	20.5	52.4
3	Bad vision at night	7	20	45	46	92
		3.3	9.5	21.4	21.9	43.8
4	Experiencing double vision	4	11	25	30	140
		1.9	5.2	11.9	14.3	66.7
5	Glare when seeing light at night	16	25	38	42	89
		7.6	11.9	18.1	20	42.4

Based on Table 3, it can be seen that there were some effects of using smartphones/gadgets for students. Students felt blurred vision in the "Always" category by 10.5% (22 students) and in the "Often" category by 21% (44 students). About 7.6% (16 students) always felt glare when they saw lights at night. About 11.9% (25 students) often felt glare when they saw lights at night. About 3.3% (7 students) always felt that their vision worsened at night. About 9.5% (20 students) often felt bad vision at night.

The effects of long duration smartphones/gadgets use on students' visions are presented in Table 4.

Table 4: Effects of long duration smartphones/gadgets on students' vision

S. No	Duration of use	Measurement and Examination		Amount
		Normal	There is disturbance	
1	<4 h	117	0	117
		55.7	0	55.7
2	>4 h and continuously >2 h	45	48	93
		21.4	22.9	44.3
Total		162	48	210
		77.1	22.9	100

From Table 4, it was found that there were 22.9% (48 students) who experienced visual

disturbances as a form of the influence of using smartphones/gadgets for a long period of time with a continuous duration.

The effects of smartphones/gadgets use on academic achievements

Smartphones/gadgets have a great influence on students' education because they can provide convenience to access the required information. The use smartphone/gadget in a proper manner will give positive influence on students' academic achievements. However, improper use will give negative effects on students' academic achievements. The effects of smartphones/gadgets use on student's academic achievements are shown in Table 5.

Table 5: Students' academic achievements categories

S. No	Academic scores	F	%
1	56–64=Low	44	21.0
2	65–80=Average	90	42.9
3	81–100=High	76	36.2
	Total	210	100

From 210 respondents, it was found that 36.2% (76 students) had high academic achievements. About 21% (44 students) had low academic achievement and 42.9% (90 students) had average academic achievement. This means that excessive use of smartphones/gadgets affected students' achievements. If smartphones/gadgets were used to support successful learning such as reading school subjects materials through e-books and to improve knowledge and so on, students would get higher academic scores. However, if smartphones/gadgets were used for the wrong purposes, students would get lower academic scores. Some examples of wrong purposes in using smartphones/gadgets by students were using them to play games during class hours, watching pornographic videos, and watching negative behaviors videos.

The effects of smartphones/gadgets use on social relations

Continuous use of smartphones/gadgets can affect the mindset of human beings. They become who more interested in applying smartphones/gadgets than interacting and building good social relationships with other humans. The behavioral data of students' social relations in using smartphones/gadgets are shown in Table 6.

Based on Table 6, it can be generally seen that 18.1% (38 students) said that they always felt more confident when they use smartphones/gadgets. 36.2 (76 students) stated that they often felt the same way. About 25.2% (53 students) claimed that their smartphones/gadgets always became their friends when they were lonely. About 33.8% (71 students) said that their smartphones/gadgets often became their friends when they were lonely. However, there were still some students

Table 6: Social relations behaviors of students in using smartphones/gadgets

S. No	Social relations behavior	A	O	S	R	n
1	Be confident	38	76	65	26	5
		18.1	36.2	31	12.4	2.4
2	Take pictures at the places visited	51	66	53	34	6
		24.3	31.4	25.2	16.2	2.9
3	Replacing friends when feeling lonely	53	71	53	20	13
		25.2	33.8	25.2	9.5	6.2
4	Ignoring parental calls	14	23	40	71	62
		6.7	11	19	33.8	29.5
5	Cannot live without smartphone/gadget	30	43	58	41	38
		14.3	20.5	27.6	19.5	18.1
6	Forgetting time	19	49	68	51	23
		9	23.3	32.4	24.3	11
7	Documenting activities before eating	6	16	50	54	84
		2.9	7.6	23.8	25.7	40
8	Having fun with smartphones/gadgets when hanging out with friends	7	17	54	76	56
		3.3	8.1	25.7	36.2	26.7
9	Passive in youth activities	19	29	59	64	39
		9	13.8	28.1	30.5	18.6
10	Solving problems with violence	2	5	24	55	124
		1	2.4	11.4	26.2	59
11	Not greeting each other	4	8	52	69	77
		1.9	3.8	24.8	32.9	36.7
12	Often sleeps late	21	55	65	43	26
		10	26.2	31	20.5	12.4
13	Late for school	1	8	49	72	80
		0, 5	3.8	23.3	34.3	38.1
14	Accessing pornographic videos	7	6	14	27	156
15	Busy with smartphones/gadgets	18	74	58	44	16
		8.6	35.2	27.6	21	7.6
16	Not going home from school on time	5	18	56	58	73
		2.4	8.6	26.7	27.6	34.8
17	Involved in gangs	6	24	20	37	123
		2.9	11.4	9.5	17.6	58.6

who have low grades in their social relationship. For "Always" category, 8.6% (18 students) stated that they were always busy with their smartphones/gadgets when hanging out with their friends. About 35.2% (74 students) stated that they were often busy with their smartphones/gadgets when hanging out with their friends.

This means that most students still depended on smartphones/gadgets and considered smartphones/gadgets as their needs. Students were also still busy to use smartphones/gadgets when hanging out with their friends. On the other hand, smartphones/gadgets also influenced users to feel more confident. However, smartphones/gadgets excessive users ignored their social relationships in their environment and became apathetic.

Identifying correlation between the use of smartphones/gadgets and the effects (hypothesis test)

Based on the test results, it was found that there were 93 students who used smartphones/gadgets in duration of more than 4 h 17 min with a continuous duration of more than 2 h. Thus, it was necessary to do a linear regression test to determine the correlation between using smartphones/gadgets and the effects. The results of this test are shown in Table 7.

Table 7: Correlation between the use of smartphones/gadgets and the effects

Model summary					Sig.
Model	R	R square	Adjusted R square	Standard error of the estimate	0.000
1	0.639a	0.408	0.401	5.807	0.000

Simple linear regression test

Table 7 shows that there was a significant effect of smartphones/gadgets use on the effects. To

find out the value of the correlation/connection (R) can be seen in Table 7.

Based on Table 7, it can be seen that the value of the correlation/connection (R) was 0.639 and the coefficient of determination (R Square) was 0.408 which implied that there was correlation between smartphone/gadgets use and the by 40.8%.

Discussion

According to DIKDOK [10], factors that can influence the effects of using smartphones/gadgets are students who use smartphones/gadgets in duration of 4 h 17 min and continuous use of more than 2 h. It is supported by the statement in Waty and Fourianalistyawati [11] which states that the ideal duration for using a smartphone/gadget is 4 h 17 min a day. This study concluded that the factors that can influence the effects of using smartphones/gadgets are users in duration more than 4 h 17 min and users in continuous duration more than 2 h.

The effects of smartphones/gadgets excessive use

Smartphones/gadgets usage for more than 4 h 17 min and with continuous duration of more than 2 h will affect students' vision, hearing, social relations, academic achievement, and operational costs. This condition will negatively or positively influence senior high school students' lives. Negative impacts due to the excessive use of smartphones/gadgets include harming students' health either directly caused by signal radiation emitted by smartphones/gadgets or indirectly. According to the World Health Organization (WHO), signal radiation from smartphones/gadgets allows the risk of brain cancer in humans [12].

Effect on students' hearing

Based on this study, it was found that the use of smartphones/gadgets effected on hearing loss in senior high school students in the city of Padang. This situation happened because using smartphones/gadgets students could easily play their favorite songs and movies. In terms of playing these songs and movies, as teenagers they always used hands-free earphones and mostly in maximum audio volume or as loud as possible so that they would feel more satisfied listening to the songs or movies without any noises/interferences from outside. In addition, they often listened to music while they were lying down and even until they felt asleep.

This situation led to problems in students' senses of hearing since they repeatedly did it over and

over again until it became too often. Hearing quality will decrease if you often listen to music with a sound that is too loud in a long period of time [13]. This statement is supported by research in Bawelle [14] which stated that hearing can be impaired because of the long duration use of earphones when using smartphones/gadgets.

The WHO explained that along with the increasing use of personal audio devices to listen to music and risky volume adjustment patterns, a threatening effect on hearing arises in form of hearing loss. Khodijah and Nurizzati [15] explained that the habit of listening to music using hands-free for a long period of time can cause hearing loss and even permanent deafness. The disease caused by being exposed to loud noises for a long period of time is called noise-induced hearing loss.

Thus, based the discussion above, it can be concluded that it is necessary to provide education for senior high school students on how to use smartphones/gadgets or hearing aids appropriately so that hearing loss on users which is caused by the use of those devices can be prevented from happening.

Effects on students' vision

The use of smartphones/gadgets for a long time and duration also affected users' vision acuity. Although it does not have a big impact, it can somehow still be dangerous for the users. This is in line with research in Sunita and Mayasari [13] which stated that there is a connection between duration of smartphone/gadget use and vision acuity. If students use smartphones/gadgets for a long duration in positions that are not ergonomic, they will feel negative effects on vision acuity and to make things worse, this condition can even lead to extreme visual impairments.

According to Rosenfield [16], the screens of gadgets have smaller font size in comparison with books or hardcopy files so that the reading distance will be closer. At this point, it increases the visual needs of the user resulting in symptoms that are called computer vision syndrome. More than 90% of smartphones/gadgets users experienced vision problems caused by prolonged use of smartphones/gadgets. Some of them were tired eyes, blurred vision, double vision, dizziness, dry eyes, and ocular discomfort when looking up close or from afar. Anies [17] explained that smartphones/gadgets are increasingly being produced with brighter screens used day and night, and this in fact made vision impairment happen more often. Using a smartphone/gadget in bed and in the dark can also decrease users' vision function.

To conclude, for smartphones/gadgets users must pay close attention to the proper position or ways to use smartphones/gadgets to minimize the effects on the vision acuity function.

Influence on social relations

In addition to the effect on hearing function and visual function, the use of smartphones/gadgets also has an effect on students' social relationships. Most senior high school students in Padang City used smartphones/gadgets as a means of communication, entertainment media, and to find information. The effects of using smartphones/gadgets on senior high school students consist of positive and negative influences. The positive influence is that it makes it easier to communicate with a lot of people through existing social media features.

It is supported by research in Mulyono [18] which explains that teenagers claimed they can use the internet to open their horizons and expand their relationships and friendships. They admit that without meeting face to face and getting to know them directly, they can make friends with anyone from anywhere and can meet new friends on their social media accounts. On the other hand, the negative effect of using smartphones/gadgets on social relationships is that students sometimes focused more on using smartphones/gadgets when hanging out with their friends so that it could interfere with the ongoing interaction process.

In addition, students felt that smartphones/gadgets could be good friends when they felt lonely or alone. If this becomes habits, students could become apathetic and do not care about the surrounding environment. This is supported by research in Subagio and Hidayati [19] which says that the higher the loneliness happened, the higher the smartphones/gadgets addiction became. This statement was also supported by research in Muflih [3] which stated that there was a significant relationship between smartphones/gadgets use and adolescent interactions at SMAN 1 Kalasan Sleman Yogyakarta. Based on the results of research in Khodijah and Nurizzati [15], it was also described that there were negative effects of using smartphones/gadgets in the school environment such as changes in student social from good to bad behaviors, disturbed interactions between students, students became individualists, students did not pay attention to lessons, students did not care about the environment around them.

Mun *et al.* [20] stated in theory that excessive time spent by adolescents in using gadgets leads to disputes between adolescents and parents and due to this situation, family time is wasted. This negative influence occurs because of the excessive use and duration of smartphones/gadgets usage and with negative usage behavior so that procedures or education are needed for smartphones/gadgets usage so that the negative effects can be overcome [21]. Nursing home the Sabai Nan Aluih and the Husnul Khotimah Riau home was not satisfactory and was only in the sufficient category.

Influence on academic achievement

Smartphones/gadgets can be used as a media to increase students' knowledge about technological advances so that students are not said to turn a blind eye to progress in the era of globalization. Students can access various educational information websites when they use gadgets. They can search for information about their school lessons that are considered difficult or poorly understood. Smartphones/gadgets in their use also have an influence on students' achievement. Learning achievement is the result or level of ability that has been achieved by students after participating in the teaching and learning process within a certain time, both in the form of changes in behavior, skills, and knowledge [22].

This study found that in general the academic achievements of senior high school students in Padang City were in average and high categories. However, in specific there were still a number of students who had low academic achievements. This means it was in line with the statement that excessive use of smartphones/gadgets will affect students' achievements. If students use smartphones/gadgets to study and search for subject matter, their academic achievement will be in the high category. This research was supported by Muhammad [23] which stated that gadgets can be used as learning media. If students have high intensity in using gadgets, students will often use the internet for studying purpose and by doing so students will get good learning outcomes. In addition, Priatno and Marantika [24] stated that utilizing information technology has a positive influence on children's achievement, if they remain under parental supervision.

On the other hand, students who use smartphones/gadgets not for learning purpose, but to do negative things such as watching porn videos, sending negative comments, making useless videos, and being addicted to online games had low category on their academic achievements. This situation needs to be improved. In line with research in Kurniawati [25] which explained that students who often use gadgets will experience addiction. They become addicted to applications that exist on gadgets from games, social networks, the internet, and other applications that they often use. In this case, students will experience a decrease in their level of achievement. However, if the gadgets can be used by students properly, they can be used as a means of learning to support their level of achievement.

The use of smartphones/gadgets that are appropriate for learning purposes will provide supports in improving students' academic achievements. This means that senior high school students in the city of Padang need to put statement in their consideration when they use their smartphones/gadgets. Education on this topic can be delivered through a health promotion program delivered by the Public Health Office and Community Health Center officers.

Influence on senior high school students' financial condition

The use of smartphones/gadgets can make students experience waste of money. The results of this study indicated that senior high school students in Padang City generally also spent their monthly pocket money to buy internet data packages. This was shown from the usage time and duration of use which are tend to be longer that required more internet data. In addition, students also sometimes bought items for the online games they had played. The influence of the use of smartphones/gadgets was that it caused a waste of students' monthly allowances. In fact, their parents provided <1 million rupiahs per month for their pocket money and they wasted them for internet data. This research was supported by Sari *et al.* [26] which stated that when using smartphones/gadgets, students lost track of time so that their behavior at school changed, and at the same time they experienced waste of money for smartphones/gadgets that were used ineffectively.

Conclusion

The results of this study found that the use of smartphones/gadgets for a long time and for a continuous duration played a significant role to negative effects on students' vision, hearing, social relations, academic achievement, and financial condition. If smartphones/gadgets were used in positive ways for learning purposes and adding new information, they gave positive impacts on users. However, if students used smartphones/gadgets in non-ergonomic positions, they experienced negative effects. Therefore, it is necessary to have an education program in form of health promotion to share the appropriate ways in using smartphones/gadgets to achieve healthy behavior in using smartphones/gadgets.

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