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Impact of electronic devices on the life of children: A cross sectional study from Ipoh, Perak, Malaysia

Karthiyayini Unplagan[1]*, Barathi Balasubramaniam[2],Thiwya Premkumar[3], Joey Lim Chu Chien[4], Annushia Sivaji Rao[5], Ratna Agustina Sibarani Ahmat Rasit[6]

Corresponding author:

[1]Ms. Karthiyayini Unplagan, final year MBBS student
Email: sf00762@qiup.edu.my

[2]Ms. Barathi Balasubramaniam, final year MBBS student
[3]Ms. Thiwya Premkumar, final year MBBS student
[4]Ms. Joey Lim Chu Chien, final year MBBS student
[5]Ms. Annushia Sivaji Rao, final year MBBS student
[6]Ms. Ratna Agustina Sibarani Ahmat Rasit, final year MBBS student

All authors are affiliated to

Faculty of Medicine
Quest International University Perak
No. 227, Plaza Teh Teng Seng (level 2)
Jalan Raja Permaisuri Bainun
30250 Ipoh, Perak Darul Ridzuan, Malaysia

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Quest International University Perak (QIUP), No.227, Plaza Teh Teng Seng (Level 2), Jalan Raja Permaisuri Bainun, 30250 Ipoh, Perak Darul Ridzuan, Malaysia

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ABSTRACT

Introduction:
The prevalence of electronic device usage by children has been increasing at an alarming rate. The contributing factors are parents, peers, media, society, and children themselves. Thus, the aim of this research was to help both children and parents to understand the consequences of excessive use of electronic gadgets as well as to rationalize their thought to control the usage.

Methods:
A cross-sectional study was conducted from April 2017 to April 2018 among children aged 6 to 11 years old in a community setting. 174 children participated in this study. SPSS version 20 was used to determine the association between time spent on electronic devices and the impact on the children's life.

Results:
A majority of children 105 (60.3%) obtained insufficient sleep which is less than 9 hours. There is a significant mean rank difference of average time spent on electronic devices between gender ($p = 0.009$). Male spent more time on electronic devices compared to females.

Conclusion:
Spending more timing on electronic devices leads to health problems and insufficient sleep. It may reflect on exam performances. So we suggest limiting media exposure to the children less than an hour. Parents should play a crucial role in teaching them how to use technology safely. Family members should be very careful to monitor children's media content. If required, addicted children should be given proper rehabilitation therapy to get rid of such a problem.

Keywords
Electronic devices, examination, sleep, social media

Introduction

Worldwide, the prevalence of electronic device usage by children has been increasing tremendously. According to American Academic of Pediatrics, today's children are spending an average of 7 hours per day on entertainment media such as television, computers, video games, mobile phone, tablet or iPad, mp3 player and other electronic devices. [1] Although various devices are available, television remains as the most common media which children spend a maximum of their time with. [2]

Ample studies show that by the age of eight, the majority of the children have watched TV, used computer, played console video games, and more than half of them played games or used apps on a portable device such as cell phone, handheld gaming system, iPod, or tablet. People seek electronic media for a company when they are alone, bored, tired and when they need solace in addition to information and entertainment. [2, 3]

Based on studies done by American Academic of Pediatrics, excessive use of electronic devices by children result in attention problem, school difficulties, sleep and eating disorder, obesity as well as risky behavior due to the internet and cell phone. Cooperation of both the children themselves and parents or caregivers are needed to overcome this issue. Parents are the vital promoters to ensure the effective use of electronic media among children. For instance, in Brazil and other countries, public health guidelines recommend that children should minimize the amount of time spent in prolonged sedentary behavior such as using electronic gadgets. [1]

The aim of this study was to find out the usage of electronic devices to help both children and parents to understand the consequences of excessive use of electronic gadgets as well as to rationalize their thought to control the usage.

Methods

Study Period

A cross-sectional study was conducted in two phases from April 2017 to April 2018 among children aged 6 to 11 years old in a community setting.

Study design, participants and the collection of data

During phase one, an interview session using a self-developed questionnaire in appropriate languages was designed and pre-tested to assess the understanding of children on the subject with parental guidance. The validity of the questionnaire as well as information sheets and assent forms were pre-tested on 5 children accompanied by their parents before the conduct of the study. During phase two, a few public places in Ipoh such as hypermarkets, parks, playgrounds, and restaurants were conveniently selected as the venue for the survey to be conducted and approval was obtained from the administrative officers of the places for our interview.

Inclusion criteria

Inclusion criteria include children aged 6 to 11 years old accompanied by their parents, children studying in the government school and both children and parent who can understand Malay and English.

Exclusion criteria

The exclusion criteria in the research include children with significant physical and mental disabilities; those are not accompanied by their parents, age below six and above 11 as well as students from the private school.

Sample size calculation

The sample size was 174, calculated using Sample Size Calculator for Prevalence Studies allowing for 20% dropout rate.

Study variables

The study variables were gender; ethnic group; types and time spent on each electronic devices; the purpose of electronic devices usage; physical activities and time spent on it; anthropometric measurement; hours of sleep and causes of lack of sleep; time spent on studies and recent results in school examination.

Ethical committee approval

Ethical approval was obtained from the National Medical Research and Ethics Committee (MREC) of the Ministry of Health (MOH) through National Medical Research Registry (NMRR) by the researchers. All responses are kept confidential, the respondents were allowed to refuse participation in the study at any point of time and no identifiable information was collected from the participants. Written informed consent and assent were obtained from eligible parents and children respectively prior to the commencement of the study.

Data management and statistical analysis

Tools used in this study were self-developed questionnaire, weighing scale, measuring tape, boys' and girls' growth chart. SPSS version 2.0 was used to determine the association between time spent on electronic devices and the impact on the children's life.

Results

Table 1 shows the mean age of children was 8.7 years consisting of 90 (51.7%) boys and 84 (48.3%) girls. Malay participants were more, followed by Indian and Chinese.

Table 1: Socio-demographic characteristics of participants

Socio-demographic Factors	n	(%)
Age*	8.7	(±1.7)
Gender		
Male	90	(51.7)
Female	84	(48.3)
Ethnic Group		
Malay	63	(36.2)
Chinese	52	(29.9)
Indian	51	(29.3)
Others	8	(4.6)

Table 2: Types of physical activities performed by children

Types of physical activities	n	(%)
Sports		
No	73	(42.0)
Yes	101	(58.0)
Exercise		
No	61	(35.1)
Yes	113	(64.9)
Martial Arts		
No	157	(90.2)
Yes	17	(9.8)
Household Chores		
No	59	(33.9)
Yes	115	(66.1)
Other physical activities		
No	170	(97.7)
Yes	4	(2.3)

Table 2 shows the various physical activities performed by children. It involved about 115 (66.1% in household chores, 113 (64.9%) performed exercises, 101 (58%) carried out sports and only 17 (9.8%) children attended martial art classes. It even involved a minority of 4 (2.3%) in other physical activities such as dancing, yoga, and active play.

Table 3: Hours of sleep

Sleep quality	n	(%)
Hours of sleep		
Sufficient sleep(9-11 hours)	64	(36.8)
Insufficient sleep(<9 hours)	105	(60.3)
Oversleep(>11 hours)	5	(2.9)

Table 3 expedites most children 105 (60.3%) that got insufficient sleep <9 hours followed by 64 (36.8%) sufficient sleep of 9 to 11 hours.

Table 4 shows the time spent on studies per day excluding school hours but including the time spent on tuition. The majority of the respondents 100 (57.4%) spent 0 to 2 hours. The majority of the students achieved Grade B, followed by Grade A and Grade C.

Table 4: Education

Education	n	(%)
Time spent on studies per day		
0-2 Hour	100	(57.4)
>2-4 Hour	66	(38.0)
>4 Hour	8	(4.6)
Grade		
A (≥80)	59	(33.9)
B (65-79)	68	(39.1)
C (50-64)	37	(21.3)
D (40-49)	7	(4.0)
F (<40)	3	(1.7)

Table 5:

Variable		Median	(IQR)	Mean rank	Z	P value
Gender						
	Male	5.0	(3.8)	96.5		
	Female	4.0	(2.5)	76.8	-2.6	0.009†
Ethnic Group						
	Malay	5.0	(3.6)	102.9		
	Chinese	3.5	(2.4)	58.7		
	Indian	5.0	(2.5)	94.8		
	Others	5.0	(1.9)	98.7	24.7[a]	0.001†
Sports						
	No	4.0	(2.5)	77.5		
	Yes	5.0	(2.4)	93.9	-2.1	0.033*
Exercise						
	No	4.0	(3.0)	78.84		
	Yes	4.5	(2.5)	91.44	-1.6	0.112×
Martial Arts						
	No	4.0	(3.0)	87.5		
	Yes	4.5	(3.5)	82.4	-0.4	0.688×
Household Chores						
	No	4.0	(3.0)	86.2		
	Yes	4.25	(3.0)	87.4	-0.2	0.880×
Other physical activities						
	No	4.0	(3.0)	86.43		
	Yes	4.5	(4.9)	111.3	-1.0	0.325×

[a] Kruskal Walis test, ×p>0.05, *P<0.05, †P<0.01

Table 5 shows, a significant mean rank difference of average time spent on electronic devices between gender (p = 0.009). Mean rank of males (96.5) is higher compared to females (76.8). Males spent more time on electronic devices compared to women.

Discussion

Usage of electronic devices by children

We observed that children spent about 5 hours on electronic devices per day, which shows gadgets consumed 20% time of a whole day. On an average daily basis, a Malaysian child has to spend around 7 hours for school and at least 9 hours to get sufficient sleep. Therefore, the child is left with the only balance of 8 hours spent on routine activities, studying, playing, entertainment, etc. However, children used 62.5% (5 hours) of 8 hours on electronic devices. This strongly illustrates a high consumption of time on electronic devices by children.

We observed males are more prone to excessive use of electronic devices compared to females. There are many probable factors which can contribute such as the attraction of games, browsing electronic shops, hovering on WebPages. Given a choice, children prefer to use electronic devices during their leisure time rather than being involved in other activities. This is because; the electronic devices are easily available and accessible at home. Nowadays, electronic devices are updated quickly with new and trendy applications and programmes from time to time and attract children to use them. This eventually leads to addiction towards electronic devices among children. [4, 5]

In addition, there is a lack of monitoring by parents on children's time spent on electronic devices because of their negligent behavior. Parent's lack of spending quality time with their children because of an excess of job work leads to less family bonding time and causes excessive use of electronic devices among children. Parents also offer electronic devices to their children to calm them down when the children throw tantrums. Parents and siblings role in using electronic devices at home for their work and for other objectives also influences the children in becoming attached to their electronic devices.

Peers of the children play an important role in influencing their friends to use electronic devices excessively. Nowadays, it has become a trend to play and compete in games through applications in electronic devices and to compete for a maximum number of likes for their posts in social media such as Facebook, Instagram, and Twitter. Children also use electronic devices as a medium of communication to strengthen their friendship.

Association between times spent on electronic devices and physical activities and BMI

Based on this study, we found a weak negative correlation between electronic devices usage and time spent on physical activities. The weak correlation is probably because of an improper method of information retrieval from the participants, whereby a recall technique was used instead of an observational technique to monitor the physical activity.

Apart from these physical activities performed for a week, the period does not represent the total time spent. It varies according to the schedule and preference of children and their parents. However, previous studies showed a significant negative correlation between electronic devices usage and time spent on physical activities among children. [3, 6]

Although several long-term studies conducted in various countries have shown that electronic device usage has a significant role in the cause of obesity but we deduced a very weak correlation. Researchers did a study in Jeddah, KSA in 2015; found that the rate of obesity is highly correlated with eating in front of the TV, long duration of electronic devices usage and lack of physical exercise. 86.8% of that study participants had a positive association between obesity and a history of eating while watching TV. [1, 7] Our results varied may be because of a difference in physical activities, diet, body metabolic rate, genetics and environment.

Sleep and times spent on electronic devices

We observed the majority of children 105 (60.3%) got insufficient sleep <9 hours. There is variability in the sleeping hours of the children during weekdays and weekends. Besides that, the time the child goes to bed does not show the exact time the child falls asleep because the child may lay on the bed without sleeping or may be playing with their phone on the bed. As parents sleeping in a different room provided the data rather than their children, there is masking of data on the exact time the child fell asleep and so the duration spent on sleeping. However, all the children who were said to have insufficient sleep pointed to electronic devices as the main cause. Electronic devices have a negative impact on the child's quality of sleep, this is supported from research by Cain et al, who stated that the presence of electronic devices in the bedroom is related to delayed bedtime, less time in bed, a shorter duration of sleep time, increased bedtime resistance and higher overall sleep disturbance in children. [8]

Time spent on electronic devices and studies

We found a weak negative correlation between time spent on electronic devices and time spent on studies. This is because less time was available for the children to spend on studies; since 20% of their daily time is being used up on electronic devices. Since they spend 5 hours on electronic devices, only 3 hours are available for the children to carry out other activities including studying. However, not all the 3 hours is being used on studies alone as children have other routine activities to be carried out.

Grades achieved by children are based on the quality time spent on education instead of the quantity of time spent on education. Furthermore, electronic devices now play a vital role in educational purposes to assist in gaining knowledge, to complete school assignments and to learn a good command of a language. Studies about the relationship between media use and cognitive development and academic achievement have not been conclusive. [9, 10]

Conclusion

Spending more time on electronic devices leads to health problems and insufficient sleep. It may reflect on exam performances. So we suggest limiting media exposure to children to less than an hour. Parents should play a crucial role in teaching them how to use technology safely. Family members should be very careful to monitor children's media content. If required, addicted children should be given proper rehabilitation therapy to get rid of the problem.

Limitation and future scope

A recall technique was applied in this study to assess the time spent on electronic devices, physical activities created bias. As the level of difficulty of examination varies in every school, grades obtained in school examinations cannot be used as a standard variable to assess the correlation between electronic device usage and grades. Moreover, the sample size was less for this study. Thus, there is a need for further research to be conducted on this topic with a suitable methodology and questionnaire using effective tools and methods. A specific age group with similar academic background should be recruited as the sample of this research in order to improve the validity of the results.

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Authors' contribution

All authors contributed equally to the conceptualization, data curation, formal analysis, investigation and methodology, project administration.

Competing interests

None declared.

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