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Prevalence of screen time use and its relationship with obesity, sleep quality, and parental knowledge of related guidelines: A study on children and adolescents attending Primary Healthcare Centers in the Makkah Region

Turki A. Alqarni^{1,2}, Mohammed A. Alshamrani^{1,2}, Alhussain S. Alzahrani^{1,2,3}, Asmaa M. AlRefaie^{1,2,3}, Ohoud H. Balkhair^{1,2,3}, Samar Z. Alsaegh^{1,2,3}

Abstract:

BACKGROUND: Since the use of handheld electronic devices is prevalent among people of all ages, health organizations have specified appropriate screen times for the different age groups. The aim of this study was to investigate the prevalence of screen use and its association with sleep quality and obesity.

MATERIALS AND METHODS: This cross-sectional study was conducted on people attending three Primary Healthcare Centers in the Makkah region between January and October 2019. The three-part questionnaire filled by parents collected data on sociodemographics, parental knowledge of guidelines, and asleep quality. Data were analyzed using STATA 14.2. For continuous variables, groups were compared using *t*-test; Pearson Chi-squared test or Fisher's exact test, as appropriate, was employed for categorical variables.

RESULTS: A total of 450 individuals completed the questionnaire. Children 2–12 years old spent more time and used phones, tablets, and television (TV) more frequently, while those younger than 2 or older than 12 used phones and TVs more than other devices. High body mass index was associated with the daily usage of electronic devices. Fewer hours of sleep, longer time to fall sleep, and longer hours in bed were associated with the usage of all electronic devices. Furthermore, a good knowledge of the maximum time allowed for children and teenagers and content scoring system was associated with hours slept per night, and low knowledge was associated with higher frequency of using electronic devices.

CONCLUSION: Children spent long periods using electronic devices, and despite knowing the guidelines, parents still allowed their children to exceed the time acceptable for the use of electronic devices, which could lead to future social problems.

Keywords:

Children, computers, infants, obesity, parents, screen time, sedentary behavior, sleep quality, television viewing, toddlers, video games, young people

¹College of Medicine, King Saud Bin Abdulaziz University for Health Sciences, ²King Abdullah International Medical Research Center, ³Department of Family Medicine, Ministry of the National Guard-Health Affairs, King Abdulaziz Medical City, Jeddah, Saudi Arabia

Address for correspondence:

Dr. Turki A. Alqarni,
P.O. Box 9515, Jeddah,
21423, Makkah Region,
Saudi Arabia.
E-mail: turki.ahmed.
alqarni@gmail.com

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Introduction

People of all ages indulge in watching television (TV), playing on different consoles and in using handheld electronic devices. An estimate in the United States of America found that 60% of children younger than 8 years owned a smartphone and 40% owned a tablet device.^[1] Another report estimated that 83% of children 6 years and below used a screen media device in a typical day.^[2] Of these, 73% watched TV, videos, or digital video disks, 18% used computers, and 9% played video games. These numbers are higher among adolescents aged 12–19 according to a report which indicated that 83% of adolescents used a smart device every day.^[3] A Mexican study found that of the devices used by children in households, smartphones accounted for 62.4% and desktop or laptops accounted for 60.9%.^[4] Another study of children between 5 and 16 found that an average daily TV viewing exceeded 6 h.^[5]

The American Academy of Pediatrics recommends that parents should limit their children's total media time to no more than 1–2 h a day of genuine quality and under supervision.^[6] It also recommends that children younger than 2 years should be discouraged from watching TV and that parents should generally watch TV with their children. Other health institutions like the Department of Health in the government of Australia also recommend that children should not have more than 2 h a day of electronic media and that preschoolers should be encouraged to be more active.^[7] Other guidelines recommend limiting the use of sedentary electronic equipment to <2 h and with a break every 30 or 60 min.^[8]

Not all movies and games are suited for children since some do include references or scenes with sexual contents or drugs or crimes. Many governments have rating systems to help parents determine what their children should watch or play. For example, the Australian government classifies movies and games into five categories. These are general (G) which are suitable for everyone, parental guidance which are not recommended for children below 15 years without guidance from parents, mature (M) which are not suitable for those below age of 15, mature accompanied (MA) which are illegal for those below 15 to watch or play unless purchased by an adult guardian who is exercising parental control over the child, and finally restricted content (R+18), which is restricted for adults only.^[9] Other governments such as American, Canadian, and European have similar classifications.^[10–12]

In Saudi Arabia, the average time spent on mobile devices is 2 h and 42 min, which is slightly above the average in the study of 10 countries across Europe and Middle East. The average age for ownership of devices is 6 years for

tablets; the average age for games consoles connected to the internet is 7 years, for laptops and computers, it is 8 years, for smartphones, it is 9 years. Parents, however, believe that children should be older when they get their devices. Around 86% of Saudi parents are concerned that their children are exposed to explicit content on the internet, 83% fear their children might meet strangers online, 80% worry their children are spending too much time in front of the screen, and 76% are concerned their children might suffer online bullying.^[13] Saudi Arabia has recently established its rating system for movies with the re-opening of cinema theaters in 2018 and substituted the American and European rating systems with its own rating systems for games in 2016.^[14]

The aim of this study was to investigate the prevalence of electronic devices used and the time children spend on the screen, and its association with sleep quality and obesity, and to investigate parental knowledge of guidelines and content rating systems related to the use of these devices.

Materials and Methods

This cross-sectional study was conducted between January and October 2019 in three primary healthcare centers of the Ministry of National Guards Health Affairs (MNGHA) in the Western area of Saudi Arabia. Ethical approval from the Institutional Review Board was obtained vide letter No. IRBC/2106/18 dated 13/12/2018, and informed written consent was taken from the parents of all participants in the study. The medical services of the MNGHA are composed of primary healthcare services scattered over Saudi Arabia along with medical cities and hospitals that provide more advanced services for its beneficiaries.

The main population targeted were 18-year-old and younger male and female adolescents and children who attended the primary healthcare centers with both or one of their parents.

The yearly average of our population attending the three primary healthcare centers exceeds 50,000 persons. This number was used to calculate the sample size needed for the study. With 95% confidence interval, and a 5% margin of error, the minimum required sample size as calculated was 375. Considering a 10% nonresponse rate, the final sample size was set at 450. We followed a quota sampling technique where 150 families were selected from each center.

Data were collected by distributing a self-administered questionnaire composed of three parts to be completed by parents. The first part consisted of sociodemographic data and information about devices used. It included

age, weight, height, gender, level of education, devices used, frequency of use of each device, time spent on each device. The second part assessed the parental knowledge of guidelines of recommended screen time for each age category and their knowledge of the content rating system. The third part was the Arabic version of the Pittsburgh Sleep Quality Index (PSQI) previously validated consisting of 19 items that assessed sleep quality in the last month.^[15] It has 7 subjective components on sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, use of sleep medication, and daytime dysfunction. The score for each component ranges from 0 (no difficulty) to 3 (severe difficulty). The total score ranges from 0 to 21, the higher scores indicating worse sleep quality.

Statistical analysis was conducted using Stata Statistical Software: Release 14 (2015) by StataCorp. College Station, TX, USA. Continuous variables were presented as mean and standard deviation (SD) and inter-group differences were compared using *t*-test. Skewed numerical data were presented as median and average rank and between-group differences were compared using the Mann-Whitney *U*-test. Paired numerical data were compared using the paired *t*-test.

Categorical variables were presented as number and percentage, and differences between groups were compared using the Pearson Chi-squared test or Fisher's exact test. Ordinal data were compared using the Chi-squared test for trend. $P < 0.05$ was considered statistically significant.

Results

Demographics show that in our study, 174 of the participants were males and 276 were females in a total of 450 participants. The number of toddlers aged <2 years old was 113 (25.1%), children between the ages of 2–6 year were 93 (20.7%), children between the ages of 6 and 12 years were 101 (22.4%), and adolescents aged >12 years old were 143 (31.8%).

Regarding frequency, the study was to evaluate how frequently children used every device per week as follows: never used, used 1–2 times per week, used 3–4 times per week, used 5–6 times per week, and used daily. Computers and laptops were never used by 386 individuals (86.2%), were used 1–2 times weekly by 36 (8%), were used 3–4 times weekly by 16 (3.6%), were never used 5–6 times weekly, and were used daily by 10 (2.2%). Video games consoles were never used by 379 (84.2%), 14 (3.1%) used them 1–2 times weekly, 21 (4.7%) used them 3–4 times a week, 6 (1.3%) used them 5–6 times a week, and 30 (6.7%) used them daily. Tablets were never used by 342 (76%) but were used 1–2 times weekly by 38 (8.4%), 3–4 times weekly

by 12 (2.7%), 5–6 times weekly by 2 (0.4%), and daily by 56 (12.4%). Phones were never used by 157 (34.9%) but were used 1–2 times weekly by 45 (10%), 3–4 times weekly by 14 (3.1%), 5–6 times weekly by 15 (3.3%), and used daily by 219 (48.7%). TVs were never watched by 133 (29.6%), 31 (6.9%), watched TV 1–2 times weekly, 33 (7.3%) 3–4 times per week, 22 (4.9%) watched TV 5–6 times a week, and 231 (51.3%) watched it daily.

Regarding the time spent on different devices, 391 (86.9%) never used computers and laptops, 36 (8%) used them for ≤ 2 h per day, 13 (2.9%) for 2–4 h per day, and 10 (2.2%) for >6 h per day, but were never used for 4–6 h. 373 (82.9%) never used video games consoles, 14 (3.1%) used them for ≤ 2 h per day 27 (6%) for 2–4 h per day, 13 (2.9%) for 4–6 h per day by and 23 (5.1%). for >6 h per day. 345 (76.7%) never used tablets, 34 (7.6%) used them for ≤ 2 h per day, 26 (5.8%) for 2–4 h per day, 11 (2.4%) for 4–6 h per day, and 34 (7.6%) for >6 h per day. 154 (34.2%) never used phones; 91 (20.2%) used phones for ≤ 2 h per day, 52 (11.6%) for 2–4 h a day, 40 (8.9%) used them for 4–6 h a day, 113 (25.1%) for >6 h every day. 139 (30.9%) never watched TV. 103 (22.9%) watched for ≤ 2 h per day, 85 (18.9%) for 2–4 h per day, 57 (12.7%) for 4–6 h a day, and 66 (14.7%) for >6 h per day.

As shown in Tables 1 and 2, infants <2 years old, most frequently watched TV and used phones almost daily, while older age groups, teenagers used phones most frequently and almost daily.

There was statistically significant difference in patterns of using electronic devices as infants <2 years never used laptops, computers, video games, nor tablets except rarely while teenagers used tablets, video games, and tablets most frequently with *P* value 0.0001, 0.0001, and 0.0001, respectively.

Regarding body mass index (BMI) for our respondents, the mean was $20.4 \pm \text{SD } 6.6$ and a median of 18.5 ranging from 10.5 to 54.3 for all respondents.

As shown in Tables 3 and 4, BMI was significantly correlated to the frequency of using electronic devices as the highest BMI was associated with daily usage of electronic devices with $P = 0.0001$. Furthermore, higher BMI was significantly associated with the use of computers and laptops, with $P = 0.01$ and using phones with $P = 0.0001$.

With regard to parental knowledge, 348 (77.3%) of the parents had heard about guidelines regarding how much screen time children should have and 102 (22.7%) of the parents had not. Three hundred fifty four (78.7%) parents had heard about content rating systems regarding the appropriateness of games or videos for children, but 96 (21.3%) of the parents had not.

Table 1: Relationship of age with frequency of use of each electronic device among children and adolescents attending primary healthcare centers in Makkah region (n=450)

Item	<2 years (n=113)	2-6 years (n=93)	6-12 years (n=101)	>12 years (n=143)	P-value
Computers and laptops					
Never	112	93	88	93	0.0001
1-2 times weekly	0	0	5	31	
3-4 times weekly	0	0	3	13	
5-6 times weekly	0	0	0	0	
Daily	1	0	3	6	
Video games consoles					
Never	112	81	75	111	0.0001
1-2 times weekly	0	3	2	9	
3-4 times weekly	0	3	12	6	
5-6 times weekly	0	0	0	6	
Daily	1	6	12	11	
Tablets					
Never	108	66	57	111	0.0001
1-2 times weekly	5	2	11	20	
3-4 times weekly	0	0	9	3	
5-6 times weekly	0	0	2	0	
Daily	0	25	22	9	
Phones					
Never	78	37	36	6	0.0001
1-2 times weekly	8	13	15	9	
3-4 times weekly	9	0	0	5	
5-6 times weekly	0	3	7	5	
Daily	18	40	43	118	
TV					
Never	44	22	20	47	0.0001
1-2 times weekly	2	0	7	22	
3-4 times weekly	3	2	7	21	
5-6 times weekly	0	6	7	9	
Daily	64	63	60	44	

Parental knowledge did not have any significant correlation with sleep quality and time spent in bed, but it had significant correlation with total sleep hours. The mean hours of sleep by children was 8.4 ± 0.1 ($P = 0.01$).

Good knowledge of the maximum time allowed for children and teenagers and content scoring system was significantly correlated with hours slept per night, and surprisingly, those with high knowledge had fewer sleeping hours of 7.7 ± 0.2 (8.4 ± 0.1 for those with less knowledge) with $P = 0.01$.

Low knowledge of the guidelines on using electronic devices was significantly associated with higher frequency in using electronic devices such as computers, video games, and phones with P value of 0.0001, 0.02, and 0.002, respectively.

Respondents had a mean time of 16.6 ± 10 min before sleep. Furthermore, they had a mean time of 8.6 ± 2.7 h in bed. However, the mean hours slept were 8.2 ± 2.6 .

Regarding sleep quality and PSQI, sleep interruptions of the respondents during their last month were infrequent, however, 14.2% could not initiate sleep within 30 min more than 3 times weekly, 12.4% woke up in the middle of night or early morning, the majority (8.9%) woke up because of a bad dream, 6.4% because they were cold, and 6% had to go to the bathroom.

Most respondents had no problem in keeping up with doing things enthusiastically (79.1%), and only 2.4% had huge problems. In addition, 66.4% rated their sleep quality as very good, 23.1% rated as fairly good, 4.2% as fairly bad, and 6.2% rated as very bad. Regarding problems faced by roommate, disorientation and confusion episodes while sleeping commonly occurred in 6.4%, loud snoring in 5.3%, and restlessness during sleep in 2.2%.

As shown in Table 5, using all types of electronic devices were significantly associated with fewer hours slept, longer time before sleep and more hours spent in bed with $P < 0.05$ except for phones with time in bed and hours slept, and video games consoles with hours slept.

Table 2: Relationship of age with time spent on each electronic device among children and adolescents attending primary healthcare centers in Makkah region (n=450)

Item	<2 years (n=113)	2-6 years (n=93)	6-12 years (n=101)	>12 years (n=143)	P-value
Computers and laptops					
None	112	93	90	96	0.0001
2 h or less	0	0	5	31	
2-4 h	0	0	3	10	
4-6 h	1	0	3	6	
>6 h	0	0	0	0	
Video games/consoles					
None	112	81	69	111	0.0001
2 h or less	0	3	8	3	
2-4 h	0	3	13	11	
4-6 h	1	0	5	7	
>6 h	0	6	6	11	
Tablets					
None	108	66	57	114	0.0001
2 h or less	5	5	8	16	
2-4 h	0	9	12	5	
4-6 h	0	3	5	3	
>6 h	0	10	19	5	
Phones					
None	78	37	36	3	0.0001
2 h or less	31	21	18	21	
2-4 h	3	17	19	13	
4-6 h	0	9	8	23	
>6 h	1	9	20	83	
TV					
None	44	22	23	50	0.0001
2 h or less	44	26	14	19	
2-4 h	14	14	20	37	
4-6 h	2	14	22	19	
>6 h	9	17	22	18	

Using PSQI, the scores from 0 to 10 were categorized as low and high if above 10. The minimum score was 0 and the maximum was 13 with a mean of 2.9 (± 2.8).

PSQI was significantly correlated, as shown in Table 6, with using computers, tablets, and TV with *P* value of 0.0001, 0.0001, and 0.04, respectively.

Discussion

This study assessed the prevalence of the use of electronic devices used and the time spent on them, and the association with weight and sleep quality as well as parental knowledge of the time recommended by the guidelines and rating system of games and movies. Out of 450 included in the study, 31.8% were above the age of 12 and 61.3% of them were female. The study found that children from 2 to 12 years old spent more time and used phones, tablets, and TV more frequently, while those younger than 2 or older than 12 used phones and TV more than other devices. It also found that phones and TV were used for more than 2 h each day. Moreover, high BMI was associated with daily use of electronic

devices. It also found that fewer hours of sleep, longer time it takes to fall asleep, and longer hours of time in bed were associated with the usage of all electronic devices. Furthermore, a good knowledge of the maximum time allowed for children and teenagers to use devices and the content scoring system was significantly associated with the hours slept per night, and low knowledge was associated with higher frequency of using electronic devices.

Our study found that high BMI was associated with daily usage of electronic devices. The frequency of using phones and computers and laptops had a significant association with BMI. A study published in 2015 in Canada found that exceeding 2 h of screen time was associated with higher weight and waist circumference.^[16] Moreover, a study in China found out that higher screen time was an independent risk factor for being overweight or obese.^[17] In addition, a meta-analysis of 16 studies conducted in 2019 showed that spending more than 2 h on screen was associated with childhood overweight or obesity and that the association in the separated screen time, such as using

Table 3: Relationship of body mass index to frequency of use of each electronic device among children and adolescents attending primary healthcare centers in Makkah region (n=450)

Item	BMI	
	Mean±SD	P-value
Computers and laptops		
Never	19.4±5.8	0.01
1-2 times weekly	26.0±8.4	
3-4 times weekly	26.1±4.7	
5-6 times weekly	0±0	
Daily	29.9±6.5	
Video games consoles		
Never	19.9±6.3	0.11
1-2 times weekly	20.8±6.1	
3-4 times weekly	24.8±6.1	
5-6 times weekly	26.1±6.1	
Daily	21.9±8.8	
Tablets		
Never	20.5±6.7	0.10
1-2 times weekly	20.5±6.3	
3-4 times weekly	22.1±8.9	
5-6 times weekly	15.3±1.0	
Daily	19.3±5.5	
Phones		
Never	17.8±4.7	0.0001
1-2 times weekly	18.3±4.8	
3-4 times weekly	20.7±6.8	
5-6 times weekly	20.1±7.6	
Daily	22.7±7.1	
TV		
Never	19.9±6.4	0.19
1-2 times weekly	22.7±6.7	
3-4 times weekly	23.5±8.3	
5-6 times weekly	23.0±5.6	
Daily	19.7±6.2	

BMI=Body mass index, SD=Standard deviation

a TV or computers, was more obvious than when total screen time is taken into account.^[18]

Our study also found that fewer hours of sleep, longer time it takes to fall asleep, and longer hours of time spent in bed were associated with usage of all electronic devices. Other studies had the same findings associated with electronic device usage on sleep patterns. One study published in 2018 in the United States found that digital screen time was associated negatively with sleep duration.^[19] Another study conducted in 2019 found that children between 2–5 and 6–10 years old who spent 4 h or more per day on portable devices were twice as likely to get insufficient sleep as individuals who spent no time on portable devices; and those who were 11–13 years old were 57% more likely to have sleep insufficiency if they spent 4 h on portable devices.^[20] Moreover, a study conducted in some European countries in 2018 found out that adolescents

Table 4: Relationship of body mass index with time spent on each electronic device among children and adolescents attending primary healthcare centers in Makkah region (n=450)

Item	BMI	
	Mean±SD	P-value
Computers and laptops		
None	19.5±5.9	0.006
2 h or less	26.3±8.3	
2-4 h	23.6±3.7	
4-6 h	0±0	
>6 h	29.9±6.6	
Video games/consoles		
None	20.0±6.3	0.06
2 h or less	18.0±5.0	
2-4 h	24.8±5.3	
4-6 h	27.3±7.7	
>6 h	19.5±8.6	
Tablets		
None	20.6±6.7	0.02
2 h or less	19.8±7.6	
2-4 h	17.6±5.2	
4-6 h	19.9±4.0	
>6 h	20.9±5.1	
Phones		
None	17.6±4.4	0.0001
2 h or less	17.9±4.3	
2-4 h	19.4±6.5	
4-6 h	23.6±4.8	
>6 h	25.6±7.5	
TV		
None	20.1±6.4	0.0001
2 h or less	17.7±5.2	
2-4 h	22.4±5.8	
4-6 h	22.1±9.3	
>6 h	21.4±5.3	

BMI=Body mass index, SD=Standard deviation

from 10 to 19 years old who exceeded 2 h of screen usage had 20% higher odds of reporting sleep-onset difficulties.^[21] Another study done in Brazil found that phones were associated with delayed bedtime and shortened sleep duration.^[22]

Regarding knowledge assessment for parents, the majority of responders had adequate knowledge on how much screen time children could have and the content rating systems as 77.3% knew the maximum time allowed for children to use electronic devices, and 78.7% had knowledge of the content scoring system. However, a high percentage of the children in the study used phones and TV daily, and many used them for more than 2 h each day, and they had fewer hours of sleep. One study found that children whose parents set rules for TV time were less likely to exceed recommended screen time limits.^[23] Other studies found that parental screen time practices had an influence on children’s screen time use

Table 5: Relationship between sleep patterns and the use of electronic device among children and adolescents attending primary healthcare centers in Makkah region: Frequency and time

Frequency of electronic device use	Hours in bed		Minutes before sleep		Hours slept	
	Mean±SD	P-value	Mean±SD	P-value	Mean±SD	P-value
Sleep pattern and frequency of using electronic devices						
Computers and laptops						
Never	8.7±2.7	0.01	14.9±14.8	0.008	8.3±2.6	0.01
1-2 times weekly	8.7±3.2		31.0±17.1		7.1±2.1	
3-4 times weekly	7.4±1.6		13.0±2.7		6.7±1.6	
5-6 times weekly	0		0		7±1.5	
Daily	7.5±1.7		0		6±0	
Video games consoles						
Never	8.9±2.7	0.001	17.0±16.2	0.1	8.5±2.6	0.001
1-2 times weekly	7.9±2.5		14.4±7.7		7.8±2.5	
3-4 times weekly	6.4±1.7		7±0		6.0±1.4	
5-6 times weekly	7±2.19		15±0		6.8±2.0	
Daily	7.1±1.5		0		6.3±2.0	
Tablets						
Never	8.8±2.8	0.0001	17.5±16.9	0.0001	8.3±2.6	0.0001
1-2 times weekly	7.8±1.7		12.9±5.0		7.1±2.0	
3-4 times weekly	7.9±1.5		6±0		7.5±1.2	
5-6 times weekly	9.5±0		0		8±0	
Daily	8.7±3.1		17.5±13.7		8.2±2.8	
Phones						
Never	9.7±2.8	0.003	13.8±11.9	0.0001	9.2±2.5	0.003
1-2 times weekly	8.3±1.9		10.6±3.2		7.7±2.3	
3-4 times weekly	9.7±1.67		11.8±7.0		9.6±1.7	
5-6 times weekly	8.4±1.7		13±2.7		8.2±1.8	
Daily	7.9±2.7		21.4±19.8		7.4±2.4	
TV						
Never	9.2±3.0	0.0001	21.8±15.0	0.0001	8.7±2.8	0.0001
1-2 times weekly	7.0±1.4	0.0001	14.4±4.6	0.0001	6.6±1.2	
3-4 times weekly	8.5±2.7		26.8±27.5		7.7±1.8	
5-6 times weekly	7.5±2.2		6±0		7.3±2.1	
Daily	8.7±2.6		12.9±14.0		8.2±2.6	
Sleep pattern and time spent on each electronic device						
Computers and laptops						
None	8.7±2.7	0.02	14.9±14.8	0.16	8.3±2.6	0.02
2 h less	8.6±3.2		27.1±19.1		7.0±2.1	
2-4 h	7.7±1.6		24±8.2		7.1±1.5	
4-6 h	0		0		0	
>6 h	7.5±1.7		0		7±1.6	
Video games/consoles						
None	8.9±2.8	0.0001	17.0±16.2	0.01	8.5±2.6	0.0001
2 h or less	8.2±1		11.4±4.9		7.8±0.7	
2-4 h	6.9±2.2		13.5±7.1		6.7±2.3	
4-6 h	6.6±1.7		0		6.1±1.7	
>6 h	7.2±1.6		0		6.3±1.9	
Tablets						
>6 h	8.7±2.8	0.002	17.4±16.9	0.0001	8.3±2.6	0.002
None	9.0±1.7		13.3±5.2		7.9±2.3	
2 h or less	7.7±2.1		0		7.5±2.0	
2-4 h	9.2±4.0		5.4±0.5		8.6±3.2	
4-6 h	8.0±2.8		22±10.9		7.7±2.5	
Phones						

Contd...

Table 5: Contd...

Sleep pattern	Hours in bed		Minutes before sleep		Hours slept	
	Mean±SD	P-value	Mean±SD	P-value	Mean±SD	P-value
None	9.8±2.7	0.15	13.8±11.9	0.01	9.3±2.5	0.15
2 h or less	8.9±2.3		20.6±16.8		8.4±2.6	
2-4 h	8.5±2.6		18.2±21.0		8.1±2.5	
4-6 h	7.9±2.0		17.6±19.6		7.1±1.3	
>6 h	7.2±2.5		16.3±12.0		6.7±2.1	
TV						
None	9.2±2.9	0.02	20.6±14.6	0.0001	8.7±2.8	0.02
2 h or less	9.2±2.7		13.1±13.4		8.8±2.5	
2-4 h	8.1±2.6	0.02	13.7±18.9	0.0001	7.7±2.3	0.02
4-6 h	8.5±2.2		11.5±2.4		7.4±2.1	
>6 h	7.5±2.2		18.6±19.2		7.2±2.3	

SD=Standard deviation

Table 6: Pittsburgh Sleep Quality Index score and its association with using of electronic devices among children and adolescents attending primary healthcare centers in Makkah region (n=450)

Electronic device	Low score	High score	P-value
	PSQI and frequency of using electronic devices		
Computers and laptops			
Never	378	8	0.0001
1-2 times weekly	36	0	
3-4 times weekly	16	0	
5-6 times weekly	0	0	
Daily	7	3	
Video games consoles			
Never	371	8	0.07
1-2 times weekly	14	0	
3-4 times weekly	21	0	
5-6 times weekly	6	0	
Daily	27	3	
Tablets			
Never	337	5	0.0001
1-2 times weekly	35	3	
3-4 times weekly	9	3	
5-6 times weekly	2	0	
Daily	56	0	
Phones			
Never	157	0	0.053
1-2 times weekly	42	3	
3-4 times weekly	14	0	
5-6 times weekly	15	0	
Daily	211	8	
TV			
Never	128	5	0.04
1-2 times weekly	31	0	
3-4 times weekly	30	3	
5-6 times weekly	22	0	
Daily	228	3	
PSQI and time spent on each device			
Computers and laptops			
None	383	8	0.0001
2 h or less	36	0	
2-4 h	13	0	
4-6 h	0	0	
>6 h	7	3	

Contd...

Table 6: Contd...

Electronic device	Low score	High score	P-value
PSQI and frequency of using electronic devices			
Video games/consoles			
None	365	8	0.01
2 h or less	14	0	
2-4 h	27	0	
4-6 h	13	0	
>6 h	20	3	
Tablets			
None	340	5	0.0001
2 h or less	28	6	
2-4 h	26	0	
4-6 h	11	0	
>6 h	34	0	
Phones			
None	154	0	0.052
2 h or less	88	3	
2-4 h	49	3	
4-6 h	40	0	
>6 h	108	5	
TV			
None	134	5	0.16
2 h or less	100	3	
2-4 h	85	0	
4-6 h	54	3	
>6 h	66	0	

PSQI=Pittsburgh Sleep Quality Index

and that limiting screen time was effective in preventing overweight. It also found that any interventions to reduce screen time should involve both parents.^[24,25]

Conclusion

Excessive screen time use has a negative impact on children and adolescents. Different studies found out that screen time was associated with other health issues not evaluated in our study, such as issues with vision, physical discomfort, depression, attention deficit/hyperactivity disorder, and antisocial behaviors.^[26-30] We recommend that these issues should be examined in future studies in our population. Moreover, this study was conducted before the COVID-19 pandemic and a comparative study might provide different results. Furthermore, a different approach to collecting data should be considered as we had difficulty in data collection for this research as parents thought that the completion of the questionnaire was too time consuming. Finally, conducting this study in a restricted military hospital and the length of the questionnaire were the main limitations to the use of a larger sample.

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Conflicts of interest

There are no conflicts of interest.

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