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# ELECTRONIC DEVICES USE AMONG CHILDREN'S AND ITS EFFECTS IN OBESITY, PHYSICAL ACTIVITY AND SLEEP IN WESTERN REGION, SAUDI ARABIA

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**Abstract:**

*Introduction: In the past few decades we have witnessed a sharp increase in the availability and use of electronic devices such as mobile phones, video game consoles, DVD players, television, audio players, computers and tablets. Along with this accessibility there has been an increase in media use among young people.*

*Methods and Objective: This cross-sectional study was conducted from September to October 2018 in preliminary schools of western region of Saudi Arabia to assess electronic devices use among children's and its effects in sleeping hours, obesity and physical activity.*

*Results: Majority of respondents were mothers ( 74% ), about (90%) leave at urban areas and (72%) were university graduated, Our study findings indicated that (80%) of children showed TV in regular manner, (16%) had TV at their rooms, (62%) had their own smart devices; it also concluded that children TV showed per day ranged from 2 to 6 hours with mean of 4 hours and children smart devices used per day ranged from 1 to 7 hours with the mean of 4 hours while children daily sleeping hours ranged from 6 -10 hours with mean of 8 hours. The study also shown a significant association between availability of TV at child room and child sleeping hours per day; between child physical activity and smart devices use in hours per day; between child Sleeping disorders, obesity and smart devices use in hours per day.*

**Keywords:** *TV, child room, electronic devices, smart devices, child Sleeping disorders, obesity.*

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## INTRODUCTION:

The presence of electronic screen devices in a child's bedroom and its use has gained in popularity, and children report using these devices late at night. [1-3], 71% of USA children report the presence of TV in their room. [2] Many studies have shown a significant relationship between TV time show children's obesity, [4,5] reduced physical activity levels [6,7] hign sedentary behavior [8,9] and sleeping disorder. [10,11]

So its strongly recommends that parents remove TV sets and internet-connected electronic devices from children's bedrooms. [12] Many studies also test the effects of other types of electronic devices on lifestyle and habits are scarce. Chahal et al. [6] stated that uses of different electronic devices were significantly associated with shorter sleep period, high body weight, poor diet and physical inactivity levels in children. Creating new knowledge in this field is essential in our efforts to provide effective programs and interventions aimed at improving children's health status.

## PROBLEM STATEMENT:

Obesity and overweight mainly occur as a result of an imbalance between the intake and expenditure of energy. The increase in the prevalence of childhood and teenager's obesity all over the world is a cause for concern due to the potentially devastating effects a high body mass index (BMI) can have on their health. A significant risk factor that has been associated with obesity is the extra amount of time spent on electronic devices such as television sets, cell phones, computers, video game consoles, and electronic tablets. Television viewing is undoubtedly the most extensively studied behavior worldwide, and there are certain mechanisms that link it to increased rates of obesity. These mechanisms also apply to the other aforementioned electronic devices and include the mindless consumption of junk food and sweetened beverages during the use of these devices, the lack of time available for physical activity, and the effect of food and drink advertisements seen through these platforms. [13,14] Many studies have analyzed the use of electronic devices and their contribution toward an increased Body Mass Index. This study takes this relatively new piece of technology into account.

In the Kingdom of Saudi Arabia (KSA), sedentary behavior is favored these days due to the major lifestyle changes that have taken place over the last few decades as a result of westernization, and due to globalization, which has made these electronic devices available everywhere. This has led to an increased prevalence of obesity (from 6.3-11.3%) among children and adolescents in KSA. [13]

## OBJECTIVES:

- To assess the rate of electronic devices used among children of 6 - 12 years of age
- To determine if there is any statistical relationship between electronic devices use and sleeping hours.
- To measure if there is any statistical relationship between electronic devices use, obesity and overweight.

## METHODOLOGY:

Study Design: This cross-sectional study was conducted from September to October 2018 in preliminary schools of western region of Saudi Arabia.

## SAMPLE SIZE:

According to the retrospective cross-sectional study conducted from March to June, 2015 at a selected number of ambulatory clinics in Jeddah, KSA indicated that the prevalence of Obesity was 87% of the study population [16] . Therefore accordingly sample size was calculated with following equation:

$$n = \frac{z^2 pq}{m^2}$$

where: z = z value (1.96 for 95% confidence level); p = assumed proportion = 87%; q = 1-p (complementary) = 13%; m = margin of error = 0.05; n = sample size, so the smple size was equal (1.69)2 *0.87* 0.13/ (0.05)2 = 129.2

To increase the validity and for analysis convenience, 150 students will be selected for the study.

## METHODS OF DATA COLLECTION:

### Instruments

The participants will be weighed to the nearest 0.1 kg using a single scale and their height (without shoes) will be measured to the nearest cm using a mechanical beam scale with a height rod.

### Data collection

The BMI is an easy way to screen for weight categories that may lead to health issues. The BMI (weight in kg divided by height in square meters) was calculated and the children were classified as either normal (5-85th), overweight (85-95th), obese (>95th), or severely obese (>99th) using Center for Disease Control and Prevention (CDC) growth charts[15] where the age of the child is also taken in to account.

Questionnaires will be filled from both school children and parents will be asked how long their children spent watching TV, how often they used other electronic devices, such as tablets, cell phones, video game consoles, and computers, if they asked for and consumed more junk food after viewing advertisements, and if they consumed junk food while using these devices. Junk food can be defined as types of food that are high in calories usually due to excessive sugar, fat, salt, and little nutritional value. They include fast food, sweetened beverages, candy, salted crisps, and so forth). Junk food consumption was measured based on whether children did or did not eat them while using these devices. Television and EECD usage were measured based on whether children used these for more than or less than 2 hours on an average day. Parents were also asked regarding their children's daily physical activities, particularly the time they spent exercising (less than or more than 30 minutes per day). An informed verbal consent was acquired from both the parents and children. Some results were excluded from the study as there were missing values for height and weight, and some BMI standard deviation (SD) values were out of range.

**Statistical Data Analysis**

All statistical analysis were conducted using Statistical Package for Social Sciences (SPSS 20). Collected data will be analyzed using descriptive statistics such as frequency and percentage for qualitative variables and mean and SD for quantitative variables while for advanced analysis Chi-square and t test where applicable will be used to compare between dependents and independents variables.

**Inclusion criteria:**

- Saudi Nationality
- governmental schools
- Age 6 -12 years or old

**Exclusion criteria:**

- Non Saudi Nationality
- Nongovernmental schools
- Age less than 6 years or greater than 12 years

**Ethical Approval:**

- All ethical issues should be considered during the process of this study and this study proposal should be approved from ethical committee before starting.

**Conflict of interest:**
No conflicts of interest declared.

**RESULTS:**

This study was conducted to assess electronic devices use among children's and its effects in sleeping hours, obesity and physical activity in Saudi Arabia.

As shown in table No. 1. Majority of respondents were mothers ( 74% ), about (90%) leave at urban areas, (72%) were university graduated and half of respondents their family income level ranged from 10000 to 2000 SRs, while (62%) of children participated in this study were males and only (38%) were females.

**Table1: Demographic characteristics of the Respondents'**

**N = 370**

| Variable | Sub Variable | Fr. | % |
|---|---|---|---|
| Gender of respondent | Male | 95 | 25.7 |
| | Female | 275 | 74.3 |
| Area of resident | Rural | 38 | 10.3 |
| | Urban | 332 | 89.7 |
| Educational Level | Illiterate | 3 | .8 |
| | Primary school | 11 | 3.0 |
| | Intermediate school | 19 | 5.1 |
| | Secondary school | 48 | 13.0 |
| | Diploma | 23 | 6.2 |
| | University | 266 | 71.9 |
| Gender of the child | Male | 228 | 61.6 |
| | Female | 142 | 38.4 |
| Family Income in SRs. | <10000 | 127 | 34.3 |
| | 10000 -20000 | 182 | 49.2 |
| | 20000-30000 | 47 | 12.7 |
| | >30000 | 14 | 3.8 |

Table No. 2 demonstrated the availability and child using habits of TV and smart devices, where (80%) of children showed TV in regular manner, (16%) had TV at their rooms, (62%) had their own smart devices.

**Table2: Availability of TV and smart devices within children**

**N = 370**

| Variable | Sub Variable | Fr. | % |
|---|---|---|---|
| Child TV show | Yes | 296 | 80.0 |
| | No | 74 | 20.0 |
| Availability of TV at child room | Yes | 59 | 15.9 |
| | No | 311 | 84.1 |
| Did your child have his / her own smart device | Yes | 229 | 61.9 |
| | No | 141 | 38.1 |
| Did your child have his / her own video games device | Yes | 175 | 47.3 |
| | No | 195 | 52.7 |

As shown in table No. 3 the age of respondents ranged from 27 to 47 years old with mean of 37 years and SD of 10 years while children ages ranged from 6 to 12 years old with mean of 9 years and SD of 3 years

**Table3: Mean and Standard Deviation of respondent and child age**

| | Range | Mean | Standard Deviation (SD) |
|---|---|---|---|
| Age of respondents in years | 27 - 47 | 37 | 10 |
| Age of child | 6 - 12 | 9 | 3 |

Table No. 4 indicated that respondents TV showed per day ranged from 3 to 7 hours with mean of 5 hours and SD of 2 hours, while children TV showed per day ranged from 2 to 6 hours with mean of 4 hours and SD of 2 hours, also this table demonstrated that Children smart devices used per day ranged from 1 to 7 hours with the mean of 4 hours and SD of 3 hours while Children daily sleeping hours ranged from 6 -10 hours with mean of 8 hours and SD of 2 hours

**Table4: Mean and Standard Deviation of respondent and child TV show and smart devices used times per day and child sleeping hours per day**

| | Range | Mean | Standard Deviation (SD) |
|---|---|---|---|
| Parents TV show and smart devices used per day in hours | 3 - 7 | 5 | 2 |
| Children TV show per day in hours | 2 - 6 | 4 | 2 |
| Children smart devices used per day in hours | 1 - 7 | 4 | 3 |
| Children daily sleeping hours | 6 - 10 | 8 | 2 |

Table No. 5 reflected that the prevalence physical inactivity, sleeping disorders and obesity among children were 71%, 80% and 18% respectively.

**Table5:  Prevalence of  sleeping disorders, physical inactivity and obesity among children**

**N = 370**

| Variable | Sub Variable | Fr. | % |
|---|---|---|---|
| Did your child do regular physical activity | Yes | 108 | 29.2 |
| | No | 262 | 70.8 |
| Did your child have any sleeping disorder | Yes | 73 | 19.7 |
| | No | 297 | 80.3 |
| Did your child suffer any type of obesity | Yes | 65 | 17.6 |
| | No | 305 | 82.4 |

As shown in tables No 6, 7, 8 and 9, there was statistically significant association between availability of TV at child room and child sleeping hours per day; between child physical activity and smart devices use in hours per day; between child Sleeping disorders, obesity and smart devices use in hours per day p value < 0.05.

**Table 6: Independent t test between availability of TV at  child room and child sleeping hours per day**

| | TV at child room | N | Mean | Std. Deviation | P Value |
|---|---|---|---|---|---|
| Child sleeping hours per day | Yes | 59 | 6.3 | 1.4 | 0.03 |
| | No | 310 | 8.1 | 1.5 | |

* There was statistically significant association between availability of TV at  child room and child sleeping hours per day; p value < 0.05.

**Table 7: Independent t test between child physical activity,  Child TV show in hours per day  and Child smart devices use in hours per day**

| | Physical activity | N | Mean | Std. Deviation | P Value |
|---|---|---|---|---|---|
| Child TV show in hours per day | Yes | 107 | 2.8 | 2.8 | 0.42 |
| | No | 260 | 3.2 | 2.4 | |
| Child smart devices use in hours per day | Yes | 108 | 2.9 | 2.4 | 0.01 |
| | No | 262 | 3.9 | 3.5 | |

* There was statistically significant association between child physical activity and smart devices use in hours per day; p value < 0.05.

**Table 8: Independent t test between child Sleeping disorders,  Child TV show in hours per day  and Child smart devices use in hours per day**

| | Sleeping disorders | N | Mean | Std. Deviation | P Value |
|---|---|---|---|---|---|
| Child TV show in hours per day | Yes | 73 | 3.1 | 2.7 | 0.88 |
| | No | 294 | 3.1 | 2.5 | |
| Child smart devices use in hours per day | Yes | 73 | 4.3 | 3.7 | 0.03 |
| | No | 297 | 3.4 | 3.1 | |

* There was statistically significant association between child Sleeping disorders and smart devices use in hours per day; p value < 0.05.

**Table 9: Independent t test between child obesity, Child TV show in hours per day  and Child smart devices use in hours per day**

| | Child Obesity | N | Mean | Std. Deviation | P Value |
|---|---|---|---|---|---|
| Child TV show in hours per day | Yes | 64 | 3.1 | 2.6 | 0.83 |
| | No | 303 | 3.0 | 2.5 | |
| Child smart devices use in hours per day | Yes | 65 | 4.6 | 3.1 | 0.005 |
| | No | 305 | 3.3 | 3.2 | |

* There was statistically significant association between child obesity and smart devices use in hours per day; p value < 0.05.

## DISCUSSION:

In the last few decades there were a dramatic increase in the presence, ownership and use of electronic devices such as smart devices, mobile and cell phones, video games, DVD players, audiovisual players and TV shows[17,18]

Our study findings indicated that (80%) of children showed TV in regular manner, (16%) had TV at their rooms, (62%) had their own smart devices; it also concluded that children TV showed per day ranged from 2 to 6 hours with mean of 4 hours and children smart devices used per day ranged from 1 to 7 hours with the mean of 4 hours while children daily sleeping hours ranged from 6 -10 hours with mean of 8 hours. Similar study found that children and youths, use media for at least 7.5 h per day [19]. Much of the media consumption time (20%) is spent on mobile devices, such as cell phones, tablets or hand-held videogame players [20], Also Calamaro et al. [21] showed that children ages 6–10 years with three technology types in their bedroom achieved 45 min less sleep than those without.

Generally obesity occurs due to an imbalance between the intake and expenditure of energy. The high prevalence of obesity among children worldwide potential effects on their health. An essential risk factor that has been associated with this problem is the reasonable amount of time spent on electronic devices , such as television sets, cell phones, computers, video games, and electronic tablets. Our finding also shown significant a significant association between availability of TV at child room and child sleeping hours per day; between child physical activity and smart devices use in hours per day; between child Sleeping disorders, obesity and smart devices use in hours per day p value $< 0.05$.

Similar study conducted in USA suggested that bedtime television viewing may lead to reduction in sleeping period by approximately 20 min compared to those who do not engage in this activity. Although another group found a relationship between long duration of television viewing and prolonged SOL[22]. Our results also agree with other previous studies showing that the presence of TV in children's bedrooms and use of different electronic devices is associated with increased risk of excess body weight and obesity.[23, 24, 25]

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