



The Relation Between Developing Childhood Obesity, TV Watching, Electronic Media and Sleeping Hours

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Abstract

We aimed to study associations between the childhood obesity, sleep duration and screen time regarding watching TV and using computer. **Methodology:** Our study included 72 patients between < 6 and 18 years, of the 72 children 38 obese children (52.8%) and 34 control cases (47.2%) have been recruited from the outpatient clinic of Pediatrics at National Nutritional Institute from September 2013 to March 2014 using anthropometric measurements, sleeping hours during daytime and weekends, TV watching & computer hours. **Results:** In our study, there was 33 male child, 16 (48.5%) of them were obese and 17 (51.5%) were in the control group, there was 39 female child, 22 (56.4%) of them were obese while 17 (50%) were in the control group (43.6%). The mean BMI of the obese group was 31.5 ± 6.1 while the control group was 14.5 ± 1.3 . But in day sleep there was significant correlation between number of hours that the child sleeps during the day and there was significant correlation between the number of hours spending in watching TV and childhood obesity, during weekends obese children watch TV more than controls but in terms of using computer, the controls spend more hours using computer in the weekends than the obese group. There was an insignificant relation between the number of hours in outdoor playing on the weekdays between both groups while on weekends there was significant correlation between numbers of spent in outdoors playing and obesity. **Conclusion:** Obese children sleep more during the day on the weekdays and the weekends but not at night. During weekends obese children watch TV more but in terms of using computers, the controls spend more hours using computer at the weekends. During weekends obese children play outdoors less than the controls.

Keywords

Childhood Obesity; Sleep Hours; Outdoor Playing; TV Watching

1. Introduction

One of the most severe public health obstacles to the 21st century is obesity in children. The issue is of global scope and is having a consistent impact on numerous low- and middle-income countries, especially in urban areas. The prevalence has risen at an alarming rate. Over forty-two million infants under the age of five are evaluated to be overweight on a global scale in 2013. Nearly thirty-one million of these individuals reside in developing countries [1].

The prevalence of childhood obesity and overweight has risen dramatically in recent decades, which raises serious concerns due to the long-term health implications, such as metabolic, musculoskeletal, and cardiovascular diseases. Obesity during childhood is likely to persist into adulthood, potentially leading to metabolic, musculoskeletal, or

cardiovascular illnesses, as well as an increased possibility for cancer [2].

The occurrence of adolescent overweight and obesity has elevated significantly in the countries of the Middle East and North Africa (MENA) region in recent years [3].

According to Kelishadi *et al.* [4], the occurrence of overweight and obesity in childhood in Iran doubled between 1993 and 1999, making it one of the seven countries with the greatest occurrence of obesity in childhood. A national investigation conducted in twenty-two provinces on kids and teens aged six to eighteen reported prevalence rates of 8.82 percent and 4.5 percent at risk of overweight, respectively, in accordance with the CDC criteria [5]. According to Rashidi *et al.* [6], the occurrence of overweight and obesity in Iranian kids and teens is 10.8 percent and 5.1 percent, respectively, as determined by a meta-analysis of 107 investigations.

Obesity is on the increase in developing countries, involving India, at all ages. According to a report from urban South India, 21.4 percent of boys and 18.5 percent of girls between the ages of thirteen and eighteen were overweight or obese [7]. The occurrence of obesity among school students in India has been reported to differ from 5.74 percent to 8.82 percent [8].

The lives of millions of individuals are being impacted by the epidemic levels of childhood and adolescent obesity in the States. The occurrence of obesity in childhood has increased by over twofold in children and by threefold in adolescents over the past three decades [9]. As per the most recent data from the National Health and Nutrition Examination Survey, the prevalence of obesity among kids and teens in the States was 18.5 percent in 2015-2016. In general, the prevalence of obesity was higher among adolescents (twelve to nineteen years; 20.6 percent) and school-aged kids (six to eleven years; 18.4 percent) than among preschool-aged kids (two to five years; 13.9 percent). Obesity was more prevalent among school-aged boys (20.4 percent) than preschool-aged boys (14.3 percent). The obesity prevalence among adolescent girls was 20.9 percent, which was greater than that of preschool-aged girls (13.5 percent). Furthermore, obesity rates have been consistently increasing from 1999-2000 to 2015-2016 [10]. In 2010, Ahmad *et al.* [11] Found that eighty percent of adolescents aged between the ages of ten and fourteen. Twenty-five percent of kids under the age of 5 and fifty percent of kids aged between the ages of six and nine who are obese are at risk of becoming adults with obesity.

155 million kids of school age and over twenty-two million kids under the age of five are severely overweight on a global scale. This suggests that one in ten adolescents worldwide are overweight. This global average is indicative of a broad spectrum of occurrence levels. Between 1992 and 2001, it was approximated that approximately 23.5 million school-aged kids in the eastern Mediterranean region were overweight or obese. This figure nearly doubled to 41.7 million by 2010. The UAE countries have the second highest occurrence of overweight and obesity in the globe, following the United States, and surpassing European countries [12].

Kids in Egypt 2015 is a statistical compilation that was developed by United nations international Children's Emergency Fund Egypt to provide current and high-quality data on the primary aspects of kid's well-being. This chapter includes statistics on the status for kids in Egypt in 2015, as overweight and obesity among adolescents and adults.

In kids, the term "overweight" is frequently utilized due to its less stigmatizing connotations [13]. A medical condition known as obesity is characterized by the accumulation of excessive body fat to the point that it might have a detrimental impact on one's health, resulting in decreased lifespans and/or a rise in health issues [14].

Weight alone is not a reliable indicator of fatness, as it does not account for height. The World Health Organization and the International Obesity Task Force [IOTF] have established the most acceptable definition of obesity in terms of body mass index (BMI) [15]. BMI is determined by dividing the square of the individual's height in meters by their weight in kilograms. BMI is frequently referred to as BMI-for-age in the context of infants and adolescents, as it is gender- and age-specific. The BMI categories utilized in adults are not used to ascertain the weight status of a child; instead, a percentile for BMI that is age- and sex-specific is utilized. This is since the composition of bodies of kids changes as they age and between girls and boys. Consequently, it is necessary to articulate the BMI levels of kids and teenagers in relation to other kids of the same age and gender.

People are classified as overweight (pre-obese) if their body mass index (BMI) is twenty-five to thirty kilogram/meter², and obese if it is greater than thirty kilogram/meter² [16]. Body mass index is a measure utilized to ascertain adolescent obesity and overweight. A body mass index that is more than the eighty-fifth percentile and below the ninety-fifth percentile for kids and teens of the same age and gender is considered overweight. Obesity is defined as a body mass index that is at or above the ninety-fifth percentile for kids and teens of the same age and gender [17]. In addition to serving as a result measure for obesity, body mass index is also a valuable anthropometric index for cardiovascular risk [18].

Physical inactivity, genetic background, and the consumption of foods with great energy density, such as those rich in fats, extracted sugars, and refined carbohydrates, are all contributing factors to the development of obesity or overweight [19]. In recent years, there was greater emphasis on the potential impact of sleep duration as a risk factor for obesity. Several investigations have demonstrated that weight gain in kids as well as adults is correlated to inadequate sleep duration [20].

The alterations in lifestyles are one of the primary factors that have been proposed as contributing to the emerging obesity epidemic. Today, kids may spend more duration engaging with electronic media than they do with any other activity, except for napping. Personal computers (PC), smart phones, Televisions (TV), or game consoles are frequently utilized concurrently, all of which promote sedentary behavior that is associated with a rise in the occurrence of obesity [2].

Obesity has been demonstrated to decrease life expectancy by seven years at the age of forty [21]. Additionally, the hazards of diabetes, hypertension, and dyslipidemia rise from a body mass index of approximately twenty-one kilogram/meter², which results in a significant rise in the societal and health economic burden and a reduction in life expectancy [22]. Kids who are overweight or obese are more likely to experience a variety of problems related to health. Obesity during childhood also poses health risks in maturity. Not only are health problems associated with obesity physical, but they are also psychological and social in nature. Kids with obesity are at an elevated risk of developing cardiovascular illnesses, high blood pressure, and elevated levels of cholesterol [23].

Childhood adiposity elevates the possibility of developing insulin-resistant type 2 diabetes and respiratory ailments such as asthma. Obesity induces sleep apnea and shortness of breath. The physical effects may also negatively impact the musculoskeletal system, resulting in bone and muscle disorders and distress because of the elevated weight on the joints [24]. This work aimed to study associations between the childhood obesity, sleep duration and screen time including time spend watching TV and using computer.

2. Material and Methods

This study is a case-control study included 72 patients between < 6 and 18 years of the 72 children 38 obese children (52.8%) and 34 control cases (47.2%) have been recruited from the outpatient clinic of Pediatrics at National Nutritional Institute from September 2013 to March 2014 using anthropometric measurements including weight, height, weight for height, BMI using childhood CDC percentiles.

2.1 Population of Study

Group 1: 38 obese children ($\geq 95^{\text{th}}$ BMI percentile for age and sex) recruited from Childhood Obesity Clinic at National Nutrition Institute.

Group 2: 34 healthy children with matched age and sex as controls.

Inclusion Criteria: *Group 1:* Children with uncomplicated obesity (BMI $> 95^{\text{th}}$ percentile for age and sex according to CDC growth charts). *Group 2:* Healthy unobese Children (BMI $< 90^{\text{th}}$ percentile) according to CDC percentiles Child Growth charts with matched age and sex.

2.2 Exclusion Criteria

Identified causes of obesity like: Obese children due to any identified syndromes, chromosomal defects or endocrine disorders, or obese kids who receive treatment with medications that may affect body weight if utilized in an extended period, such as glucocorticoid.

- (1) **History taking; Personal History:** age (date of birth), address name, and gender.
- (2) **Medical History:** History of any present or past illness, history of medication intake.

History of number of sleeping hours at night and sleeping hours a daytime in weekdays and weekends. regarding outdoor playing hours during weekdays and weekends, TV watching and computer time during weekdays and weekends.

- (3) **Physical examination:** Complete physical examination, anthropometric measurements included weight, height and BMI (weight/height²).

3. Results

This study included 72 patients of the 72 child 38 obese child (52.8%) and 34 control cases (47.2%) and have been

recruited from the outpatient clinic of Pediatrics of National Nutritional Institute from September 2013 to March 2014. In our study, there was 33 male children, 16 of them were obese (48.5%) and 17 were in the control group (51.5%), there were 39 female children, 22 of them were obese (56.4%) while 17 were in the control group (43.6%). In our study, Among the participants under 6 years of age, 8 children were included, with 4 being classified as obese and 4 as controls. Between 6 and 12 years old, we had 50 children 26 of them were obese (52%) while 24 of them belong to the control group (48%). At 12 years old, we had 14 children, 8 of them are obese (57.1%) while 6 of them belong to the control group (42.9%). Of the 38 obese children, the mean of weight is 58.9 ± 21.9 while in the control group; the mean of weight is 21.3 ± 5.5 . In the obese group, the mean of height is 134.8 ± 15.8 while in the control group; the mean of height is 120 ± 12.7 . In the obese group, the mean of the body mass index was 31.5 ± 6.1 while in the control group were 14.5 ± 1.3 (**Table 1**).

Table 1. The descriptive data of the investigation

Variable		Cases (obese) 38 (52.8%)	Control 34 (47.2%)	P value
Sex	Females	56.4%	43.6%	0.065
	Males	48.5%	51.5%	
Age/year	< 6 years (8)	4(50%)	4 (50%)	0.598
	6-12 years (50)	26 (52%)	24 (48%)	
	≥ 12 years (14)	8 (57.1%)	6 (42.9%)	
Age/year		9.2 ± 3.1	8.4 ± 2.5	0.240
Weight		58.9 ± 21.9	21.3 ± 5.5	0.000
Height		134.8 ± 15.8	120 ± 12.7	0.000
BMI		31.5 ± 6.1	14.5 ± 1.3	0.000

Table 2 shows when comparing the number of sleeping hours at night between the obese and the control group was insignificant in both weekdays and weekends. A significant association was observed between increased daytime sleep hours and obesity in both weekdays and weekends, with obese children sleeping more during the day compared to controls. **Table 3** shows that in our study, there is significant association between the number of hours spending in watching TV and childhood obesity, in our study during weekends obese children watch TV more than control cases but in terms of using computer, the control group spends more hours using computer in the weekends than the obese child.

Table 2. The number of sleeping hours at night and day sleep in weekdays and weekends and its relation to obese group and control group

Variable		Cases (obese) 38 (52.8%)	Control 34 (47.2%)	P value
weekdays Sleep at night	> 7 hours	84.2%	91.2%	0.372
	< 7 hours	15.8%	8.8%	
	None	73.4%	67.6%	
Day sleep	> 2 hours	18.4%	5.9%	0.048*
	< 2 hours	7.9%	26.5%	
weekends Sleep at night	> 7 hours	91.2%	91.2%	0.887
	< 7 hours	7.9%	8.8%	
	None	84.2%	84.2%	
Day sleep	> 2 hours	15.8%	2.9%	0.004*
	< 2 hours	0%	14.7%	

Table 3. The number of watching TV and using computer in weekends and its relation to obese group and control group

Variable	Cases (obese) 38 (52.8%)	Control 34 (47.2%)	<i>P</i> value
Number of hours watching TV in weekends	Never	7.9%	0%
	< 1 hour	0%	14.7%
	1 hour	26.3%	29.4%
	2 hours	26.3%	35.3%
	≥ 3 hours	68.2%	31.8%
Number of hours using computer in weekends	Never	63.2%	29.4%
	< 1 hour	0%	14.7%
	1 hour	18.4%	23.5%
	2 hours	7.9%	23.5%
	≥ 3 hours	10.5%	8.8%

Table 4 shows that there was significant correlation between the number of hours spending in watching television and playing on a computer and childhood obesity, in our study during weekdays obese children watch TV and play on a computer more than control cases. **Table 5** shows that there was insignificant relation between number of hours spend in outdoor playing in the weekdays between both groups while in weekends there was significant correlation between numbers of hours spend in outdoors playing and obesity, during weekends the obese children play outdoors less than the control group.

Table 4. The number of hours watching television and using computer in weekdays and its relation to obese and control group

Variable	Cases (obese) 38 (52.8%)	Control 34 (47.2%)	<i>P</i> value
Number of hours watching TV in weekdays	Never	7.9%	0%
	< 1 hour	0%	17.6%
	1 hour	5.3%	20.6%
	2 hours	13.2%	5.9%
	≥ 3 hours	73.7%	55.9%
Number of hours using computer in weekdays	Never	36.8%	29.4%
	< 1 hour	0%	14.7%
	1 hour	18.4%	8.8%
	2 hours	23.7%	2.9%
	≥ 3 hours	21.1%	20.8%

Table 5. The number of hours spend in outdoors playing in both obese and control groups

Outdoor weekdays	Never	76.3%	41.2%	0.050
	< 1 hour	5.3%	14.7%	
	1 hour	5.3%	8.8%	
	2 hours	5.3%	11.8%	
	≥ 3 hours	7.9%	23.5%	
Outdoor weekends	Never	65.8%	20.6%	0.002*
	< 1 hour	2.6%	11.8%	
	1 hour	13.2%	11.8%	
	2 hours	5.3%	20.6%	
	≥ 3 hours	13.2%	35.3%	

Table 6 showed that there was insignificant correlation between the educational level of the mother and both groups.

Table 6. The relation between the educational level and the prevalence of childhood obesity

	Illiterate	0.0%	5.9%	
Educational level	1ry	5.3%	14.7%	0.083
	2ry	34.2%	44.1%	
	bachelor	60.5%	35.3%	

4. Discussion

The increasing incidence of obesity and overweight in kids over the past few decades is concerning. The alterations in lifestyles are one of the primary factors that have been proposed as contributing to the emerging obesity epidemic. Currently, kids may spend more time with electronic media than with any other activity, except for resting [25]. Televisions, personal computers, smart phones, or game consoles are frequently utilized concurrently, all of which promote sedentary behavior [2].

In our study, a significant correlation has been observed between the number of hours spending in watching TV and childhood obesity, in our study during weekends obese children watch TV more than control cases but in terms of using computer, the control group spends more hours using computer in the weekends than the obese child. In our investigation, a significant correlation has been observed between the number of hours spending in watching television and playing on a computer and childhood obesity, in our study during weekdays obese children watch televisions and play on a computer more than control cases. There was an insignificant relation between number of hours spent outdoor playing in the weekdays between both groups while in weekends there was significant correlation between numbers of hours spent in outdoors playing and obesity. During weekends the obese children play outdoors less than the control group. Our investigation comes in accordance with the investigation performed by our findings align with Mushtaq *et al.* [26] who found that sedentary behavior, including screen time exceeding one hour per day, was significantly associated with overweight and obesity in children. They revealed that kids who engaged in a sedentary lifestyle for more than one hour per day (forty-nine percent) were significantly more possibly to be overweight and obese, while those who participated in physical activity for more than two hours per week (fifty-three percent) were significantly less likely to be obese and overweight. Gomez *et al.* [27], Matheson *et al.* [28], and Ekelund *et al.* [29] reported that overweight was independently correlated with physical activity and sedentary lifestyle.

Our findings in accordance with the investigation performed by Appelhans *et al.*, [30] who stated that the weight status of children was indirectly associated with various aspects of the social and physical home environment through their screen time. Additionally, Dennison *et al.* [31] discovered that the prevalence of obesity increases by two percent for each additional hour of television viewing per day. Our research was consistent with the findings of Suresh *et al.* [32], who discovered that television viewing during adolescence had an impact on the change in body mass index over time. The most frequent TV viewers experienced excess gains of 0.011 to 0.013 kilograms per square meter per year. Sedentary lifestyles are induced by television viewing, which in turn leads to an increase in television viewing among kids. Consequently, this creates a vicious cycle. Additionally, watching television results in exposure to advertisements for food products, which influences the duration of food consumption in the form of saturated fat, simple carbohydrates, a reduction in the consumption of fruits and vegetables, and lower consumption of milk and yogurt [2].

In our study, the comparison of the number of sleeping hours at night between the obese and the control group was insignificant in both weekdays and weekends. But in day sleep a significant correlation has been observed between number of hours that the child sleeps during the day and the obese group at the weekdays and weekends (the obese group sleep more during the day than the control group in the weekdays and the weekends). Our research was consistent with the findings of Börnhorst *et al.* [2], who observed that the mean sleep duration was comparable between the thin/normal weight and overweight/obese children's groups. Our results were in contradiction to those of Miller *et al.* [33], who observed that most investigations investigating the correlation between daytime napping and adiposity in young kids have not identified any associations.

5. Recommendations and Conclusion

- Lifestyle modifications, such as increasing physical activity during the day and reducing sedentary behaviors like TV watching, could be effective interventions for improving weight status in children. Limiting screen time and promoting outdoor play may help prevent and manage childhood obesity.
- Remove TV from kid's bedrooms, which is usually addressed in pediatric weight management interventions can limit sedentary activities and limit consumption of unhealthy food and exposure to food advertisement.
- More studies on use computer games and their effect on weight as more physical and mental use can improve weight.

Sources of Support

None.

Competing Interests

The authors have nothing to disclose.

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