

SEDENTARY BEHAVIOR RELATED TO OVERWEIGHT AND OBESITY IN CHILDREN AND ADOLESCENTS

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Abstract

This study aimed to investigate the relationship of time spent on TV and in the use of computer and video game with overweight and obesity in children and adolescents. The sample was composed by 114 individuals. The time spent watching TV as well as the use of the computers and of the video games was obtained by recall questionnaire. The cutoff used was 120 minutes. The body mass and height were measured to calculate the BMI and the nutritional status was determined by the protocol proposed by Conde and Monteiro (2006). Logistic regression was used to obtain odds ratio, with confidence interval of 95% ($p < 0.05$). Individuals who spent more than 120 minutes per day with computers and/or video games have 2.6 times more chance to present excess of weight.

Keywords: Sedentary Behavior - Overweight and Obesity - Children and Adolescents

Introduction

The World Health Organization (WHO, 2000) indicates overweight and obesity as major public health problems, assuming epidemic proportions worldwide.

The prevalence of overweight in pediatric populations has increased alarmingly, and in some Brazilian cities overweight now affects around 30% of children and adolescents (BALABAN; SILVA; MOTTA, 2001; RETECHUKI et al., 2005).

Its incidence has multifactorial character and is associated with the emergence of other diseases, this being an important risk factor for cardiovascular disease both in children and adolescents (BALABAN; SILVA; MOTTA, 2001; ABRANTES; LAMOUNIER; COLOSIMO., 2002; MELLO ; LUFT, MEYER, 2004; DANIELS et al., 2005; STABELINI NETO et al., 2008).

The decrease in physical activity and the joint increase in time spent on electronics favor the elevation of body weight (PEREIRA; FRANCISCHI; LANCHÁ JÚNIOR, 2003; MASCARENHAS et al., 2005) and, in children and adolescents, this behavior is influenced by the process of industrialization and the availability of technology, which favors the increase of time spent on activities of low energy expenditure (MASCARENHAS et al., 2006; BERGMANN; HALPERN; BERGMANN, 2008).

Among these electronics, the time spent in front of the TV, computer and video games seems to be related directly to rates of overweight and obesity in pediatric populations (ROBINSON, 1999; JAKES et al., 2003; MASCARENHAS et al., 2004). Thus, the American Academy of Pediatrics (2001) recommends that children and adolescents do not spend more than 120 minutes per day with these electronics.

The association of this sedentary behavior in overweight and obesity has been shown in previous studies (ROBINSON, 1999; CRESPO et al., 2001; JASSEN et al., 2004; MASCARENHAS et al., 2005), yet, little has been studied on this association in Brazilian children and adolescents (CAMPAGNOLO; VITOLO; GAMA, 2008).

Thus, this study examined the relationship between time spent watching television and using computers and / or video games with overweight and obesity in children and adolescents in the city of Jacarezinho-PR.

Materials and methods

Population and sample

This study was conducted in accordance with the resolution 196/96 of the National Health Council and approved by the Ethics Committee at the Federal University of Paraná, Process No. 2004015187.

This research was conducted with children and adolescents aged between 6 and 14 years of three schools in the town of Jacarezinho, Paraná. Consent forms were given to 210 individuals; nevertheless, only 114 have obtained the consent of their parents or guardians to participate in the study, being 53 (46.5%) females and 61 (53.4%) males.

Instruments and procedures

All volunteers underwent assessment of body mass (BM) and stature. For the evaluation of body mass, we used a portable digital anthropometric scale (Plenna ®), with graduation of 0.1 kg and 180 kg capacity, regulated according to the Decree 236/94 of INMETRO. The evaluated individuals were barefoot, wearing light clothes and were instructed to distribute their body weight equally between both feet (HEYWARD; STOLARCZYK, 1996).

Height was measured using a stadiometer (Seca ®), wall mounted with graduation of 0.1 cm and maximum score of 220 cm measured from the floor base. The individuals were barefoot, with the weight distributed between the feet and arms relaxed. They were also instructed to remain as much upright as possible. The head was positioned so that the face remained upright and at the time of measurement, the individual made a forced inspiration and the stadiometer was placed on the highest point of the head, compressing the hair (HEYWARD; STOLARCZYK, 1996).

Body mass index (BMI) was obtained from the ratio of body weight (in kilograms) by the square of the height (in meters) and it was expressed as kg / m^2 (QUETELET, 1970).

The BMI classification was made by means of tables for references to gender and age group proposed for Brazilians classifying individuals as underweight, eutrophic, overweight and obese (CONDE; MONTEIRO, 2006). However, none of the study participants had low

weight and only 5 were obese, thus, in order to perform the analysis, children and adolescents were classified as Eutrophic and Overweight (overweight + obesity).

The identification of time spent watching TV and using the computer and / or video game was made through a recall questionnaire answered by the participant, applied as an interview concerning the three days of the week (Wednesday, Thursday and Sunday), where the average time spent in those days was used in the analysis. This questionnaire involved the following issues: a) How much did time you spend watching TV last Wednesday, Thursday and Sunday? B) How long did you spend using the computer and / or video game in last Wednesday, Thursday and Sunday?

The time spent watching TV and using computer and / or video game was achieved in hours per day and subsequently converted into minutes per day (minutes / day). As for time spent on computer and / or video game, subjects were instructed to add the times of the two components (time spent using the computer + time spent using the video game) when they made use of these components in a single day.

Individuals were categorized according to the cutoff point proposed by the American Academy of Pediatrics (2001), which recommends a maximum length of stay of 120 minutes daily in front of the TV or computer.

Statistical analysis

The descriptive method was used to characterize the sample, whereas the frequency distribution was used to identify the prevalence of overweight and time spent with TV and computers and / or video game.

The t test for independent samples was used to check for differences between the observed variables in boys and girls.

To identify the relationship between the variables of time spent with TV and computers and / or video games with nutritional status, we used logistical regression, taking as reference the group that presented less time spent with these electronics (up to 120 minutes / day). The confidence interval was set at 95% and the level of significance was 5% for all analysis. All data processing was performed by using the software Statistical Package for Social Sciences ® (SPSS) version 15.0.

Results

For the total sample, there was a mean age of 10.2 ± 1.6 years, BM, 37.6 ± 10.8 kg, height 1.41 ± 0.10 m and BMI of 18.4 ± 3.2 kg / m². Table 1 presents the sample characteristics according to gender.

Table 1: Minimum, maximum, mean values and standard deviation (values of t and p) of the variables studied according to gender.

	Boys (N= 61)			Girls (N= 53)			t	p
	Mean/ DP	Min.	Max.	Mean/ DP	Min.	Max.		
Age (years)	10.3 ±1.7	6.0	13.8	10.1±1.6	7.0	13.0	-0.51	0.61
BM (Kg)	37.6±11.1	20.0	65.8	37.6±10.6	22.0	65.0	0.00	0.99
Height (m)	1.4±0.1	1.2	1.7	1.4±0.1	1.2	1.6	0.08	0.93
BMI (Kg/m ²)	18.3±3,0	13,4	26,0	18.5±3.5	13.3	31.4	0.62	0.83
TV (minutes/day)	156.4±79.9	60	420	191.3±95.6*	0	420	2.19	0.03
Computer and /or VG (minutes/day)	131.8±90.9	0	420	148.3±106.9	0	360	0.89	0.37

According to the results presented, it was found that on average, girls spend more time watching TV than boys ($t = 2.19$, $p = 0.03$). However, when analyzed the remaining variables there was a similarity between genders.

Overweight was observed in 35.1% of the sample and, after analysis according to gender, it was noticed that 31.1% of boys and 39.6% of girls were overweight.

Table 2 presents the proportion of individuals according to the categories of time spent watching TV and computer and / or video game, according to gender.

Table 2: Prevalence of categories of time spent watching TV and using computers and/or video game, according to gender

Boys			
Time		Television	Computer and/or video game
Up to 120 min./day	N	39	42
	%	63.9	68.9
More than 120 min./day	N	22	19
	%	36.1	31.1
Girls			
Time		Television	Computer and/or video game
Up to 120 min./day	N	20	34
	%	37.7	64.2
More than 120 min./day	N	33	19
	%	62.3	35.8

Concerning the relationship between time spent on sedentary behavior and overweight and obesity, table 3 shows the odds ratio of overweight estimated for each electronic analyzed in this study, and their prevalence according to nutritional status.

Table 3: Prevalence of time spent daily on television and computer and / or video game, and estimated odds ratio (OR) and confidence intervals (CI 95%) according to nutritional status

Time spent watching television				
Time	Eutrophical	Overweight	OR (CI 95%)	P
Up to 120 min./day	527%	50%	1	-
More than 120 min./day	47.3%	50%	1.11 (0.516 – 2.406)	0.78

Time spent on computer and/or video game				
Time	Eutrophical	Overweight	OR (IC 95%)	P
Up to 120 min./day	74.3%	52.5%	1	-
More than 120 min./day	25.7%	47.5%	2.62 (1.16 – 5.89)	0.02

OR: odds ratio; CI: Confidence interval

Discussion

The rates of overweight evidenced in this research, whether general (35.1%) or according to gender (31.1% in boys and 39.6% in girls) exceed those reported by Salomons, Rech and Loch (2007), which showed rates of 20.9% in children of the town of Arapoti-PR, which also exceeded those reported by Abrantes, Lamounier and Colossimo (2002) in children and adolescents in the Southeast and Northeast of Brazil.

Regarding the time spent watching television; this research found that girls spent on average more time watching TV than boys (191.3 ± 95.6 minutes / day vs. 156.4 ± 79.9 minutes / day). Literature shows itself contradictory regarding hours spent watching television between genders during adolescence, which demonstrates the need for further studies of this nature (MASCARENHAS et al., 2003; BERCEDO SANZ et al., 2005; CAMPAGNOLO; VITOLO; GAMA, 2008). However, females become less engaged in physical activities, and this in turn is inversely correlated with time spent on sedentary behaviors, thus, there is a greater tendency for girls to spend more time in sedentary activities (NADER et al., 2008), moreover, another important fac-

tor is the increased participation of girls in domestic-oriented activities and, thus, they would spend more time inside their homes (WAGNER, 2005).

Compared to the average time of computer use, it showed no significant differences when comparing boys and girls. However, both genders spent more time watching TV and using computers and / or video games than recommended by the American Academy of Pediatrics (2001).

As the ratio of time spent in sedentary behavior, there was no association between time spent watching TV with the change in body weight, possibly because the prevalence of individuals above the cutoff point of 120 minutes to be similar between normal weight and overweight individuals.

Gortmaker et al. (1996) found an odds ratio higher than reported in this study as well as Rosendo da Silva and Malina (2003) who found a significant relationship in TV viewing time with excess weight presenting odds ratios ranging from 1.17 to 2.35, from 1-5 hours of television per day, representing an increase of 17% probability of overweight for each additional hour of television.

Nonetheless, these results do not confirm the finding of this study since there are differences in data processing, where the study by Gortmaker et al. (1996) the cutoff point used was less than 5 hours of TV daily and the study of Rosendo da Silva and Malina (2003) the analysis was multiple, setting the odds ratios for each additional hour watching TV, and these factors may influence the comparison of results, as well as the use of samples from different regions.

By analyzing the time spent on computers and / or video games, it was found that individuals who spend more than 120 minutes per day are approximately 2.6 times more likely to present overweight. Silva et al. (2008) also showed that boys who spend more time in use of computers and video games are more likely to have excess body weight (OR = 1.40).

The likelihood of developing overweight and obesity, from the time spent in activities such as watching television or using computers and video games may be related to decreased physical activity and, consequently, to the lowest daily energy expenditure, besides the time spent in front of the screen to be related to a higher intake of calories and fatty foods, as previously reported in literature (BOYTON-JARRET et al., 2003; GIAMMATTEI et al., 2003; LANNINGHAM-FOS-

TER et al., 2006; EPSTEIN et al., 2008). Other factors such as hormonal disorders, such as hypothyroidism can also influence in overweight, in contrast hypothyroidism alone is not responsible for overweight, being also dependent on environmental factors (ZAMBOM et al., 2009), in addition to that, the prevalence of this dysfunction in pediatric populations is minimal, with values around 0.11% (HUNTER et al. 2000), hence, not significantly influencing the results of this study.

Faced with the need to reduce the time spent by children and adolescents with entertainment electronics, some guidelines bring the importance of using the school curriculum as a device in this regard (JORDAN, ROBINSON, 2008).

Therefore, within the scope of physical education, encouragement of its practice during the class period and inserting activities on the school counter-round seems to favor the reduction of sedentary behavior in children and adolescents, and this fact was evidenced by Gortmaker et al. (1999) with the insertion of a multidisciplinary program orientation and fitness and by Robinson (2003) with the use of dance as its main content.

In a new perspective, some studies have found that using the new generation of interactive video games helps to increase energy expenditure during their practice (GRAVES et al. 2008; PATE, 2008), however, the surrounding context of the fight against excess weight, such games do not replace the practice of physical activity (WANG; PERRY, 2006), besides the fact that this technology is not accessible to large segments of the population due to its high cost.

This study presents limitations on the use of the recall method to determine the time spent on sedentary habits, as there is the dependence of the individual's ability to remember their habits. However, this research technique is widely used, since the use of objective methods for measuring the level of physical activity such as accelerometers, provides no identification of sedentary pursuits, and in addition, there are discrepancies in literature about the cutoff points on the classification of sedentary activity (GUINHOYA et al., 2007, CORDER et al., 2008).

Another important limitation was that the evaluation of energy consumption was not performed, since this factor has been linked to changes in body weight.

Conclusion

It was found that the rates of overweight found for both genders, were higher than reported in literature both for children and adolescents. It was also observed that the outlay of more than 120 minutes a day with the use of computers and / or video games was associated with excess weight; on the other hand, the time spent watching TV was not significantly associated.

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