Television viewing and obesity among Iranian children: the importance of economic status and residential area

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Abstract

Background: Obesity is a health problem among adolescents worldwide and television (TV) viewing could promote it in several ways**.**

Objective: To determine the association between time spent on TV viewing and obesity considering economic status and residential area in primary schoolchildren in the north of Iran.

Method: A descriptive cross-sectional study was carried out on primary schoolchildren from 112 schools**.** Schools and students were chosen by cluster sampling. All children completed a questionnaire containing questions on the socio-economic condition. Overweight and obesity were classified based on the Centres for Disease Control and Prevention (CDC) values with body mass index (BMI) in excess of the 85th and 95th percentiles, respectively. Daily time spent on TV viewing was classified into 3 groups: less than 1 hour or no watching, 1-2 hours and 3 hours or over. SPSS 16.0 software was used for statistical data analysis.

Results: Study population comprised 7,453 primary schoolchildren (urban 3,662, rural 3,791). Of the subjects 52.7% viewed TV for 3 hours or more. In boys, prevalence of obesity had a positive association with TV viewing time but in girls, it was not a steady trend. In urban areas, time spent on TV viewing was in line with obesity but wasting significantly decreased with more time spent on TV viewing (P=0.001). This association was not seen in rural children. In the poor economic group, prevalence of obesity significantly decreased with more time spent on TV viewing (P=0.041) but this trend was not found in the moderate economic group. In the good economic group, the association between obesity and time spent on the TV viewing was not significant.

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Conclusion: About half of Iranian northern schoolchildren spent 3 hours or more daily viewing TV. A positive association between time spent on TV viewing and obesity was seen in high income families and in urban areas.

(Keywords: Obesity, television, schoolchildren, socioeconomic status, Iran)

Introduction

Obesity has doubled during the past two decades in Iran[1]. Many cross-sectional studies, but not all, have identified a positive association between time spent on TV viewing and the weight status of children[2,3]. Reducing sedentary behaviour, including TV viewing, is important in prevention of overweight and obesity[4,5]. Children who watched over 5 hours of TV were 4.6 times as likely to be overweight as children who watched 0-1 hours per day[6]. Findings from longitudinal studies also showed that children who watched more TV have more overweight, even after 6 or 11 years of follow-up assessment[7]. In a randomized trial among elementary schoolchildren, obesity declined when time spent on TV viewing was reduced after 1 year[8]. TV viewing could promote obesity by promoting poor diets, displacing time for physical activity, giving more opportunities for unhealthy snacking and by interfering with sleep[9,10]. Golestan province is located north of Iran and 1.7 million people (56% urban, 44% rural) live in this area where the main job is agriculture[11].

Objective

Main aim of this study is to determine the association between time spent on TV viewing and obesity considering the economic status and residential area in primary schoolchildren north of Iran.

Method

A cross-sectional retrospective study was carried out in children from 112 schools north of Iran**.** Schools and students were chosen by cluster sampling. Golestan province has 14 districts and initially, all primary schools in each district were numbered. Then 8 schools were randomly chosen from each district

by school list. After enrolling 112 schools, a systematic random sample of students was drawn from each school using the student class list. From each class, 15 subjects were chosen by systematic random sampling and in villages with less than 15 students, all were chosen. Date of birth was obtained from school file. Of total sample, 34 students (0.5%) were excluded because some data was missing.

The estimated sample size was based on stratification of respondents by urban/rural and gender of 14 district areas. With resumption of 50% prevalence rate, a confidence level of 95% and a maximum marginal error about 0.02, the sample size was calculated to be 2401 subjects. With regard to cluster sampling methods, sample size enlarged up to three times the baseline sample size**.** Gender, age, location area, economic status, weight, height and TV viewing time were recorded by questionnaire. Overweight and obesity were classified based on the Centres for Disease Control and Prevention (CDC) values with body mass index (BMI) in excess of the 85th and 95th percentiles, respectively[8].

Economic status was categorized based on possession of 10 consumer items considered necessary for modern-day life viz. telephone, running water, gas pipeline, home ownership, colour television, computer, video, modern refrigerator, private car and cooler. According to this list, the economic status of participants was categorized as follows: 3 or less as low, 4-6 as moderate and 7-10 as good. Daily time spent on TV viewing was classified into three groups: less than 1 hour or no watching, 1-2 hours and 3 hours or more. Anthropometric measurements of the children were performed in light dress and without shoes in the morning. Body-weight was measured to the nearest 0.1 kg using a balanced-beam scale, and height was measured to the nearest 0.5 cm with the child standing up and head, back, and buttock on the vertical land of the height-gauge.

SPSS 16.0 software was used for statistical data analysis. Chi-square test was used for qualities groups and P-value under 0.05 indicated significance. This study was approved by Ethical Research Committee of Golestan University of Medical Sciences. Verbal informed consent was received from parents of all the children.

Results

The study population comprised 7,453 primary schoolchildren. The baseline characteristics of the study population are shown in Table 1.

Table 1
Baseline characteristics of study population
(n=7453)

Variable	Number (%)
Region	
Urban	3662 (49.1)
Rural	3791 (50.9)
Gender	
Male	3963 (53.2)
Female	3490 (46.8)
Obesity	
Male	600 (15.1)
Female	442 (12.7)
*Economic status	
Low	1172 (15.8)
Moderate	4523 (61.0)
Good	1724 (23.2)
TV viewing time	
<1hour or no watching	902 (12.1)
1-2 hours	2624 (35.2)
3 hours or more	3927 (52.7)

*34 cases no response to this question

Distribution of obesity based on sex and time spent on TV viewing is shown in table 2.

Table 2: *Distribution of BMI based on gender and time spent on the TV viewing*

Gender	TV viewing time	BMI Distribution Number (%)			
		<5% BMI-CDC	5-85% BMI-CDC	85-95% BMI-CDC	≥95% BMI-CDC
Male	<1 hour or no viewing (404)	124(30.7)	198(49.0)	26(6.4)	56(13.9)
	1-2 hours (1281)	329(25.7)	662(51.7)	102(8.0)	188(14.7)
	3 hours or over (2278)	518(22.7)	1191(52.3)	213(9.4)	356(15.6)
	Total (3963)	971(24.5)	2051(51.8)	341(8.6)	600(15.1)
	P value	0.001	0.477	0.369	0.562
Female	<1hr or no viewing (498)	129(25.9)	263(52.8)	49(9.8)	57(11.5)
	1-2 hours (1343)	313(23.3)	741(55.2)	112(8.3)	177(13.2)
	3 hours or over (1649)	442(26.8)	878(53.2)	121(7.3)	208(12.6)
	Total (3490)	884(25.3)	1882(53.9)	282(8.1)	442(12.7)
	P value	0.086	0.496	0.180	0.608

In boys, prevalence of obesity had a positive association with TV viewing time but statistical difference was not significant and wasting rate (<5%BMI-CDC) significantly decreased with more TV viewing time (P=0.001). In girls, obesity and time spent on TV viewing was not a steady correlation. Distribution of obesity based on location and time spent on TV viewing is shown in table 3.

Table 3: ***Distribution of BMI based on location area and time spent on the TV viewing***

Location	TV viewing time	BMI distribution Number (%)			
		<5%BMI-CDC	5-85%BMI-CDC	85-95%BMI-CDC	>=95%BMI-CDC
Urban	<1 hour or no viewing (389)	123(31.6)	183(47.1)	28(7.2)	55(14.1)
	1-2 hours (1269)	316(24.9)	643(50.7)	110(8.7)	200(15.8)
	3 hours or over (2004)	460(23.0)	1012(50.4)	172(8.6)	360(18.0)
	Total (3662)	899(24.5)	1838(50.2)	310(8.5)	615(16.8)
	P value	0.001	0.420	0.636	0.086
Rural	<1 hour or no viewing (513)	130(25.3)	278(54.2)	47(9.2)	58(11.3)
	1-2 hours (1355)	326(24.1)	760(56.1)	104(7.7)	165(12.2)
	3 hours or over (1923)	500(26.0)	1057(55.0)	162(8.4)	204(10.4)
	Total (3791)	956(25.2)	2095(55.3)	313(8.3)	427(11.3)
	P value	0.450	0.711	0.540	0.375

In urban children, time spent on TV viewing was associated with obesity but wasting rate (<5%BMI-CDC) significantly decreased with more time spent on TV viewing (P=0.001). The association between time spent on the TV viewing and obesity was not seen in rural areas. Distribution of obesity based on economic status and time spent on TV viewing is shown in table 4.

Table 4: ***Distribution of BMI based on economic status and time spent on TV viewing***

Economic status	TV viewing time	BMI distribution Number (%)			
		<5%BMI-CDC	5-85%BMI-CDC	85-95%BMI-CDC	>=95%BMI-CDC
Poor	<1hr or no viewing (207)	58(28.0)	111(53.6)	12(5.8)	26(12.6)
	1-2 hours (435)	126(29.0)	237(54.5)	28(6.4)	44(10.1)
	3 hours or over (530)	156(29.4)	297(56.0)	40(7.6)	37(7.0)
	Total (1172)	340(29.0)	645(55.0)	80(6.8)	107(9.1)
	P value	0.929	0.804	0.643	0.041
Intermediate	<1hr or no viewing (545)	161(34.8)	281(10.3)	47(8.6)	56(10.3)
	1-2 hours (1625)	408(25.1)	889(54.7)	127(7.8)	201(12.4)
	3 hours or over (2352)	584(24.8)	1258(53.5)	199(8.5)	312(13.2)
	Total (4523)	1153(25.5)	2428(53.7)	373(8.2)	569(12.6)
	P. Value	0.068	0.425	0.724	0.157
Good	<1hr or no viewing (141)	33(23.4)	65(46.1)	14(9.9)	29(20.6)
	1-2 hours (554)	102(18.4)	273(49.3)	59(10.6)	120(21.7)
	3 hours or over (1029)	216(21.0)	507(49.3)	94(9.1)	212(20.6)
	Total (1724)	351(20.4)	845(49.0)	167(9.7)	361(20.9)
	P value	0.307	0.770	0.620	0.879

There was a positive and significant association between obesity and economic status levels (P=0.001). In poor economic group, prevalence of obesity significantly decreased with more time spent on TV viewing (P=0.041) but this trend was not seen in moderate economic group. In the good economic group, association between obesity and time spent on the TV viewing was not significant.

Discussion

Daily TV viewing time for 3 hours or over was seen in 52.7% of school children. In Tabriz, a capital city in northwest Iran, 37.5% and 13.7% of primary schoolgirls viewed TV for 2-4 hours and over 4 hours respectively[12]. In Milan, 85.3% of primary schoolchildren watch TV from 30 minutes to 2 hours per day[13]. More time spent on TV viewing in our area may be related to lack of access to other amenities. In the present study, a steady trend was seen between TV viewing time and obesity in urban areas while this trend was not seen in rural areas. The association between obesity and time spent on the TV viewing was converse in poor economic children.

Some studies in children and teens suggest that computer, video game and internet use are associated with excess weight[14-16] while other studies have not

found similar effects[17-18]. In Iranian adolescents, the time spent on TV viewing was associated with an increased risk of obesity while obesogenic foods and physical activity had no effect on the frequency of obesity[19]. In Portugal, only 12.2% of children spend 1.5 hours or less on TV and computer and boys who spend less time on TV and computer were 75.4% less likely to be overweight/obese than those who spend more time[20]. Indicators of sedentary lifestyle, such as screen time and presence of a TV in the child's bedroom, were associated with overweight and obesity in Norwegian schoolchildren[21]. In a review study within 43 countries it was shown that physical activity levels were lower and TV viewing times higher in overweight compared to normal weight youth[22]. Physical activity levels were lower and TV viewing times higher in overweight and obese than in normal-weight in Canadian youth[23]. It has been proposed that through viewing TV, people spend less time on performing physical activity and increased consumption of obesogenic foods[10]. However, Ekelund found that viewing TV increases adiposity independent of physical activity[24]. Overweight is the result of genetic and environmental factors[25] and the tripled increase of overweight in the last decades[26] implies that environmental factors have more effect on BMI than genetic factors. The association between the time spent on viewing TV and obesity among schoolchildren north of Iran is different compared with other regions. These differences can be related to some environmental factors such as food behaviour, physical activity, ethnicity and genetic factors that were not evaluated in our study.

Conclusions

- Fifty three percent of northern Iranian schoolchildren spent 3 hours or more viewing TV.

- A positive association between time spent on TV viewing and obesity was seen in high income families and in urban areas.

We did not evaluate all factors associated with obesity and TV viewing time such as food intake, ethnicity, other sedentary equipments and parents' education. In addition, we did not provide a proper statistical test to consider the design effect caused by cluster sampling. These are our limiting study factors.

Acknowledgments

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