

Research Article

Prevalence of Overweight and Obesity and Related Risk Factors in Schoolchildren 6 to 12 Years at Las Flores Neighborhood-Barranquilla

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Abstract: The aim of the study is to determine the prevalence of overweight and obesity and related risk factors in children aged 6 to 12, who attended four public and private schools in the neighborhood of Las Flores, in the city of Barranquilla, Colombia. A descriptive cross-sectional study was carried out in children aged 6 to 12. The population studied was 281 students, 51.60% girls and 48.40% boys, with average age of 8.9 years. The study subjects were selected by simple random sampling. The variables studied include socio-demographic characteristics such as age, sex and school grade, type of educational institution, the pattern of physical activity, food pattern (frequency of consumption of foods, fast foods and soft drinks) and nutritional status. Thirty percent of the population studied were under an excess of weight, 22% were overweight and 8% were obese. Excess weight was more prevalent in boys (32%) than in girls (29%). It was observed that overweight increases as age and school grade increases. The high prevalence of overweight and obesity in school-age children is a potential risk for adult obesity. This situation is problematic for public health in which timely intervention is required.

Keywords: Feeding, food and nutritional security, food pattern, nutritional status, student

INTRODUCTION

Overweight and obesity are nutritional states, which have been present since ancient times. In addition, they have gradually become a disturbing situation in many sectors such as health, policies and social (WHO (World Health Organization), 2014). Today the statistics regarding this nutritional state are shocking; especially the rate of childhood obesity that is growing day by day in a worrying way, as shown by the results of the last National Survey of the Nutritional Situation in Colombia (ICBF, 2010), which identify that one in six children and adolescents are overweight and obese.

The World Health Organization, (WHO (World Health Organization), 2012) states that overweight, obesity and the comorbidities derived from them are largely preventable, since an inadequate diet added to a sedentary lifestyle are its main cause of appearance. This situation has led to current treatments focusing more on controlling the problem rather than on curing it. People regularly consume food without taking into account whether they will receive the necessary nutrients or if their body will take advantage of the nutrients thereof. In general, these people eat just for eating or for quenching the feeling of hunger. Many factors influence these eating habits such as; culture,

geography, economic situation and lack of knowledge or nutrition education.

It could be affirmed that the fundamental cause of the increase of childhood obesity is the currently established lifestyles such as inadequate food intake, lack of physical activity and increased intake of foods high in fat and carbohydrates and low in vitamins and minerals. (Lima *et al.*, 2015) This situation is common in areas with low socioeconomic level, families with low income due to the lack of income tends to consume foods based on carbohydrates and fats that produce more filling sensation, are also cheaper and exclude foods rich in protein, fruits and vegetables because of its high cost (Vargas *et al.*, 2014). In the same way, the sedentary lifestyle endorsed by today's technology, long hours in front of the TV, video games or computer lead to less time of outdoor activities and physical recreation (Ramírez-Izcoa *et al.*, 2017; Londoño *et al.*, 2009).

Additionally, increasing urbanization and the change of means of transportation, as well as a genetic predisposition have caused schoolchildren to be more prone to this pandemic. Taking into account these factors that favor weight gain, there was a need to quantify the cases of obesity and overweight existing in Las Flores neighborhood since due to the scarce resources, they do not have a balanced diet. The eating habits was mainly based on large amounts of fat and

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carbohydrates because they are at low prices and produce more satiety (Reales and Rodríguez, 2015). This study aims to determine the prevalence of overweight and obesity and related risk factors in schoolchildren aged 6 to 12 years old in Las Flores neighborhood, describing the behavior of the demographic variables of the population.

MATERIALS AND METHODS

A cross-sectional descriptive study was carried out to measure the prevalence of overweight and obesity and the risk factors of schoolchildren from Las Flores neighborhood, a low income community in Barranquilla, Colombia. The population of the study were aged between 6 to 12 years who attended two public and two private schools in Las Flores, without discrimination of sex, present on the day of the study and with the consent of their parents.

The exclusion criteria included children with diseases that affect weight and height, such as diabetes, hypothyroidism, infections, paralysis and influenza in the last month, as well as children who are undergoing dietary treatment and with hormonal problems. The study subjects were selected by simple random sampling, using the program Microsoft Excel 2007, based on the lists of the children enrolled in primary and high school. To define the sample size, the Epiinfo program was used, taking into account the distribution of students by Institution and by grade.

The following variables were considered: Socio demographic characteristic such as age, sex, grade, educational institution. The pattern of physical activity: type of physical activity, the frequency of physical activity and duration, time spent on the computer, television or video games. Food pattern: frequency of

food consumption, consumption of fast foods and soda. Overweight and obesity: weight, height and BMI.

The researchers took the anthropometric measurement using a digital scale (SECA ®) with a capacity of 200 kg to determine participant's weight and stadiometer (SECA ®) to determine participant's height. The nutritional status was determined from the BMI using the WHO AnthroPlus software, version 3.2.2, in accordance with the World Health Organization (WHO) reference standard (De Onis *et al.*, 2007). The results were expressed as Z-scores according to classification of BMI indicator for the Colombian population (Colombia, 2010): wasted (ZSD<-2), risk of wasted (ZSD≥-2 and ZSD<-1), eutrophic (ZSD≥-1 and ZSD = 1), overweight (ZSD>1 and ZSD = 2) and obese (ZSD>2).

For data collection, a questionnaire was employed to obtain general information, anthropometric data, eating habits and physical activity data.

To carry out the study, the directives of the institutions were asked for the proper approval, guaranteeing the anonymity of the participants and the parents or guardians of the children provided informed written consent.

RESULTS AND DISCUSSION

The study was conducted in a sample of 281 children, from which 145 (51.60%) were girls and 136 (48.40%) were boys, with an average age of 8.9 years (range of 6 to 12 years).

Table 1 shows that 30% of the population studied were under an excess of weight, of which 22% were overweight and 8% were obese. Overweight was more prevalent in boys with 32% compared to 29% in girls (Table 1). It can be observed that at an older age, there

Table 1: Nutritional diagnosis of schoolchildren, according to BMI
Nutritional status classification of schoolchildren according to BMI

Variables		Nutritional status classification of schoolchildren according to BMI (%)				
		Appropriate	Thinness	Risk of thinness	Over weight	Obesity
Sex	Female	66.0	0.7	5.0	21.0	8.0
	Male	61.0	0.0	7.0	23.0	9.0
Age	6-8 years	70.0	6.0	0.0	17.0	7.0
	9-12 years	57.0	6.0	1.0	27.0	10.0
School	I.E.D Las Flores	66.9	0.8	9.8	15.0	7.5
	Colegio Libertador Simon Bolivar	57.6	0.0	3.2	29.6	9.6
	Instituto Las Flores	75.0	0.0	0.0	25.0	0.0
Grade	C.F.I. Mahanaim	80.0	0.0	0.0	13.3	6.7
	1°	77.0	0.0	5.0	16.0	2.0
	2°	67.0	0.0	5.0	15.0	13.0
	3°	63.0	0.0	10.0	19.0	8.0
	4°	70.0	0.0	2.0	20.0	9.0
	5°	55.0	0.0	2.0	33.0	10.0
	6°	27.0	3.8	15.0	42.0	12.0
	7°	100.0	0.0	0.0	0.0	0.0
Family history	Relatives on overweight	22.0	0.0	29.0	39.0	48.0
Type of school	Public	62.3	0.4	6.5	22.3	8.6
	Private	78.0	19.0	3.0	19.0	3.0
Total	Total population	64.0	0.4	6.0	22.0	8.0

is a greater increase in excess weight and it is observed that as the school grade is increased, there is a greater increase of excess weight in the population. In the case of sixth grade, this problem affects 54% of the children, compared to the first grade that only affects 18%. As for the prevalence of overweight and obesity in schoolchildren with a family history, it was found that 87% of this population suffers from this type of malnutrition. Also, the proportion of students with excess of weight is higher among those from public school (30.9%) than those from private school (22.0%)

In Table 2 it can be observed that the rice and pasta group as well as the sugar, panela and honey group, are the most consumed since all the population studied consumes minimum once a day these type of foods. The tubers group and the bread and biscuits group are the second most consumed daily with 81 and 98% of the population respectively.

Table 3 shows the frequency of daily food consumption taking into account the degree of affection of overweight and obesity. The evaluation of the frequency of physical activity; was done taking into

Table 2: Frequency of food consumption by schoolchildren

Food	Never		Once a month		2-3/month		One day/week		Two days/week	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Rice, pastas	0	0	0	0	0	0	0	0	0	0
Bread, arepa, crackers	0	0	0	0	0	0	0	0	0	0
Tubers	0	0	0	0	0	0	0	0	0	0
Cooked vegetables	21	7	11	4	84	30	54	19	54	21
Raw vegetables	42	15	24	9	45	15	83	22	80	32
Fruit juice	0	0	0	0	0	0	0	0	0	0
Whole fruit	0	0	0	4	35	12	114	41	73	26
Red meat	0	0	0	0	0	0	0	0	107	38
Poultry	0	0	0	0	0	0	73	26	155	55
Tuna or sardine	37	13	0	36	124	44	19	7	0	0
Fish or seafood	35	12	0	23	41	15	78	27	64	23
Visceral	63	22	0	46	33	12	43	15	13	5
Eggs	4	1	0	0	6	2	11	4	37	13
Chicken mash	125	44	0	31	45	16	24	9	0	0
Grains	2	1	0	0	13	5	24	9	85	30
Bienestarina	218	78	0	11	10	4	15	5	8	3
Milk	14	5	0	0	41	15	47	17	82	29
Dairy products	0	0	0	21	162	68	57	20	57	20
Healthy fats	26	9	0	7	21	7	38	14	50	19
Sausages	11	4	0	0	57	20	10	4	78	28
Fried food	0	0	0	0	0	0	3	1	52	19
Candies	0	0	0	0	6	2	6	2	22	8
Packaged food	0	0	0	0	3	1	14	5	69	25
Sodas	0	0	0	0	6	2	23	8	54	19
Fast food	29	10	0	17	16	6	182	65	7	2
Other fats	38	14	0	22	9	3	75	27	46	16
Coffee or tea	153	54	0	9	6	2	71	25	12	6
Panela, sugar and honey	0	0	0	0	0	0	0	0	0	0
Light food	269	96	0	4	0	0	0	0	0	0
Supplements (vitamins)	262	93	0	0	0	0	0	0	0	0

Food	3-4 days/week		5-6 days/week		Once a day		Twice a day		Three/day	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Rice, pastas	0	0	0	0	47	17	179	64	59	21
Bread, arepa, crackers	0	0	5	2	154	65	122	43	0	0
Tubers	0	0	52	19	139	40	80	28	10	4
Cooked vegetables	11	4	0	0	42	14	0	0	0	0
Raw vegetables	17	6	0	0	0	0	0	0	0	0
Fruit juice	1	9	64	21	64	30	99	35	33	12
Whole fruit	28	10	21	7	0	0	0	0	0	0
Red meat	90	32	42	15	26	9	16	4	0	0
Poultry	37	13	15	5	1	0	0	0	0	0
Tuna or sardine	0	0	0	0	0	0	0	0	0	0
Fish or seafood	0	0	0	0	0	0	0	0	0	0
Visceral	0	0	0	0	0	0	0	0	0	0
Eggs	33	12	30	11	160	57	0	0	0	0
Chicken mash	0	0	0	0	0	0	0	0	0	0
Grains	67	24	39	14	45	16	8	2	0	0
Bienestarina	0	0	0	0	0	0	0	0	0	0
Milk	33	12	29	10	35	12	0	0	0	0

Table 2: Continue

Food	3-4 days/week		5-6 days/week		Once a day		Twice a day		Three/day	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Dairy products	1	0	0	0	0	0	0	0	0	0
Healthy fats	96	34	26	9	2	1	0	0	0	0
Sausages	50	18	26	9	39	14	10	4	0	0
Fried food	18	8	145	52	58	21	5	2	0	0
Candies	33	12	65	23	98	35	34	12	17	6
Packaged food	120	43	23	19	18	6	6	2	0	0
Sodas	101	36	52	19	41	15	4	1	0	0
Fast food	0	0	0	0	0	0	0	0	0	0
Other fats	28	10	11	4	9	3	4	1	0	0
Coffee or tea	5	2	7	2	1	0	0	0	0	0
Panela, sugar and honey	0	0	0	0	0	0	0	0	0	0
Light food	0	0	0	0	0	0	0	0	0	0
Supplements (vitamins)	0	0	0	0	0	0	0	0	0	0

Table 3: Frequency of daily food consumption, according to nutritional status

Food	Overweight						Obesity			
	Once a day		Twice a day		3 times/day		Once a day		Twice a day	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Rice, pasta	7	11	35	57	19	31	0	0	12	52
Bread, arepa and crackers	29	48	32	52	0	0	17	74	6	26
Tuber and plantains	22	36	24	39	9	15	11	48	7	30
Cooked vegetables	15	25	0	0	0	0	6	26	0	0
Fruit juice	24	39	26	43	5	8	6	28	6	26
Red meat	5	8	5	8	0	0	1	4	0	0
Eggs	32	52	0	0	0	0	11	48	0	0
Dried grains	9	15	0	0	0	0	8	35	0	0
Milk	14	23	0	0	0	0	5	22	0	0
Sausages	12	20	0	0	0	0	6	26	0	0
Fried food	27	44	0	0	0	0	14	61	0	0
Candies	28	46	11	18	9	15	9	39	3	13
Packaged food	7	11	1	2	0	0	0	0	3	13
Sodas	8	13	0	0	0	0	4	17	0	0
Butter and milk cream	3	5	0	0	0	0	1	4	0	0
Panela, sugar and honey	23	38	14	23	24	39	11	48	3	13
Vitamins	3	5	0	0	0	0	1	4	0	0

Food	Obesity		All					
	3 times/day		Once a day		Twice a day		3 times/day	
	N	(%)	N	(%)	N	(%)	N	(%)
Rice, pasta	11	48	43	15	179	65	59	21
Bread, arepa and crackers	0	0	154	55	122	43	0	0
Tuber and plantains	1	4	139	49	80	28	10	4
Cooked vegetables	0	0	42	15	0	0	0	0
Fruit juice	4	17	84	30	99	35	33	12
Red meat	0	0	26	9	16	6	0	0
Eggs	0	0	160	57	0	0	0	0
Dried grains	0	0	45	16	6	2	0	0
Milk	0	0	35	12	0	0	0	0
Sausages	0	0	39	14	10	4	0	0
Fried food	0	0	58	21	5	2	0	0
Candies	3	13	98	35	34	12	17	6
Packaged food	0	0	16	6	6	2	0	0
Sodas	0	0	41	15	4	1	0	0
Butter and milk cream	0	0	9	3	4	1	0	0
Panela, sugar and honey	9	39	189	67	51	18	41	15
Vitamins	0	0	19	7	0	0	0	0

account the activities that children develop within and outside institutions.

Activities such as running, cycling and playing hide and seek are the most popular with 89, 63 and 47% respectively. Activities such as jumping rope and dancing are the least performed by overweight children (about 10%). Overweight children are those who are

most often in front of a screen, whether it be computer, TV or any electronic object.

In this study of the Las Flores neighborhood, it was possible to observe the high prevalence of overweight and obesity in schoolchildren aged 6 to 12 years, which is a potential risk for adult obesity. Thirty percent of the population is overweight, with 22% being overweight

and 8% being obese, a situation that is quite alarming, since this is three times higher than the data obtained two years earlier in a study conducted by students of the Universidad del Norte (Latorre *et al.*, 2013) in this neighborhood, where the population affected by obesity was 11%.

According to nutritional status and gender, it is evident that in Las Flores overweight was more prevalent in boys with 32% compared to 29% in girls. These findings coincide with the study of the Universidad del Norte (Barrios *et al.*, 2012) held two years earlier in the same neighborhood. Similarly, a study performed in Cartagena, Colombia (Hernández, 2010) observed that a higher proportion of boys was overweight. This is usually because in Colombian society it is very common for men to consume a greater quantity and/or proportion of food compared to women. It can also be explained; in terms of the number of hours, the child devotes to being in front of a screen.

As for the frequency of food consumption, it can be evidenced that the students present daily high consumption of rice, pasta, bread, arepas or crackers (100%) and 48% of obese children ate rice and pasta three times per day.

Ninety percent of the overweight children report a daily consumption of tuber and plantains, 36% at least once a day. It was also observed a daily high consumption of sweetened fruit juice (90%) fried food (44%), sweets or candy (79%) and sugar, panela and honey (100%) and less than 51% consumed vegetables daily as well as a low consumption of whole fruits, fresh vegetables and dried grains. Some findings were very similar to those in the study carried out in Cartagena (Hernández, 2010).

It has been shown that in general, schoolchildren have a low frequency in the consumption of vegetables and fruits and high consumption of sweets, sausages and soft drinks. For the overweight youth population it is very attractive to consume the so-called fast foods, hence these foods mentioned above, since they seem to find healthy and nutritious foods like fruits and vegetables, tasteless.

Additionally, physical activity is fundamental for the maintenance of body health. The decrease in physical activity or the absence of this is a determinant of overweight and obesity. Sedentary lifestyle habits in children and adolescents tend to perpetuate into adulthood and make them a risk factor for cardiovascular disease, type II diabetes and other chronic non-transmissible diseases.

It is very well known that the prevalence of overweight and obesity in schoolchildren is increasing in Colombia, as observed in this study; which is a potential risk for adult obesity. This situation is due to a variety of factors, such as poor eating habits, inadequate lifestyles and strong association with day-to-day children becoming more sedentary and technology dependent.

CONCLUSION

The prevalence of overweight and obesity in schoolchildren, which is increasing more and more in Colombia, is extremely noticeable. This was evidenced in the Las Flores neighborhood of Barranquilla. It was identified between 2014 and 2015, that out of the 281 students who participated in the study, 30% have excess weight, with a percentage of 22% in overweight and 8% in obesity; which is a potential risk for adult obesity. This situation is due to several factors; such as poor eating habits, inadequate lifestyles and associated with children's dependence on technology; supporting physical inactivity and lack of physical activity.

In terms of food consumption, it was clearly seen that the whole population in excess of weight consumes rice, pasta, bread, arepas or cookies daily, in a high percentage. It was also observed that there is a small difference in the consumption of tubers; with regard to the general population, the group that consumes the most is overweight by 90%. Other foods also consumed in high percentage were fats, sweets, sugar and soda. This situation is a problem of public health in which it is necessary to work, developing programs of prevention of the overweight and obesity in schoolchildren and in the same way within their families, through nutritional education activities, in order to produce changes in patterns and eating habits.

CONFLICT OF INTEREST

The authors state that there is no conflict of interest.

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