

Overweight and physical inactivity in children living in favelas in the metropolitan region of Recife, Brazil

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Abstract

Objective: To assess the prevalence of overweight and obesity and its association with physical activity levels in children living in favelas in the city of Recife, state of Pernambuco, Brazil.

Methods: A cross-sectional study was performed with 973 children ranging from 7 to 10 years old, all from two favelas in Recife, Fragoso and Caranguejo (total population of 9,315); of the 973 children assessed, 733 were included in the study. Overweight was defined as body mass index (BMI) equal to or above the 85th percentile, and obesity as BMI equal to or above the 95th percentile, using Centers for Disease Control and Prevention growth charts. Physical activity level was assessed by the Physical Activity Questionnaire for Older Children (PAQ-C). Children with scores ≥ 3 were considered active, while those with scores < 3 were considered inactive.

Results: Of the 733 children studied, overweight and obesity were observed in 92 (12.6%). There was no statistical association between physical inactivity and sex, income, maternal schooling, number of siblings and hours of television. However, more children with physical inactivity were observed among overweight or obese children, 66/92 (71.6%) vs. 363/641 (56.7%) ($p = 0.008$).

Conclusions: The prevalence of overweight and obesity is high, and is associated with physical inactivity in children living in favelas in the city of Recife, Brazil.

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Introduction

For the last few decades, obesity and overweight have been on the rise throughout the world, especially in developing countries undergoing an epidemiological transition, with better control of infectious diseases.¹⁻⁴ In Brazil, for the last several years, there have been increases in rates of overweight among the least wealthy share of the population.⁵⁻⁷ This part of the population suffers high levels of nutritional issues in fetal life and for the first few months of life, with higher risks of developing cardiovascular disease, diabetes mellitus and obesity as adults.⁸⁻¹⁰ The interaction between these risk factors represents an important and emerging public health problem for developing countries, because of the

rise in morbidity and mortality among adults from cardiovascular disease, the primary cause of death globally and in Brazil, as well as the significant rise in health costs from secondary and tertiary assistance for these disorders.¹¹⁻¹³

Since obesity is a complex metabolic disorder, fundamentally a result from an imbalance between calorie intake and consumption,^{14,15} it is important to establish which factor has the greatest effect, especially among today's most vulnerable populations, i.e., children living in unfavorable socioeconomic conditions.

Among these populations, especially among children, the impact of physical inactivity is still unknown in the new Brazilian nutritional scenario. Since sedentary habits are usually

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acquired during childhood and tend to follow subjects into adulthood,^{16,17} identifying unhealthy habits is key for the implementation of health policies and programs to better control chronic illnesses in adulthood. Thus, the goal of this study was to verify the frequency of overweight/obesity among children in low income communities and verify its association to physical activity levels.

Methods

This was a cross-sectional study, performed in Fragoso and Caranguejo, two favelas in the metropolitan region of Recife, state of Pernambuco, Brazil. In 2005, these two communities had a total population of 9,315. Sanitation coverage in the two areas was under 50%, circa 80% of structures were built out of bricks and mortar, and almost 100% of households had electricity.

Of a total of 973 children living in the two favelas from 7 to 10 years old, 860 were found to be eligible, because they were enrolled in Family Health Program (PSF, from the original), developed by Instituto Materno-Infantil Prof. Fernando Figueira (IMIP). Children were excluded if they had chronic conditions which affected their nutritional status (cardiopathy, hepatopathy, or neurological, endocrine, and metabolic disorders) or which limit motion, those with mental disorders, and those who used medication which could interfere with weight and/or height. The study was performed from January to August of 2006.

Weights were always measured at the Basic Health Unit using a previously calibrated digital scale (brand: Filizola™), which could weigh up to 180 kg and was sensitive to a scale of 100 g. Children were always measured barefoot and in their underwear. Height was measured with children standing up, barefoot, using vertical stadiometers (brand: Stanley; precision: 0.1 cm). Body mass index (BMI) was calculated by dividing weight in kilograms by height in square meters. Children were considered overweight if they had BMI over the 85th percentile for their sex and age, and obese if they were above the 95th percentile, as per BMI curves and percentile tables from the Centers for Disease Control and Prevention (CDC).¹⁸

Physical activity level was assessed by applying the Physical Activity Questionnaire for Older Children (PAQ-C)¹⁹ to children in the presence of their mothers. The questionnaire was translated into Portuguese and validated by Silva & Molina,²⁰ excluding physical activities and sports not practiced in Brazil. The questionnaire assesses levels of moderate and intense physical activity in children for the seven days before its application. The questionnaire consists of nine questions about playing sports and games; physical activities at school and as leisure, including weekends. Questions have values ranging from 1 to 5, final scores are attained by averaging responses, from very sedentary (1) to very active (5). Scores 2, 3 and 4 represent sedentary, moderately active and active, respectively. Therefore, the score allows us to divide subjects into

two groups, sedentary and active. Active individuals have scores ≥ 3 , while sedentary individuals have scores < 3 . The questionnaire also assesses the number of hours spent watching television per day.

Collected data were typed as double entries and recorded using the Epi-Info application, version 6. Statistical analysis was based on the application of the Pearson chi-square test of association to examine the association between variables and outcome. Significance level was established at 0.05; analyses were performed using the Statistical Package for the Social Science (SPSS) application, version 8.0.0 (SPSS Incorporation, 1977).

The study project was previously approved by the IMIP Research Ethics Committee; it followed guidelines from CNS Resolution number 196/1996. All parents of participating children signed release forms giving their free and informed consent.

Results

Of the 860 eligible children, 733 were part of the study (85.2%); 122 children were not located or did not come to the Health Unit for data collection, while five presented morbidities that fit exclusion criteria. Ninety-two children (12.6%) were found to be overweight (73; 10.0%) or obese (19; 2.6%), 44.5% of them male and 55.5% female.

There was no significant statistical association between sex, household income, presence of refrigerator or television set at the home, maternal schooling, number of siblings, or hours watching television per day. However, a higher number of children with physical inactivity was found, PAC-C score < 3 , among those overweight or obese (Table 1).

Discussion

There are not many studies determining the frequency of overweight/obesity among children in Brazilian favelas. A study from the previous decade at a favela in the city of São Paulo found prevalence of overweight of 6.4% among boys and 8.7% among girls.²¹ Since the issue of overweight/obesity has seen major rises in Brazil, especially among the least wealthy, this percentage, found in São Paulo over 10 years ago, might be similar to those found in our Recife study. Other studies from Brazilian favelas point at overweight/obesity frequencies among the general adult population of 15.7% overweight/obesity, though reaching 22.7% among women.²² When comparing our results to studies of children of higher socioeconomic status in various regions of Brazil, we find rates of obesity almost two times higher among children of higher socioeconomic status.²³⁻²⁵ However, we studied children who were at constant risk of food insecurity due to extremely low household incomes. We consider that these findings may be justified by the cost of foodstuffs, since this population has access to very low cost food, usually with high sugar and fat content. The relationship between overweight

Table 1 - Distribution of biologic and socioeconomic variables of children in study, overweight/obese or not, from favelas in Metropolitan region of Recife, Brazil

Variable	Overweight/Obesity		p
	Yes (n = 92) n (%)	No (n = 641) n (%)	
Male	41 (44.5)	267 (41.7)	0.677
Household income < 1 MMW	60 (65.0)	432 (67.5)	0.766
Refrigerator in the home	57 (61.9)	423 (65.9)	0.519
Television in the home	85 (92.3)	607 (94.6)	0.511
Maternal schooling < 4 years	28 (30.3)	184 (28.7)	0.826
Number of siblings > 2	44 (47.5)	282 (44.0)	0.562
Watches television > 3 h/day	68 (74.0)	459 (71.5)	0.736
PAQ-C score < 3	66 (71.6)	363 (56.7)	0.008

MMW = monthly minimum wage; PAQ-C = Physical Activity Questionnaire for Older Children.

and socioeconomic status is often inconsistent and without a clear pattern, which hinders its generalization.⁶

We have found a high number of physically inactive children. One reason for this finding in particular seems to be the lack of physical space. Homes have no backyards, and some don't even have streets, which are most often not much wider than a single meter. There are also no wide open spaces or parks in which children could perform physical activities. When comparing the PAC-C-measured physical inactivity of overweight/obese and non-overweight/obese children, eutrophic children are found to have higher levels of physical activity. However, since this is a prevalence study, we cannot be certain of how the cause and effect relationship between the two variables works here. Overweight and obese children might have greater difficulties for locomotion, practicing sports, and playing games which demand more vigorous physical activity.²⁶

The habit of watching television for over 3 hours a day was found among most children, without differences among those who were or weren't overweight/obese. Several studies have pointed at a direct relationship between number of hours spent watching television and obesity.^{26,27} Perhaps one of the

roles watching television has on the rise of obesity, that of stimulating food consumption through advertising, is stunted in this population due to low income. We should stress that television sets were more often found in households than refrigerators.

For some authors, food intake alone does not justify the increase in obesity among low income populations.²⁸ Some surveys have pointed out that children who suffer malnourishment early in life have higher risk of becoming overweight as adults, and they are at especially higher risk of developing visceral obesity.^{29,30} Such studies have pointed at these children's lower energy consumption, changes in the lipid oxidation mechanisms, and higher rates of growth, all compensatory, immediate and late mechanisms, when faced with nutritional problems.^{30,31}

Our study has some limitations. First, the questionnaire used is limited by not differentiating the intensity, frequency and duration of physical activities and by not estimating calorie consumption.¹⁹ Second, said questionnaire was described as usable with children ranging from 8 to 12, but we used it with children aged 7 years old, even though we did only apply questionnaires in the presence of their mothers. We should

also stress that study design does not allow us to answer the question of whether the frequency of physical inactivity found among overweight children was cause or consequence of the nutritional deviation.

In conclusion, there is a high prevalence of overweight among school-age children living in favelas in the metropolitan region of Recife, which implies in increases of said nutritional disorder in adulthood, thus increasing the probability of chronic degenerative disease. Overweight and obesity are associated to physical inactivity among these children, and further studies are required in this population to better understand the association and the implementation of public health policies for its control.

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