

Evaluation of nutritional status of children aged 0 to 5 years old in Early Childhood Education of the Municipal Education Network of Itajaí/SC

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ORIGINAL ARTICLE

ABSTRACT

The increasing number of children from 0 to 5 years old, evaluated as overweight in recent years, motivated teams of the Health Program at School and the School Feeding Program of the Municipal School Network of Itajaí/SC (Brazil) to conduct a research in order to verify the nutritional status of students regularly attending the Early Childhood Education centers. We seek to minimize the effects of this condition throughout life. We adopted the cross-sectional, descriptive and field study method, with data collection between April and July 2016, from 64 Early Childhood Education Centers. Data shows that 925 children, representing 1/3 of the total number of students aged 0 to 5 years and 11 months old, are in an overweight situation. From those, 610 were with high weight for the age, corroborating the waistline perimeter data (WP) with children at risk; 175 children were diagnosed with thinness and, of these, 65 also have low weight for their age. Thus, these children require special attention of those involved. We considered, therefore, the study presented extremely important as it may trigger prevention actions and immediate intervention.

Keywords: physical education, early childhood education, childhood obesity, nutrition evaluation.

INTRODUCTION

The World Health Organization (WHO) points out that the biggest public health problem in the world today is obesity, which is growing at a rapid pace. The Organization predicts that about 2.3 billion adults may be diagnosed with being overweight. This is even more worrying as the projection estimates that 700 million people might present an obese state and that the number of overweight and obese children in the world may reach 75 million if nothing is done about it (Brazil, 2014).

The reality in Brazil is also a concern due to the growth of obesity rates in the country. Some surveys indicate that more than 50% of the population is classified as being overweight and obese. Among children, this rate reaches approximately 15%, according to a study done by the National Network of Early Childhood (*Rede Nacional da Primeira Infância - RNPI*, 2014).

The growing interest in the search for reasons about the prevalence and factors

associated with the diagnosis of overweight and obesity in 0 to 5-year-old children has been verified in several studies. The main causes of being overweight are associated with improper eating habits, sedentary lifestyle, overweight and obese parents, socioeconomic status and environmental factors (Onis, 2015; Rivera et al., 2014).

Obesity is defined as an atypical accumulation or excess of fat in the body, which can lead to negative implications for the health condition and to the development of other pathologies such as diabetes, hypercholesterolemia, arterial hypertension, osteoarticular involvement, cardiovascular diseases, and various types of cancers. Malnutrition (Chagas et al., 2013), on the other hand, is defined as a condition resulting in different dimensions of energy and protein deficiency, being aggravated by repeated situations of infectious processes.

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According to RNPI (2014), in Latin America, approximately 3.8 million children aged up to five years old were diagnosed with excessive weight: overweight or obesity. At the same time, the same data was pointed out by the Pan American Health Organization (PAHO, 2014), in its report, which presents obesity as an epidemic. Data from the Food and Nutritional Surveillance System of the Ministry of Health (Brazil, 2014) has revealed a rise in the diagnosis of overweight risk, overweight and obesity in Brazilian children in recent years, increasing the epidemiological panorama of the so-called non-communicable diseases, which are risk factors for other diseases.

Although the data presented shows problems of excessive weight, the table of classification of nutritional status also presents diagnoses of thinness and acute thinness that occur throughout the country, especially in children living in conditions of social vulnerability. According to Conde and Gigante (2007), underweight or malnutrition has been considered, if not the main cause, one of the risk factors relevant to the number of people with disability and the fourth factor for mortality in terms of world population, especially in developing countries. In Brazil, according to IBGE (2006), underweight cases (below z -2.0 score) are among the poorest social classes, whose total family income is lower than the minimum wage. The highest frequency is in urban areas, in the North and Northeast regions.

Chagas et al. (2013), in a survey in the six largest municipalities of the state of Maranhão (Brazil), in 2006/2007, with 1214 under five-year-old children, found that in the weight-for-age classification, malnutrition was 4.5%, and in the weight-for-height 3.9% were already classified as malnourished, corroborating with height-for-age of 8.5% of children with previous malnutrition; and 6.7% being overweight.

Lima et al. (2010), in a survey carried out in the northeast of Brazil, on the causes of the decline of malnutrition in that region, confirmed that the prevalence of malnutrition due to being underweight has decreased in Brazil. On the other hand, it has been noticed the prevalence of diagnoses related to overweight in children,

although it is not affirmed that there was a substitution or compensation, but that the interferences of environment, the increase of nutritional options and the possible decrease of children's physical activity, can justify that the cases of overweight and obesity prevail to those of thinness.

Magalhães, Sant'Ana, Priore and Franceschini (2014), in a bibliographical study, analyzed researches with indicators for fat accumulation, among them the Waist Perimeter (WP), stating that the WP measure, when assessing obesity in the abdominal region, revealed that fat excess in the central region of the trunk in children corroborates the results obtained in other indicators, such as the Body Mass Index (BMI).

In the Municipal School Network of the city of Itajaí (Santa Catarina – Brazil), there are about 10 thousand students enrolled in Early Childhood Education, aged 0 to 5 years and 11 months old, distributed in nursery, pre-kindergarten, kindergarten, pre-school, living daily in an educational environment that has the institutional role of caring for and educating young children at all times during their routine (Itajaí, 2015), namely: the entrance and exit, feeding, hygiene, rest, plays, Physical Education classes in the park and in the external areas, among other activities that are experienced daily by the children, being translated into meaningful experiences.

Given that, the present research, developed through a partnership between Avantis College and the Municipal Secretariats of Education and Health of Itajaí/SC, had the objective of verifying the nutritional status of students who regularly attend the Municipal School Network of Itajaí/SC. We intend to support future appropriate nutritional prescriptions, through the 'Health in School' and 'School Feeding' Programs, as well as intersectoral health actions with schools and families, in the pursuit of compliance with Law No. 5853, of September 16th, 2011 (Itajaí, 2011), which establishes the Policy of Obesity and Overweight Combat – 'Lighter Itajaí' in the scope of the Municipality of Itajaí/SC. In this study, the focus was on Early Childhood Education, involving 0 to 5 years and 11-month-old students.

Therefore, this research is justified because, nowadays, many children are at risk due to their body composition condition. According to WHO (2015), about 40% of Brazilian children are diagnosed with overweight and obesity, and, despite that, diagnoses of malnutrition due to being underweight still occurs.

This research was inserted in the Brazil Platform n.º CAAE: 55258116.3.0000.5592, and evaluated and approved by the Committee of Ethics and Research of the Avantis College under the protocol n.º 032069/2016.

METHOD

This is a cross-sectional, descriptive and field study (Thomas, Nelson, & Silverman, 2012). Data was collected between April and July 2016 in 64 Early Childhood Education Centers of Itajai/SC, which belong to the Municipal School Network, with students enrolled and present on the day of data collection. However, it is necessary to emphasize that the research samples did not consider as basis of analysis the students with Down Syndrome, because they are subjects that must be evaluated in a specific manner.

The nutritional diagnosis of the students was defined based on the widely used anthropometric indices indicated by the WHO (2006, 2007 as cited in Brazil, 2011), and adopted by the Brazilian Ministry of Health for the evaluation and classification of the nutritional status of children according to gender: BMI-for-age, weight-for-age, height-for-age for all, and weight-for-height for children up to 60 months of age; as well as Waist Perimeter (WP) classified by Fernández, Redden, Pietrobelli and Allison (2004) for children over 2 years old.

Participants

The sample size covered 6,432 children aged 0 to 5 years and 11 months old, corresponding to 66% of the total number of children enrolled in the 64 Early Childhood Education Centers of Itajaí/SC in the Municipal School Network. The age of the children was defined in months based on the difference between the date of birth reported by the schools and the date when data

was collected. Anonymity and confidentiality were guaranteed to the subjects.

Instruments and Procedures

The instrumentation adopted for data collection included the elaboration of spreadsheets with the students' cadastral information, containing: class, name, date of birth and gender; Mabbis® non-elastic, flexible anthropometric tape; Welmy® baby scale and WCS® horizontal anthropometer to verify the length; Powner® digital scale, with a maximum capacity of 150 kg; WCS® stadiometer, built in wood, with printed scale, varying from 40 to 220 cm. Following the guidelines for the collection of anthropometric measurements from the Ministry of Health (Brazil, 2011), the weight was measured and recorded in kilograms on the scale for babies, weighed without clothing; the other children were weighed on a digital scale placed on a flat even floor, assuming the orthostatic positioning, barefoot, without coats, upper limbs along the body, head with the Frankfurt plan established. The length was measured in children up to 2 years of age with the anthropometer, in the oldest the height was measured also observing the orthostatic positioning, barefoot, the head with the Frankfurt plan established, registered in the nearest millimeter.

The anthropometric evaluation of the students was established from the calculation of the Body Mass Index, verified through the formula:

$$BMI = \frac{\text{weight}}{\text{height}^2}$$

The weight-for-age, weight-for-height and height-for-age indices were used to classify the nutritional status, according to the Percentile Tables of the World Health Organization (WHO, 2006, 2007, as cited in Brazil, 2011), considering the age in months, as already described. These procedures followed the description of measurement and analysis of the 'Guidelines for the collection and analysis of anthropometric data in health services: Technical Standard of the Food and Nutrition

Surveillance System' of SISVAN - Ministry of Health (Brazil, 2011).

For the classification of the cardiac risk of the students, the Perimeter of the Waist (PW) according to Petroski's protocol (2007) was measured, being verified with the anthropometric tape and having as reference the midpoint between the last lower rib and the iliac crest. The data obtained were registered to the nearest millimeter, classified by the percentile tables for PW of Fernández et al. (2004), for children and adolescents from 2 to 18 years of age, by gender, considering the cut-off points for Risk and No Risk.

The researchers decided to add the classification 'Near Risk', for children who, despite not being at risk, present proximity of values of risk classification, serving as an alert.

Statistical analysis

Data was tabulated in the Microsoft Excel® program and are expressed in percentages, considering that the research is still in progress for the data collection with children and adolescents of Elementary and Young Adult Education (called EJA in Brazil).

The statistical results of the research by categories according to the anthropometric indices evaluated are presented in tables. No statistical association was made considering the gender of the students with the other data investigated.

RESULTS

The results of the anthropometric indices, divided by categories, are presented in Tables 1 to 5.

Table 1

Classification of weight-for-age data obtained according to WHO tables (2006/2007 as cited in Brazil, 2011)

Categories	Frequence/Students	Percentual
Very low weight for age	19	0.30%
Low weight for age	46	0.72%
Appropriate weight for age	5757	89.51%
High weight for age	610	9.48%
Total	6432	100.00%

Table 2

Classification of height-for-age data obtained from WHO tables (2006/2007 as cited in Brazil, 2011)

Categories	Frequence/Students	Percentual
Very short height for age	36	0.56%
Short height for age	160	2.49%
Adequate height for age	6236	96.95%
Total	6432	100.00%

Table 3

Classification of BMI-for-age data obtained according to the WHO tables (2006/2007 as cited in Brazil, 2011)

Categories	Frequence/Students	Percentual
Healthy	4013	62.39%
Risk of overweight	1317	20.48%
Overweight	622	9.67%
Obesity	249	3.87%
Severe obesity	56	0.87%
Thinness	121	1.88%
Acute thinness	54	0.84%
Total	6432	100.00%

Table 4

Classification of weight-for-height data obtained according to WHO tables (2006/2007 as cited in Brazil, 2011), for children up to 60 months old

Categories	Frequence/Students	Percentual
Healthy	3336	63.41%
Risk of overweight	1255	23.85%
Overweight	407	7.74%
Obesity	146	2.78%
Thinness	76	1.44%
Acute thinness	41	0.78%
Total	5261	100.00%

Table 5

Classification of waist perimeter data obtained according to Fernández et al. (2004) for children above 2 years old

Categories	Frequence/Students	Percentual
Without risk	3558	68.33%
Close to risk	299	5.74%
Risk	1350	25.93%
Total	5207	100.00%

DISCUSSION

From the data presented, we can verify that the prevalence of malnutrition is low in relation to the values of overweight indicators. Although society discusses obesity as an epidemic, this is worrying as malnutrition and its consequences are forgotten.

Chagas et al. (2013) investigated children from six municipalities in the state of Maranhão (Brazil). They found 4.5% of those evaluated with BMI rating of thinness, and the values of the weight index for the stature of 3.9% in malnutrition at that time. These are values that differ from the 2.0% thinness found in Itajaí/SC, indicating malnutrition for both BMI and weight-for-height, which could trigger diseases such as anemia and hypovitaminosis, exposing the subjects to a high risk of becoming ill and even dying.

The overweight indicators of both BMI and weight-for-height were 34.89% and 34.37%, respectively. Comparing them to the data obtained by the analysis and classification of the WP, 25.93% are at risk; and 5.74% with values very close to the risk percentiles, which totals 31.67% of children over 2 years old. Therefore, through the approximation of results, the confirmation of these values indicates risks for

children to become obese adults, develop noncommunicable diseases linked to obesity, such as diabetes, hypertension, high cholesterol, insulin resistance, and triglycerides, among others (Onis, 2015).

In the study of Vitolo et al. (2008), of 3,957 children aged 1 month to 5 years old, during the National Vaccination Campaign in the city of São Leopoldo (Rio Grande do Sul – Brazil) in 2002, they found that 9.8% of the evaluated children were overweight.

The data presented by Miglioli et al. (2015), in a cross-sectional study investigating the nutritional status of 790 children under five years of age, they found 1.5% of those evaluated through BMI for age with low-weight diagnosis; and through the weight-for-age classification 2.6% were with underweight diagnosis. With the same indicators, 4.7% and 8.6% of the children diagnosed, respectively, with overweight, and 8.9% of the sample with short height-for-age, differing from the data found in this research of 3%, when the data of short stature and very short stature were added.

In this aspect, we can see that, although the sample is smaller, the data presented by Vitolo, Gama, Bortolini, Campagnolo, and Drachler (2008) and Miglioli et al. (2015) are also generally close to the data of the research with the children of Itajaí/SC, in which the BMI indices by age and height-for-age are very close in all their classifications.

In the study carried out in Itajaí/SC, we can verify a higher percentage of children who have high weight compared to that found by Schuch, Castro, Vasconcelos, Dutra, and Goldani (2013). The authors carried out a study with students from public schools in the states of Rio Grande do Sul and Santa Catarina, totaling 4,914 children (2,578 in Rio Grande do Sul and 2,336 in Santa Catarina). In the case of Santa Catarina, in six municipalities, 7.5% of the children were overweight.

PAHO proposed, in the 2014-2019 action plan, to prevent obesity in children and adolescents in Latin America. This plan focuses on modifying a current environment that predisposes obesity to a beneficial environment

that allows the consumption of a nutritious diet and physical activity exercise, and approaching the WHO global tactic on food intake, physical activity and health.

In relation to prevention, the Municipal School Network of Itajaí/SC, through the Municipal Department of Education, included Physical Education (PE) as a compulsory school content, taught by a PE professional in all Early Childhood Education schools in 2014.

It is worth clarifying that in all the years of elementary education, PE has already been an effective curricular component, taught by duly qualified teachers. The practice of physical and playful activity systematized since childhood can contribute to improving the health status of children. Concomitant with the inclusion of PE in Early Childhood Education, a Municipal School Feeding Plan was developed, which established rules and guidelines for local actions, including the substitution of rich in fat and sugar foods for natural ones. The consumption and variety of fruits and vegetables was considerably increased, as well as the inclusion of infant formula instead of cow's milk for children up to 2 years of age, improving the nutritional quality of the menus served to children daily.

The intention of the Municipal Department of Education was to provide students with a healthy, balanced and adequate menu by age group, consisting of some whole foods such as bread, pasta and rice, beans, lentils, eggs, meat, fish, vegetables, varied fruits and natural juices. Another important measure was the deactivation of canteens in all school units in the municipality. The lack of anthropometric data prior to this action was a limiting factor for a comparative analysis to verify if the PE classes, as well as the adequacy of the menus, contributed or not to reduce the cases of overweight.

Another situation considered as limiting to this study refers to the impossibility of covering all the students in the data collection, although it is sensible to say that the sample of 66% is consistent to demonstrate its relevance. Data shows that 925 (1/3) children are in an overweight situation. Among these 610 have

high weight for their age, corroborating with Waist Perimeter (WP) data with children at risk, and 175 children with a diagnosis of thinness – among them, 65 also indicate low weight for age and need special attention.

CONCLUSION

In this study, the high number of overweight children found warn to the development of effective public policies. It is necessary to immediately implement a periodic evaluation routine for all children, since the early childhood education, involving Physical Education professionals, with training in protocols of anthropometric measures and adequate equipment.

The research developed, and the referenced studies show that the disposition for childhood obesity starts at six months. Thus, monitoring the growth pattern becomes effective to monitor and control the occurrence of overweight cases in school-age children and adolescents. This will enable immediate intervention throughout the observation of the increase in the percentiles of the BMI-for-age, weight-for-age, height-for-age, weight-for-height indicators and WP, providing to family members, schools, nutritionists and health-care professionals at school with up-to-date data and information, generating knowledge that supports the adoption of healthy eating habits and practices of physical activities in their daily routine. Thereby, ensuring the maintenance, preservation and expansion of times and spaces for physical activity at school are essential for the transformation of obesogenic environments into healthy environments.

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Conflict of interests:

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