



**NUTRITIONAL STATUS OF CHILDREN AND ADOLESCENTS AT A
SOCIOASSISTENTIAL AND EDUCATIONAL PROJECT**
**ESTADO NUTRICIONAL DE CRIANÇAS E ADOLESCENTES ATENDIDOS EM UM PROJETO
SOCIOASSISTENCIAL E EDUCACIONAL**
**ESTADO NUTRICIONAL DE NIÑOS Y ADOLESCENTES ATENDIDOS EN UN PROYECTO SOCIO-
ASISTENCIAL Y EDUCACIONAL**

Hellen Santos de Oliveira¹, Thaís Carolina Bassler², Mauricéia Alexandra de Oliveira Ferro³, Juliana Dias Reis Pessalacia⁴, Fernando Ribeiro dos Santos⁵

ABSTRACT

Objective: to analyze the nutritional status of children and adolescents assisted in a socio-educational and educational project. **Method:** this study is a descriptive, cross-sectional, and quantitative research conducted with 377 children and adolescents, aged 5 to 15 years old, enrolled in the project in 2015. A sociodemographic questionnaire was used as a collection tool, besides the nutritional status evaluation through Anthropometric measures of weight and height. **Results:** nutritional status analysis showed that overweight and obesity are more prevalent than malnutrition in this population, also showed a high percentage of height deficit for age and higher obesity rates in the adolescent group. **Conclusion:** Overweight and obesity among children and adolescents are more prevalent than malnutrition in the studied group, raising interest and concern about the importance of implementing programs aimed at healthy eating and physical exercise. **Descriptors:** Nutritional Status; Child; Adolescent; Social Conditions.

RESUMO

Objetivo: analisar o estado nutricional de crianças e adolescentes atendidos em um projeto socioassistencial e educacional. **Método:** estudo descritivo, transversal, de abordagem quantitativa, realizado com 377 crianças e adolescentes, com idade entre 5 e 15 anos, matriculados no projeto em 2015. Utilizou-se como instrumentos de coleta, questionário sociodemográfico além da avaliação do estado nutricional através das medidas antropométricas de peso e estatura. **Resultados:** a análise do estado nutricional evidenciou que o sobrepeso e a obesidade estão mais prevalentes do que a desnutrição nessa população; também mostrou um alto percentual de déficit de estatura para a idade e maiores índices de obesidade no grupo adolescentes. **Conclusão:** o sobrepeso e a obesidade entre crianças e adolescentes estão mais prevalentes do que a desnutrição no grupo estudado, despertando interesse e preocupação quanto à importância da implementação de programas voltados para a alimentação saudável e para a prática de exercícios físicos. **Descritores:** Estado Nutricional; Criança; Adolescente; Condições Sociais.

RESUMEN

Objetivo: analizar el estado nutricional de niños y adolescentes atendidos en un proyecto socio-asistencial y educacional. **Método:** estudio descriptivo, transversal, de enfoque cuantitativo, realizado junto a 377 niños y adolescentes, con edad entre 5 a 15 años, matriculados en el proyecto en 2015. Se utilizaron como instrumentos de recolección, cuestionario sócio-demográfico además de la evaluación del estado nutricional a través de las medidas antropométricas de peso y estatura. **Resultados:** el análisis del estado nutricional evidenció que el sobrepeso y la obesidad están más prevalentes de lo que la desnutrición en esta población, también mostró un alto porcentual de déficit de estatura para la edad y mayores índices de obesidad en el grupo de adolescentes. **Conclusión:** el sobrepeso y la obesidad entre niños y adolescentes están más prevalentes del que la desnutrición en el grupo estudiado, despertando interés y preocupación con la importancia de la implementación de programas dirigidos para la alimentación sana y para la práctica de ejercicios físicos. **Descriptor:** El Estado Nutricional; Infantil; Adolescentes; Condiciones Sociales.

¹Student, Nursing Graduation Course, Federal University Foundation of Mato Grosso do Sul/UFMS - Campus de Três Lagoas. Três Lagoas (MS), Brazil. E-mail: hellenolivera@hotmail.com; ²Nutritionist, Ph.D. Professor, Professor of Nursing and Medicine, Federal University Foundation of Mato Grosso do Sul/UFMS - Campus de Três Lagoas. Três Lagoas (MS), Brazil. E-mail: thacarol@hotmail.com; ³Nutritionist, Specialist Professor, Nutrition Course, Teaching and Culture Association of Mato Grosso do Sul (AEMS). Três Lagoas (MS), Brazil. E-mail: ceiaferro@hotmail.com; ⁴Nurse, Post-Ph.D. in Nursing, Graduate Program in Nursing Federal University Foundation of Mato Grosso do Sul/UFMS. Campo Grande, (MS), Brasil. E-mail: juliana@pessalacia.com.br; ⁵Student, Nursing Graduation Course, Federal University Foundation of Mato Grosso do Sul/UFMS - Campus de Três Lagoas. Três Lagoas (MS), Brazil. E-mail: fernanddoribeiro@hotmail.com

INTRODUCTION

Overweight and obesity are one of the most serious public health problems of the 21st century. Such changes more than doubled among children and adolescents in the last 30 years. High rates in children are concern because of the potential for long-term health damage, including the risk of heart disease, type 2 diabetes, hypertension, and other chronic conditions.¹⁻²

Adolescence also represents a critical period for bone mineralization in both genders and involves a 60% risk of developing osteoporosis in adulthood. Therefore, it is related to the acquisition of bone mass in this phase of life. Excess fat in adolescence, besides to effects on bone tissue, is also related to the onset of clinical manifestations of coronary heart disease, respiratory problems, and type 2 diabetes.

These risk factors attest that the nutritional status of children and adolescents is a new challenge for health policies around the world and in developing countries.³⁻⁴ Developed and developing countries are experiencing an ongoing process of epidemiological transition and nutritional status, where lifestyle and dietary changes in the last decades are related to the increasing development of chronic noncommunicable diseases (NCDs), such as obesity, diabetes and systemic arterial hypertension.⁴⁻⁵ The exposure to behavioral risk factors, such as inadequate nutrition and sedentary lifestyle, often starts in childhood and adolescence and consolidates into adulthood.⁴

Since the 1960s, the World Health Organization (WHO) has proposed the use of nutritional assessment tools for the early detection of nutritional problems that are highly prevalent in different contexts, as a basis for the development of measures to prevent and control nutritional changes. In the 1990s, WHO emphasized the importance of the Body Mass Index (BMI) for the diagnosis of various degrees of low weight, overweight and obesity.⁵

WHO data showed a prospect of 42 million overweight or obese children worldwide in 2013. In 2006, the same agency released reference data on growth for children and cut-off points for BMI, noting this indicator is the most used to evaluate obesity. However, it should be noted that BMI is based on weight and height and does not allow differentiation if an excess of body weight reflects increases in fat mass or fat-free mass. Particularly in children, there is a large variation in the mass fat content for a given BMI.⁶

Regarding the importance of BMI, it is noted that the risk related to the development of cardiovascular disease (CVD) in adulthood is significantly higher for each increase of one unit in the BMI in children from 7 to 13 years old. Therefore, decreasing BMI in childhood and adolescence is an effective secondary prevention strategy for CVD. At the most basic level, reductions in BMI can be achieved through a negative energy balance, that is by reducing energy consumption and/or increasing energy expenditure.²

On the other hand, despite the current context of nutritional transition, with a trend towards higher rates of overweight and obesity, it can be stated that socioeconomic disadvantages contribute to the late development of obesity and chronic diseases. There is an inverse association of socioeconomic status in childhood and adolescence with adult obesity.⁷

In the Brazilian context, the transition to the nutritional profile of children has also been shown, and children under five years old, overweight was observed in 7.3%, and height-for-age deficits also showed similar values (7,0%).⁸ Thus, programs aimed at continuous monitoring of overweight and obesity are essential, and body mass index (BMI=weight [kg]/stature [m²]) becomes the most common indicator for assessing changes in nutritional status because it is a low-cost, non-invasive measure of body weight.¹

OBJECTIVE

- To analyze the nutritional status of children and adolescents assisted in a socio-educational and educational project.

METHOD

This is a descriptive cross-sectional study of a quantitative approach carried out with children and adolescents aged 5 to 15 years old who were enrolled in a socio-educational and educational project in Três Lagoas, Mato Grosso do Sul, Brazil.

This study was carried out in the urban area of the Municipality of Três Lagoas. The municipality has a territorial area of 10,206,949 km², belonging to the Cerrado and Atlantic Forest biome and it is located in the extreme east of Mato Grosso do Sul (MS), located 340 km from the capital of MS, located in the Center-West region of Brazil.⁹

The study was held in a Reference Center for Social and Educational Assistance, whose target audience is children and adolescents between 6 and 17 years old, of both genders,

Oliveira HS, Bassler TC, Ferro MAO et al.

Nutritional status of children and adolescents...

from low-income families, students from the public school system, assisted from Monday to Friday, in the morning and evening periods.

The selection criteria were children and adolescents aged between 5 and 15 years old, enrolled in the socio-educational and educational project during the period of data collection and who were not distant in the period of data collection.

The study population consisted of 420 children and adolescents. There were 37 of them excluded because they did not have the Free and Informed Consent Form (TCLE) signed by the parents and 6 were excluded because they did not sign the consent form, remaining 377 who accepted participating in the survey and had the selection criteria fulfilled.

The data were collected between September and November of 2015, by students of the Nursing course of a Federal Public University, who were trained by the coordinator of the research project, as well as two nutritionists who were present in all data collections. A classroom with ample room was available for an interview with the application of an instrument composed of sociodemographic variables, besides the evaluation of the nutritional status. The approximate time for data collection (interview and anthropometric measures) was 10 to 20 minutes per child or adolescent. The sociodemographic data were collected through interviews and recorded in a specific form. The data collected were: gender, age, education, and nationality. The anthropometric variables examined were weight (kg) and height (cm).

The weight was collected by a single examiner, while the stature was collected twice, by two different examiners. The children and adolescents were weighed standing, barefoot, with the minimum of clothing possible and the balance was placed on a smooth surface to avoid possible oscillations in the measurements. The scale used was Mallory Sagittarius digital, with a capacity of 150 kg.

The child and adolescent were positioned barefoot and with their heads free of props To obtain height, standing erect and with their

arms extended along the body, with their heads raised, in a central position to the stadiometer. Their legs were parallel, and their feet formed a right angle with their legs. A Sanny stadiometer with a measuring range of 80 cm to 230 cm was used to obtain stature, an anthropometric fiberglass tape with lock and automatic retraction of 1.5 meters, pencil and common pen.

The analysis of the nutritional status of children and adolescents was based on data from the Food and Nutrition Surveillance System (SISVAN),¹⁰ where there is the incorporation of growth curves of the World Health Organization of 2006 and 2007. Based on these data, it is possible to evaluate the Nutritional status of children and adolescents where they were diagnosed with low BMI for age, Eutrophic, Overweight and Obesity, and still short for age and height for age. The cut points were BMI for age in children (0 to 10 years): score <-2: low BMI for age, score \geq -2 and <+1: eutrophic, score \geq +1 and <+2: overweight, and score \geq +2, obesity. The cut-off points of height by age in children were: <-2 short stature for age and \geq -2: height suitable for age. The cut-off points for adolescents (10 to 19 years) of BMI by age: score <-2: low BMI for age, score \geq -2 and <1: eutrophic, score \geq 1 and <+2: overweight, and Score \geq +2, Obesity. Cut-off points of height by age in adolescents: <-2 short stature for age and \geq -2: height suitable for age.

This study was approved by the Research Ethics Committee of the Federal University of Mato Grosso do Sul Foundation under protocol n° 19/2014.

RESULTS

Table 1 shows the characterization data of the 377 children and adolescents included in the study.

Table 1. Characterization of the population of children and adolescents, according to gender, age, and nutritional status. Três Lagoas (MS), Brazil, 2016.

Variables	n	%
<i>Gender</i>		
Male	187	49.6
Female	190	50.4
Total	377	100
<i>Age</i>		
< 10	221	58.6
10-15	156	41.3
Total	377	100
<i>Height/age</i>		
Low height	10	2.6
Adequate height	367	97.4
Total	377	100
<i>BMI/Age</i>		
Low weight for age	14	3.7
Eutrophic	276	73.3
Overweight	45	11.9
Obesity	42	11.1
Total Geral	377	100

The research demonstrated a prevalence of 2.6% of malnutrition, according to the height/age index, for the study population. Regarding the nutritional evaluation for BMI/age, the prevalence of underweight was 3.7%, while the prevalence of overweight

(overweight and obesity), according to the adopted index, was 23.0%. However, both for the height/age index and for the BMI/age index, there was a prevalence of eutrophic children and adolescents, 97.4% and 73.3%, respectively.

Table 2. Classification of the nutritional status of children and adolescents, by gender and age, by height/age index. Três Lagoas (MS), Brasil, 2016.

Variables	Total	Nutritional			
		Low Height		Adequate Height	
		N	%	N	%
<i>Age (Years old)</i>					
< 10	222	7	3.2	215	96.8
10-15	155	4	2.6	151	97.4
<i>Gender</i>					
Male	187	3	1.6	184	98.4
Female	190	8	4.2	182	95.8

Regarding gender, Table 2 shows females with greater participation in the study with 190 girls, of whom 4.2% presented height-for-age deficit when compared to males in whom height/age was 1.6%, totalizing a 5.8%

prevalence of malnutrition in all children and adolescents studied. The highest prevalence found in this case was the group of children younger than 10 years old (3.2%) and female (4.2%).

Table 3. Classification of nutritional status, by gender and age, BMI/Age. Três Lagoas (MS), Brazil, 2016.

Variáveis	n	Nutritional State					
		Low weight for age		Eutrophy		Overweight/Obesity	
		n	%	n	%	n	%
<i>Age (Years old)</i>							
< 10	222	8	3.6	164	73.9	50	22.5
10-15	155	6	3.9	110	71	39	25.1
<i>Gender</i>							
Male	187	9	4.81	137	73.3	41	21.9
Female	190	5	2.6	137	72.1	48	25.2

Regarding gender, Table 3 shows female children and adolescents presenting a higher prevalence of overweight and obesity (25.2%) when compared to males (21.9%). On the other hand, in the low weight for age, the male prevailed over the female, with 4.8% and 2.6% of malnutrition, respectively.

Regarding BMI/age, the adolescent's population (10 to 15 years old) had a higher prevalence of overweight and obesity (25.1%) when compared to the population of children. Malnutrition was also found more prevalent in adolescents (3.9%) than in children (3.6%).

DISCUSSION

The results obtained should be interpreted considering the characteristics of the studied population, children, and adolescents of a socio-educational and public educational project. It is necessary to emphasize that these results cannot be extrapolated to other projects of children and adolescents, due to the socioeconomic characteristics of the researched group.

Although the current nutritional transition context shows a tendency to overweight and

Oliveira HS, Bassler TC, Ferro MAO et al.

Nutritional status of children and adolescents...

obesity, it should be considered that these indices are among individuals of higher socioeconomic classes and that socioeconomic difficulties during childhood can affect height in the adulthood due to malnutrition during early childhood.⁷ The results of this study agree with the fact that malnutrition (21.7%) was approximately three times higher than overweight (6.8%) in the study population.

In the comparison between the genders, it was verified that both malnutrition and overweight were more prevalent in the girls than in the boys, in the age group the girls from 7 to 9 years old malnutrition prevailed with 164 (24.6%) in the age group of 10 to 14 years old 60 (7.7%) was classified as overweight. In this regard, it is known that poverty contexts may predispose to greater adiposity in adolescence and adulthood, since it is related to malnutrition during the intrauterine period and childhood, and can shape hormonal and physiological responses to richer diets later in life.⁷ Weight gain after entry into school age is also expected, that is, BMI scores increase steadily as children get older. Despite the socioeconomic differences, comparing the results of this research with those of a study conducted by the US National Health and Nutrition Examination Surveys (NHANES), a higher prevalence of obesity was also identified in children between 9 and 11 years old compared to those of 6 to 8 years old, suggesting that some children gain excessive weight and become obese during mid-childhood. Regarding gender, there was evidence of differences in nutritional pattern. However, one study showed that overweight increased in women from childhood to adolescence, where at nine years old, 30.6% of black women and 22.4% of white women were overweight, increasing to 39.3% and 24.1%, respectively, at 16 years old is 56.9% and 41.3% at 19 years old.¹¹

However, the fact that a high prevalence of eutrophic was found in this study stands out, that is, the children and adolescents evaluated were of the right weight most of the time.

These indexes are related to the fact that, although the study site shelters children and adolescents in disadvantaged socioeconomic conditions, it develops social projects with stimulus to sports practices, educational and food reinforcement, as well as actions aimed at promotion and prevention in health. It is known that social programs can be effective in improving the nutritional status of children and adolescents, since a study carried out in South Korea to evaluate the impact of a Program for Healthy Eating and Physical

Activity resulted in several changes in children's eating behaviors, especially about consumption of more balanced foods such as mixed grains, vegetables, white milk, eggs, and fruits. These changes in eating behaviors were different according to the child's weight status but were not differentiated according to gender.¹² A study carried out with 109 children and adolescents accompanied at the Child Obesity Center in the city of Campina Grande-PB found that constant multi-professional follow-up by the Endocrine-Pediatrician, Psychologist, Nurse, Nutritionist, Physical Trainer, Social Worker, Biochemist/Pharmacist and Master's students and Scientific Initiation of the State University of Paraíba, was able to encourage healthy nutritional habits in this population, besides influencing the types of consumed snacks, showing for monitoring interference in their nutritional quality.¹³

A systematic review study also found such school interventions may be effective in reducing BMI. It has also shown that, in general, such interventions are more effective considering the female. It also found that teachers play a strong role in a child's social environment and have the potential to influence behavior through environmental and social interactions positively and that teacher-led interventions are effective in improving BMI.¹⁴

Another relevant data in this study was the percentage of height deficit for the identified age, with higher rates for females and higher prevalence in the group of children under 10 years old. It is known that BMI is positively correlated with height during childhood. Some authors have provided explanations for this phenomenon; it is assumed that biological processes, nutrition, and genetic factors cause early increases in BMI and height in childhood.¹⁵ In Brazil, data from 2006 indicated that 7.0% of Brazilian children have a deficit of height and the prevalence of this condition varies considerably in the regions of the country. This trend is also observed in most countries in Africa, Asia, and Latin America and it is associated with socioeconomic conditions and access to health, sanitation and education services. In developed countries, variations in stature pattern reflect the influence of genetic and hereditary factors, already in developing countries is a result of the interaction between genetic load and environmental factors, such as food, health, hygiene, housing and general child care.¹⁶ A study in Vietnam also found the impact of socioeconomic differences, where the highest socioeconomic

Oliveira HS, Bassler TC, Ferro MAO et al.

Nutritional status of children and adolescents...

level reduced the chances of dwarfism in childhood and an increase in growth retardation was caused in part by increasing inequality in the socioeconomic situation.¹⁷

A study conducted in the Brazilian state of Paraíba also found an association between stature deficit and incomplete vaccination schedule in children. It also found the influence of maternal factors, because, in addition to the social context in which the child lives, the malnutrition of children also presents biological determination, inserting the mother as an important interface between the child and the environment. It was also found that low birth weight is highly associated with linear growth deficit when compared to adequate birth weight.¹⁶

Regarding BMI/age, the adolescent's population (10 to 15 years old) had a higher prevalence of overweight and obesity (25.1%) when compared to the population of children. Malnutrition was also found more prevalent in adolescents (3.9%) than in children (3.6%). Adolescent Obesity is a well-recognized global public health problem. It is known that interventions aimed at improving the lifestyle of adolescents typically result in weight loss immediately after treatment and after a short period of maintenance (that is, 6 to 12 months). However, individual responses vary widely. Regarding the socioeconomic factor, there is no evidence of its influence on the results of treatments for obesity. However, it is known that disadvantaged socioeconomic situations can negatively influence the ability of parents to adopt healthy eating patterns in their children.¹⁸ Despite the low rates of overweight and obesity identified in the children population, it is worth noting that early childhood is the stage of life ideal for intervening in the course of obesity since it is the time when new healthy life practices can be introduced.¹⁹

The main limitation of this study is because it is a descriptive and cross-sectional study that does not become possible comparisons and generalizations. However, it presents important contributions to the discussions about the nutritional pattern of children and adolescents in disadvantaged socioeconomic conditions.

Due to the current context of nutritional transition, early interventions in the school context are important, aiming at the prevention of non-transmissible chronic diseases in adult life, increasing the expenses with these diseases much more and consequently impacting the quality of life of the population.

CONCLUSION

The research showed that overweight and obesity among children and adolescents are more prevalent than malnutrition in the studied group, arousing interest and concern about the importance of implementing programs aimed at healthy eating and physical exercise.

The results also show a high frequency of height deficit for the age, which may be associated with the disadvantaged socioeconomic conditions of the studied group, which results in inadequate dietary patterns, low vaccination coverage and lack of access to health services, among other factors; Also, higher obesity rates were identified in the adolescent group, emphasizing the importance of early interventions, aiming at reducing this aggravation in this group and the prevention of chronic non-transmissible diseases in adult life.

Thus, new studies that explore the relationship between socioeconomic conditions and nutritional changes, as well as studies aimed at assessing the impact of nutritional interventions on children and adolescents in these conditions become relevant.

REFERENCES

1. Ghosh-Dastidar MB, Haas AC, Nicosia N, Datar A. Accuracy of BMI correction using multiple reports in children. *BMC Obes* [Internet]. 2016 Sept 13 [cited 2016 Oct 05]; 3(1):37. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5020432/>
2. Truby H, Baxter K, Ware RS, Jensen DE, Cardinal JW, Warren JM; et al. A Randomized Controlled Trial of Two Different Macronutrient Profiles on Weight, Body Composition and Metabolic Parameters in Obese Adolescents Seeking Weight Loss. *PLoS One* [Internet]. 2016 Mar 29 [cited 2016 Oct 05]; 11(3):e0151787. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4811557/>
3. Ripka WL, Modesto JD, Ulbricht L, Gewehr PM. Obesity Impact Evaluated from Fat Percentage in Bone Mineral Density of Male Adolescents. *PLoS One* [Internet]. 2016 Sept 29 [cited 2016 Oct 05]; 11(9):e0163470. Available from: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0163470>
4. Carneiro MNL, Lima OS, Marinho LM, Souza MAM. Association between dietary habits and

Oliveira HS, Bassler TC, Ferro MAO et al.

Nutritional status of children and adolescents...

nutritional status in college students. *Rev Soc Bras Clín Med* [Internet]. 2016 Apr-June [cited 2016 Oct 05]; 14(2):84-8. Available from: <http://docs.bvsalud.org/biblioref/2016/08/1248/14284.pdf>

5. Gigante DP, Minten GC, Horta BL, Barros FC, Victora CG. Nutritional evaluation follow-up of the 1982 birth cohort, Pelotas, Southern Brazil. *Rev Saúde Publica* [Internet]. 2008 Dec [cited 2016 Oct 05];42(Suppl2):60-9. Available from:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2671135/>

6. Aristizabal JC, Barona J, Hoyos M, Ruiz M, Marín C. Association between anthropometric indices and cardiometabolic risk factors in pre-school children. *BMC Pediatr* [Internet]. 2015 Nov 6 [cited 2016 Oct 05];15:170. Available from:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4636828/#!po=11.9048>

7. Isasi CR, Jung M, Parrinello CM, Kaplan RC, Kim R, Crespo NC, et al. Association of Childhood Economic Hardship with Adult Height and Adult Adiposity among Hispanics/Latinos. The HCHS/SOL Socio-Cultural Ancillary Study. *PLoS One* [Internet]. 2016 Feb 26 [cited 2016 Oct 05];11(2):e0149923. Available from:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4769180/>

8. Miglioli TC, Fonseca VM, Gomes Junior SC, Silva KS da, de Lira PI, Batista Filho M. Factors associated with the nutritional status of children less than 5 years of age. *Rev Saude Publica* [Internet]. 2015 [cited 2016 Oct 05];49:59. Available from:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4617433/>

9. Instituto Brasileiro de Geografia e Estatística - IBGE. Cidades. IBGE [Internet]. 2016 [cited 2016 Oct 05]. Available from: <http://www.ibge.gov.br>.

10. Brasil. Ministério da Saúde. Vigilância alimentar e nutricional - Sisvan: orientações básicas para a coleta, processamento, análise de dados e informação em serviços de saúde. Brasília: Ministério da Saúde, 2004. 120 p.

11. Howe LD, Firestone R, Tilling K, Lawlor DA. Trajectories and Transitions in Childhood and Adolescent Obesity. In: Burton-Jeangros C, Cullati S, Sacker A, Blane D, editors. *A Life Course Perspective on Health Trajectories and Transitions* [Internet]. Cham (CH): Springer; 2015 [cited 2016 Oct 05]. Chapter 2. Available from:

<https://www.ncbi.nlm.nih.gov/books/NBK385368/>

12. Lim H, Kim J, Wang Y, Min J, Carvajal NA, Lloyd CW. Child health promotion program in South Korea in collaboration with US National Aeronautics and Space Administration: Improvement in dietary and nutrition knowledge of young children. *Nutr Res Pract* [Internet]. 2016 Oct [cited 2016 Oct 05];10(5):555-62. Available from: <http://e-nrp.org/DOIx.php?id=10.4162/nrp.2016.10.5.555>

13. Mariz LS, Vieira CNK, Medeiros CCM, França ISX de. Social and nutritional characteristics of children and adolescents with overweight: cohort study. *J Nurs UFPE on line* [Internet]. 2012 Oct [cited 2016 Oct 05];6(10):2342-9. Available from: http://www.revista.ufpe.br/revistaenfermagem/index.php/revista/article/view/3159/pdf_1523.

14. Brown EC, Buchan DS, Baker JS, Wyatt FB, Bocalini DS, Kilgore L. A Systematised Review of Primary School Whole Class Child Obesity Interventions: Effectiveness, Characteristics, and Strategies. *Biomed Res Int* [Internet]. 2016 [cited 2016 Oct 05]; 2016:4902714. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5030395/>

15. Van Dommelen P, de Kroon ML, Cameron N, Schönbeck Y, Van Buuren S. The impact of height during childhood on the national prevalence rates of overweight. *PLoS One* [Internet]. 2014 Jan 22 [cited 2016 Oct 05];9(1):e85769. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3899068/>

16. Pedraza DF, Vendas MC, Menezes TN. Fatores associados com o crescimento linear de crianças socialmente vulneráveis do Estado da Paraíba, Brasil. *Ciênc Saúde Coletiva* [Internet]. 2016 Mar [cited 2016 Oct 05];21(3):935-46. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1413-81232016000300935&lng=en

17. Kien VD, Lee HY, Nam YS, Oh J, Giang KB, Van Minh H. Trends in socioeconomic inequalities in child malnutrition in Vietnam: findings from the Multiple Indicator Cluster Surveys, 2000-2011. *Glob Health Action* [Internet]. 2016 Feb 29 [cited 2016 Oct 05]; 9:29263. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4780091/>

18. Gow ML, Baur LA, Ho M, Chisholm K, Noakes M, Cowell CT, et al. Can early weight loss, eating behaviors and socioeconomic factors predict successful weight loss at 12- and 24-months in adolescents with obesity and insulin resistance participating in a

Oliveira HS, Bassler TC, Ferro MAO et al.

Nutritional status of children and adolescents...

randomised controlled trial? Int J Behav Nutr Phys Act [Internet]. 2016 Apr 1 [cited 2016 Oct 05];13:43. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4818484/>

19. Hammersley ML, Jones RA, Okely AD. Parent-Focused Childhood and Adolescent Overweight and Obesity eHealth Interventions: A Systematic Review and Meta-Analysis. J Med Internet Res [Internet]. 2016 July 21 [cited 2016 Oct 05];18(7):e203. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4974451/>

Submission: 2016/10/15

Accepted: 2017/01/16

Publishing: 2017/03/15

Corresponding Address

Thais Carolina Bassler

Fundação Universidade Federal de Mato

Grosso do Sul - Campus Três Lagoas

Avenida Ranulpho Marques Leal, 3.484

Caixa Postal 210

Bairro Distrito Industrial

CEP: 79602-080 – Três Lagoas (MS), Brazil

Copyright of Journal of Nursing UFPE / Revista de Enfermagem UFPE is the property of Revista de Enfermagem UFPE and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.