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Original/*Otros*

# Perception of body image of adolescents and of their parents in relation to the nutritional status and blood pressure

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**Abstract**

**The perception of body image of adolescents is an instrument for nutritional assessment to health conditions.**

***Objective:* To verify the body image perception of adolescents and their parents in relation to nutritional status and blood pressure levels.**

***Methods:* Population-based study, and cross-sectional model, conducted with parents and adolescents aged 10-19 years old, in rural and urban zones in public schools. There was applied the Scale silhouettes for parents about the perception of the described body image and a question about the concern of the nutritional status of their children. There were verified the blood pressure, weight, height and waist circumference, the BMI (kg/m²) calculation of the adolescents, and the self-perceived body image. The data was expressed as average ± standard deviation and percentages.**

***Results:* The sample consisted of 914 adolescents with a mean age of 13.12 ± 2.17 years, 56.8% female and 68.9% were eutrophic. As for blood pressure levels, 17.6% were classified in pre-hypertensive, 18.8% in stage 1 hypertension and 6% in stage 2. About the self-perception, 68% considered themselves being eutrophic and 64.75% of the parents classified their children as eutrophic. There was observed a direct and significant correlation among the body mass index, waist circumference, weight, systemic and diastolic blood pressure with the self-perception of the adolescents and the body image perceptions of the parents (p<0.001).**

***Conclusion:* The nutritional status was significantly correlated with blood pressure, waist circumference and body image perceptions of the adolescents and their respective parents.**

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Key words: *Adolescents. Nutritional status. Body image. Perception. Nutritional evaluation.*

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## PERCEPCIÓN DE IMAGEN CORPORAL DE LOS ADOLESCENTES Y SUS PADRES EN RELACIÓN A NIVELES DE PRESIÓN ARTERIAL Y EL ESTADO NUTRICIONAL

**Resumen**

**La percepción de la imagen corporal de los adolescentes de un instrumento para la evaluación nutricional de las condiciones de salud.**

***Objetivo:* Verificar la percepción de la imagen corporal de los adolescentes y sus padres en relación con los niveles de estado y la presión arterial nutricionales.**

***Métodos:* Estudio poblacional, y el modelo de la sección transversal, realizada con los padres y adolescentes de 10 a 19 años de edad, en las zonas rurales y urbanas en las escuelas públicas. Se aplicó la Escala de siluetas de los padres acerca de la percepción de la imagen corporal descrita y una pregunta acerca de la preocupación de la situación nutricional de sus hijos. No se verificaron la circunferencia de la presión arterial, peso, altura y cintura, el IMC (kg/m²) cálculo de los adolescentes, y la imagen corporal de la percepción subjetiva. Los datos se expresaron como media ± desviación estándar y porcentajes.**

***Resultados:* La muestra estuvo constituida por 914 adolescentes con una edad media de 13,12 ± 2,17 años, 56,8% mujeres y 68,9% eran eutróficos. En cuanto a los niveles de presión arterial, el 17,6% fueron clasificados en pre-hipertensos, 18,8% en la etapa 1 de hipertensión y el 6% en la etapa 2. Sobre la percepción de sí mismo, el 68% se consideraban ser eutróficos y 64,75% de los padres a sus hijos como clasificado eutróficos. No se observó una correlación directa y significativa entre el índice de masa corporal, circunferencia de la cintura, el peso, la presión arterial sistémica y diastólica con la auto-percepción de los adolescentes y la percepción de imagen corporal de los padres (p <0,001).**

***Conclusión:* El estado nutricional se correlacionó significativamente con la presión arterial, circunferencia de la cintura y la percepción de imagen corporal de los adolescentes y sus respectivos padres.**

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Palabras clave: *Adolescentes. El estado nutricional. La imagen corporal. Percepción.Evaluación nutricional.*

## Abbreviations

WC: Waist Circumference.
SAH: Systemic Arterial Hypertension.
BMI: Body Mass Index.
BP: Blood Pressure
DBP: Diastolic Blood Pressure.
SBP: Systolic Blood Pressure.
HBS: Household Budget Survey.
WHO: World Health Organization.

## Introduction

Adolescence is a period of extreme and notable changes, moving through the stages of development and physical, cognitive, psychological, hormonal and social growth in the formation of the individual to adulthood. According to the World Health Organization (WHO), this period comprehends the age group between 10 and 19 years[2]. The current population of Brazil is 190 million of people; 60 million are under 18 years old, the equivalent of almost one third of the whole population of children and adolescents of Latin America and Caribe[3]. In addition to constitute a numerous population group, the teenagers are a conceptualized parcel of low risk for morbidity and mortality, although there is evidence that some chronic diseases of adulthood are initiated in childhood and adolescence[4].

In recent decades, the countries of Latin America were confronted by several processes of transformation in dietary patterns, these movements attributed to nutritional transition of the society that before witnessed numerous cases of prevalence of low body weight and thinness to the emergence of large overweight and obesity epidemic in modern population. These peculiarities found in the nutritional transition process reached Brazil and other countries, causing changes in the nutritional status of the Brazilian population in all cycles of life[5].

The prevalence of overweight and obesity is increasing among the younger population. In Brazil, according to the last national study of the Household Budget Survey (HBS) conducted in the range of 10 to 19 years old, between 2008 and 2009, the prevalence of overweight was 21.5% in boys and 19.4% in girls[6]. The weight gain may contribute to changes and high risk of the developing of hypertension, cardiovascular diseases[7] and the onset of chronic childhood diseases such as insulin resistance, nonalcoholic fatty liver disease, cancers and dyslipidemia[8,9].

Body image is the definition of the individual about his/her own body regarding to the experiences lived on dimensions of their actions, perceptions, physiological, affective and social stimuli. Self-perception of body weight is important because it reproduces the individual's satisfaction and concerns about his/her image. Teenagers are susceptible to certain prevailing social and cultural influences in society that spread an idea of body perfection regarding to the body, distinct from real, driven by conflicts that can generate situations of low esteem and development of eating disorders with negative outcomes for the health[10]. During the period of puberty family, friends and the media influence directly the perception of the body of adolescents[11].

The perception of the nutritional status of adolescents and parents can be a positive resource for the prevention, treatment of obesity in childhood and adolescence and eating disorders. In this sense, the present study aims to verify the body image perceptions of adolescents and their parents in relation to nutritional status and blood pressure levels.

## Methods

It is a population-based cross-section study. It was performed in two municipalities of Taquari valley, Rio Grande do Sul-Brasil. The sample consisted of 914 adolescents of an age group between 10 ≥ and 19≤ years old, of both genders and their respective parents, regularly enrolled in public schools in urban and rural areas. The data was collected during the period from April-June 2014.

The survey was conducted in two stages. In the first step, there was applied the structured questionnaire for the parents about the perception of body image described by Silhouettes Scales of the adolescents and asked a question about the concern regarding to the nutritional status of their children. This questioning was adapted from Aparício and collaborators[8].

In the second stage, there was applied the self-perception questionnaire to the adolescents through image of Silhouettes Scales and the anthropometric measurements, when there were measured the blood pressure (BP), the weight (kg), height (m) and the waist circumference (cm) for subsequent calculation of BMI (kg/m$^2$).

The body weight was measured by using a calibrated digital scale, of brand plena®, with a capacity for 150 kg and 100 g of accuracy. The adolescents were wearing light clothing, barefoot, positioned in the center of the equipment, erect, the feet together and the arms extended along the body, according to the standards established by the Ministry of Health[12].

To measure the height, there was used a stadiometer Avanutri® brand, with extension of 2 meters, divided into centimeters, subdivided into millimeters. The student was placed in the center of the equipment, barefoot, with the head free of props, standing erect, with the arms extended along the body, the head up, looking at a fixed point at the eye level, at the Frankfurt plane, according to the standards established by the Ministry of Health[12].

The BMI was calculated from measurements of weight and height according to the formula: BMI=P/A$^2$,

where P is the weight in kilograms and A is the height in meters squared. The BMI cut-off points adopted were according to the World Health Organization (WHO) in 2007 for each age group[13].

The BP was measured with a digital recorder aneroid Omron® brand; the teenager was seated, arm outstretched on a firm surface, resting for 5-10 minutes, empty bladder and not having practiced any physical exercise, smoked or consumed alcohol, coffee and food 30 minutes before the measurement. The cuff was firmly positioned about 3 cm above the antecubital fossa, keeping the patient's arm at heart height and legs uncrossed and relaxed. Three measurements were performed with an interval of 1-2 minutes among them, and the final value of BP was obtained from the arithmetic average of the three measurements[14]. The BP was classified according to the V Brazilian Guidelines on Hypertension[14].

The waist circumference (WC) was collected with an inextensible tape measure, brand CESCORF, with an accuracy of 1 mm, on the narrowest portion of the torso, between the ribs and the iliac crest at the time of expiration so that the waist region remained naked, according to the standards established by the Ministry of[12]. The cutoff points adopted for WC for children and adolescents from 6-16 years old, classified according to the recommendation of McCarthy et al[15] to the age group and those over 16 years were classified according to Taylor et al[16].

The data regarding to the body image perception was obtained through Figure Rating Scale proposed by Stunkard et al.[17] and validated for the Brazilian population[18].

The participants were included by adhesion, from the signature of Informed Consent Form. The study was approved by the Ethics Committee under Research number 72871 (COEP/UNIVATES), accredited by the National Council of Health.

### *Statistical analysis*

The data was analyzed using the SPSS program, version 20.0. The level of significance was 5% ($p<0.05$). Univariate descriptive (average, standard deviation and frequencies) and bivariate (chi-square association test and Spearman correlation test) statistics were performed. There was used the Kolmogorov-Smirnov test to assess whether the continuous variables followed a normal distribution. The chi-square test was used to compare the adolescents according to the school, urban or rural area, gender, classification of BMI and WC for the variables: BMI, SBP and DBP, WC, self-perception of body image and perception of the parents. The Spearman correlation test was applied to analyze the association among the continuous variables (BMI, weight, SBP, DBP, WC, self-perception and perception of parents).

## Results

There were evaluated 914 adolescents of an average age of 13.12 ± 2.17 years, 56.8% (n=519) were female. Most of the adolescents (68.9%, n=630) were at normal weight as BMI classification by WHO, 2007 and 73.5% (n=672) showed normal WC for their age and gender. As to the blood pressure variables (SBP and DBP), 17.6% (n=161) of the adolescents were classified as pre-hypertensive, 18.8% (n=172) in hypertension (HBP) stage 1 and 6% (n=55) in hypertension stage 2. Regarding to perception, 68% (n=562) of the adolescents considered themselves to be eutrophic, while 64.75 of the parents rated their children as normal. The general characteristics of the sample are shown in table I.

By comparing the schools, there was a significant difference among the prevalence of hypertension ($p=0.026$), increased WC ($p<0.001$), image perception by the responsible ($p=0.014$) and concern about obesity ($p<0.001$).

There was no significant difference between the prevalence of hypertension according to the classification of DBP ($p<0.001$), increased WC ($p<0.001$) and concern about obesity by the responsible ($p=0.021$), while comparing rural and urban areas. So, there was a direct association between the rural schools and pre-hypertension among the adolescents, as well as in urban schools and normal blood pressure levels; between the rural area and increased WC, and urban area and normal WC, between parental concern and urban schools, while there was no concern in rural schools.

By comparing the genders, there was a significant difference among the classification of BMI, WC, SBP and DBP, self-perception and perception of the image of the parents, so that there was association among the female gender and eutrophy according to the BMI, the self-perception and the perceptions of the parents, normal WC and normal SBP/DBP normal. As for the male gender, there was association with overweight and obesity according to the BMI, the self-perception and the perception of the parents, increased WC and pre-hypertension or hypertension.

By analyzing the association between the variables of anthropometric profile with the body image perceptions of the adolescents and the parents with the pressure levels, there is a direct and significant correlation among BMI, WC, weight, SBP and DBP with the self-perception of the body image and the body image perceptions of the parents ($p<0.001$). The results are shown in table II.

## Discussion

This study found the majority of adolescents in eutrophic condition, according to the BMI, normal WC for the age and blood pressure variables (SBP

**Table I**
*General characteristics of the sample*

| *Variables* | *n* | *%* |
|---|---|---|
| Zone | | |
| Urban | 805 | 88,1 |
| Rural | 109 | 11,9 |
| Gender | | |
| Female | 519 | 56,8 |
| Male | 355 | 43,2 |
| BMI | | |
| Accentuated Thinness | 4 | 0,4 |
| Thinness | 10 | 1,1 |
| Eutrophy | 630 | 68,9 |
| Overweight | 164 | 17,9 |
| Obesity | 93 | 10,2 |
| Severe Obesity | 13 | 1,4 |
| SBP and DBP | | |
| Normal (<P90º) | 526 | 57,5 |
| Pre-hypertension (>P90º e <P95º) | 161 | 17,6 |
| SAH stage 1 (>P95º e <P99º) | 172 | 18,8 |
| SAH stage 2 (>P99º) | 55 | 6,0 |
| WC | | |
| Normal | 672 | 73,5 |
| High | 242 | 26,5 |
| Self-Perception | | |
| Thinness (image 1) | 79 | 9,6 |
| Eutrophy (image 2,3) | 562 | 68,0 |
| Overweight (image 4,5) | 163 | 19,7 |
| Obesity (image 6,7) | 21 | 2,5 |
| Severe Obesity (image 8,9) | 2 | 0,2 |
| Gender of the Responsible | | |
| Female | 709 | 77,6 |
| Male | 205 | 22,4 |
| Relationship of the Responsible | | |
| Father/Mother | 870 | 95,2 |
| Grandparents | 19 | 2,1 |
| Uncle/Aunt | 6 | 0,7 |
| Brother/Sister | 8 | 0,9 |
| Other Relatives | 11 | 1,2 |
| Perception Parents Image | | |
| Thinness (image 1) | 148 | 16,26 |
| Eutrophy (image 2,3) | 591 | 64,7 |
| Overweight (image 4,5) | 158 | 17,3 |
| Obesity (image 6,7) | 17 | 1,9 |
| Concern | | |
| Not concerned at all | 301 | 32,9 |
| Concerned | 505 | 55,3 |
| Very concerned | 108 | 11,8 |

Frequencies described in percentages (%). BMI = Body Mass Index. SBP = Systolic Blood Pressure. DBP = Diastolic Blood Pressure.

and DBP) of prehypertension and hypertension and self-perception and the perception of the parents in accordance with nutritional status.

In a study of coorte[19] conducted in the South of Brazil, with 4.452 adolescents at the age of 11 years, the results obtained that were very similar to this study in relation to the nutritional status of the adolescents; about 69.8% as normal, 11.6% overweight and 11.6% obese, showing a higher prevalence of obesity among males, 15.1%; however, the females showed 13.0% of overweight. Another correspondent data was about the self-perception of the adolescents; 56.0% felt normal and the perception of the parents about the nutritional status of the adolescents was 58%, according to the nutritional assessment that was found. The study of Boa Sorte and collaborators[20] in Brazil, conducted by questions about weight perception with 1,741 students, children and adolescents aged 6-19 years, resulted in 64.7% for the self-perception and 75.3% for the perception of the mothers, since 16.8% of the adolescents overestimated their own weight and 18.4% underestimated the perceived weight in relation to the BMI classification.

The results of this study identified on the parents' perception about the weight of their children were contradictory in relation to those of the study by Tenorio and colaborators[8] that detected a low perception of the parents; the articles described considered that parents of overweight kids do not recognize or do not consider that this is a health problem.

In the study of Heshmart and collaborators[21] performed in Iran with 5.570 adolescents, from 10-19 years old of both genders, which evaluated the association of perceived weight status (body image), the body mass index (BMI), life satisfaction and self evaluation of health with the national database of students of surveillance entitled "Study of Surveillance and Prevention in Children and Adolescence of noncommunicable diseases that are common in adults (Caspian)", has detected a mismatch between the BMI and the body weight perception. The study demonstrated that around 40% of the adolescents misinterpret their body image; these results found in relation to the perception of body weight were considered a negative association with the life and self evaluation of the health of the adolescents.

The increased consumption of foods with high calorie content in Brazil, high level of sodium, saturated fats, sugar, sugary drinks and snacks of fast food type, and low consumption of fruits and vegetables in the diet of adolescents and the physical inactivity in all ages, boost higher risks of development of overweight and obesity and the arising of chronic diseases among Brazilian adolescents[22]. The prevalence of overweight and obesity in international studies[23,24,25,26] with adolescents of average age 10-17 years old, showed numbers of overweight of 35.0%[23], 25%[24], 22,85%[25] and 16,75%[26], that comply with the results of this study; 17.9% overweight and 10.2% obese.

**Table II**
*Correlation of nutritional status and blood pressure with the perception of the body image of adolescents and parents*

| [n 914] | BMI | | Weight | | WC | | SBP | | DBP | |
|---|---|---|---|---|---|---|---|---|---|---|
| | R | p | r | p | r | p | r | p | r | p |
| Self perception | 0,645 | <0,001 | 0,512 | <0,001 | 0,541 | <0,001 | 0,241 | <0,001 | 0,173 | 0,013 |
| Perception of responsible | 0,678 | <0,001 | 0,483 | <0,001 | 0,527 | <0,001 | 0,220 | <0,001 | 0,207 | <0,001 |

r = Coefficient of correlation; Body Mass Index (BMI) = weight in kg divided by height in meters squared; WC = Waist Circumference in centimeters; SBP (systolic blood pressure) and DBP (diastolic blood pressure) reported in mmHg. Spearman correlation test (nonparametric variables) for the correlation among variables, considering significant p<0.05 (5%).

When the higher nutritional risk was compared to the assessment of Stunkard silhouette scale, the study of Musaiger and collaborators[27] conducted in the Middle East, with 661adolescentes aged between 12-17 years in public schools, the results of this study were confirmed, where there was an association with overweight and obesity for males of 20.5%.

In the study of by Domingos and collaborators[28] conducted in the North of Brazil with 154 adolescents aged 10-17 years old, there were verified the anthropometric variables, the circumference of abdominal waist and the blood pressure at rest; there was found an association between nutritional status and the high blood pressure with significance of (p=0.032), as well as between the WC and high blood pressure (p=0.003). In this study, when there were compared the urban and rural schools, there was perceived that there was a significant difference between the hypertension prevalence according to the classification of the DBP (p<0,001), increased WC (p<0,001). This direct association of rural schools was about the prehypertension, the increased WC and it showed differentiation about the male gender that where there was significance among the classification of BMI, WC, SBP and DBP.

In the study of Campagnolo and colaborators[29] held in the countryside of the South of Brazil, that verified the predictive anthropometric measurements of high blood pressure of 1.1013 adolescents aged from 10-16 years old, the prevalence of high blood pressure was 13.4%; there was no significant difference between genders (14.0% among girls and 12.8% among boys p=0.553), as well as the prevalence of high WC was 37.2% according to the criteria of Taylor *et al*. In that study, the anthropometric measurements showed a significant correlation with the blood pressure, compared to this study, the variables of blood pressure (SBP and DBP), showed high numbers of 17.6% (n=161) of adolescents were classified as pre-hypertensive, 18.8% (n=172) in SAH stage 1 and 6% (n=55) in SAH stage 2, but there was a differentiation in the genre, the male was more representative in this sample.

Regarding to the question about the evaluation of the level of parental concern about their children becoming overweight or obese, based on the study of Aparicio and collaborators[8], which examined the sight of the parents on the nutritional status of the of preschool children aged 3-6 years with 234 participants, using the Figure Rating Scale of Collins, that consists of seven images of both genders, there was identified in the aspects of nutritional assessment 64.1% normal weight, 16.7% overweight, 17.9% obesity and 1.3% low-weight. There was found that most of the parents, 65% consider themselves nothing or little concerned, especially regarding to the male children (68,4%) and only 22.2% showed to be concerned in relation to the daughters (25.8%), a small percentage proved to be quite or very concerned (5.6% and 7.3% respectively) and there was not found significance about the parent's concern about their children becoming overweight or obese, in parity to this study; the parents of adolescents were given only three answers to choose about the same question and the percentages were very similar; 55.3% showed concern, 32.9% were not concerned at all, and 11.8% were very concerned. When comparing the perception of the parents and the demographic variables due to the area of residences to which belonged the surveyed schools in both studies, there was significant difference among the concern of parents; in urban schools parents were more concerned, while in the schools of the countryside they did not care.

## Conclusion

The nutritional status was significantly correlated with the blood pressure levels, the waist circumference and the body image perception of the adolescents and their parents. The results show that the adolescents and their parents have a real perception of body image. Once parents recognize the nutritional status of their children of overweight and obesity and other health problems, if they are controlled in this stage of life, many chronic diseases can be prevented in adulthood.

### *Limiting Factors*

The verification of eating habits through a nutrition survey, a 3-day record, could have contributed to a proper assessment of dietary intake in relation to

macro and micronutrients caloric needs of adolescents and analysis of socio-economic characteristics of the parents.

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