46 - UNDERWEIGHT AND OVERWEIGHT IN ADOLESCENTS: A PROPOSAL FOR A REFERENCE CURVE FOR A STATE IN NORTHEASTERN BRAZIL

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INTRODUCTION

The human being is nothing more than a product resulting from genetic interactions with the macro social environment, economic and cultural context in which it occurs, is fully developed preceded by their satisfaction with their food needs (COUTINHO, 1998). Therefore, environmental effects that influence the satisfaction of these needs are factors that contribute to the change of situation of a healthy weight for problems with overweight or underweight.

Adolescence, in turn, is characterized as a transition between childhood and adulthood exposed to significant changes occur (MARCONDES, 1987; BRAGGION; MATSUDO; MATSUDO, 2000). This time, changes occur in the accelerated and significant body composition, "influenced by hereditary, environmental, nutritional and psychological (SERRA, 2001) in which about 50% by weight and 20% of its final height is acquired at the same time that is the completion of their sexual maturation and increase their bone mineral (SAITO, 1993).

Overweight is defined as an excess of body fat relative to lean body mass characterized by a body mass index percentile (BMI) greater than 85% (MUST; DALLAL; DIETZ, 1991; WHO, 1995; COLE et al., 2000) while low weight, as defined by BMI percentile than 5% (WHO, 1995), is a deficiency or lack of nutrients - proteins, carbohydrates, vitamins and aminoacids - essential for the proper development of the individual. However, it is important to note that the reference model of growth and development currently used in Brazil (WHO, 1995), does not reflect the reality due to our geographical size and variability of environmental influences in different regions and ecosystems (SISVAN, 2004).

The use of anthropometric measures has been considered a valid strategy to generate indicators of nutrition and living conditions of population groups (GUIMARÃES; PIRES-NETO, 1997). According Sigulem et al. (2000), the anthropometric method has become the main tool for the creation of instruments, based on mathematical formulations with high diagnostic power of various disorders of growth and development.

Because of its high applicability, low cost and ease of use, BMI, has been used as a tool for assessing nutritional status in various studies on body composition and nutritional status of diverse populations (COLE et al., 2000; SILVA, 2002; SOUZA; DUARTE, 2005; ARAUJO, 2006), in however this instrument is not accepted without qualification: the main one is its inability to distinguish fat mass from fat-free mass, and the fact that adolescents, due to different methodological proposals in the development of the particular curves combined socioeconomic and environmental groups underwent studies, standardization of cutoff of nutritional status becomes impossible (REIFF e VIEIRA et al., 2006).

From the methodological point of view, various proposals have been suggested for the construction of population curves (MARQUES et al., 1975; MUST; DALLAL; DIETZ, 1991; COLE et al., 2000; KUCZMARSKI et al., 2000) so that, while it is contemplated the characteristics of each target group of the study, emphasis is the difficulty of standardizing an instrument that characterizes the various populations of Brazil and the world.

Given the above and understanding the research population endowed with specific social and geo-economic policies that distinguish it from others, this paper aims to propose a reference curve BMI / age for adolescents from southern state of Sergipe, based on behaviors that influence status of that population.

METHODS

The study of cross-sectional sketch was developed based on behaviors that influence the nutritional status of adolescent students in southern Sergipe, in northeastern Brazil.

To carry out data collection used the administrative classification established by the Secretary of State for Education and Culture of Sergipe comprising the municipalities of Regional Offices of Education (DREs).

The DRE chosen, called DRE 02, is located in the southern state and covers seven counties.

Used as a factor in the homogenization of selected cities, the human development index (HDI), indicator based on a combination of three dimensions - longevity, education and income - showed those districts classified as medium human development (0.500 to 0.800) PNUD, (2003).

The sample of 648 high school students in state public education has been characterized as random and proportional by county, uniform and stratified by gender and age, intentional and part of class lessons with a mean age of 16.50 ± 1.12 for males and females

The survey data were collected in two meetings, by two tools: a questionnaire with information about the socio economic situation of individuals, daily physical activity and behavior of anxiety and depression, explained that after the house was filled in and returned to the evaluator in the school and the anthropometric measurements, and measured height and weight, performed in individuals who returned questionnaires properly filled.

RESULTS AND DISCUSSION

In adolescents, due to high individual variability in the rate of maturation (MARCONDES, 1987; COUTINHO; BARROS, 2001; SOUZA; DUARTE, 2005), the BMI is associated with age across the bows of population references, nomograms that each individual is positioned relative to one group or population of reference represents, theoretically, a group of individuals within a population that benefits from environmental conditions, social and economic measures to exploit their full genetic potential of development (MARCONDES, 1987; SISVAN, 2004, DEVICENZI; RIBEIRO; SIGULEM, 2005).

In this sample to determine the status of underweight and overweight was made use of BMI and adopted as the reference for overweight 85th percentile (P85) (MUST; DALLAL; DIETZ, 1991; WHO, 1995; OLIVEIRA; TADDEI, 1998; COLE et al., 2000; SISVAN, 2004) and low birth weight percentile 05 (P05) (WHO, 1995; SOARES, 2003; SISVAN, 2004).

The reference population for the contents of height / age / gender and BMI / age / gender was used as recommended by the World Health Organization, through the scale of the National Chronic Disease Center - CDC and National Center for Health Statistics-NCHS (OLIVEIRA; TADDEI, 1998). The cutoff points of BMI, specific for the group were determined from the subjects selected to compose the population of reference outlined by individuals who have positive environmental interactions measured by classifying as "eutrophic" by reference nomograms of the WHO (1995); total height with age-appropriate reference by the CDC (BARROS; NAHAS, 2003), considered "physically active" for the assessment of PAQ-C (SILVA; MALINA, 2000); single (a), with up to four residents in the same residence, with home ownership, with a minimum family income three minimum wages, with a minimum education of parents less than 5th grade of elementary school.

To determine the cutoff points were used percentiles Eighty-five (P85) for overweight (MUST; DALLAL; DIETZ, 1991; WHO, 1995; COLE et al., 2000; SISVAN, 2004; DEVICENZI; RIBEIRO; SIGULEM, 2005) and five (P05) for low birth weight (WHO, 1995; SISVAN, 2004; DEVICENZI; RIBEIRO; SIGULEM, 2005). For therefore, we calculated the cumulative frequency (percentile) of each BMI among the reference population, thus determining which correspond to the BMI percentiles for overweight and underweight in each gender and age (Table 1).

Table 1 - Cut-off points proposed for the reference population of southern Sergipe

AGE	MALE		FEMALE	
	P05	P85	P05	P85
	(Underweight)	*(Overweight)*	*(Underweight)*	*(Overweight)*
15 years	16,57	22,56	17,72	21,95
16 years	17,56	22,59	17,56	22,19
17 years	17,13	22,69	17,73	23,31
18 years	17,23	24,43	17,86	22,70

These cuts are almost identical to P05 (underweight), among males with the references to WHO (1995), this is not happening among the females showing higher values at all ages compared to the same nomogram. For the P85 (overweight), the cuts proposed by the WHO (1995) are higher in all ages and both sexes. This may be due to the fact that the population used in drawing the curves of WHO is made up of individuals from around the world, most developed countries where overweight and obesity have high rates of occurrence, determining so little genetic variation, indicating that the use of cutoff points of BMI of reference proposed for international use may underestimate the gain of body fat in populations where overweight has not yet reached high levels.

To determine the validity of the cut-off points proposed for the population studied, tests were made of sensitivity and specificity.

In this study, the high values of sensitivity and specificity due to the fact that nomograms were used as reference tools with a similar design methodology used in constructing the proposal of this research (Tables 2 and 3).

Table 2 - Test Sensitivity and Specificity for P05 (low weight) and P85 (Overweight) students were male adolescents in southern Sergipe.

AGE	UNDERWEIGHT		OVERWEIGHT	
	Sensibility	Specificity	Sensibility	Specificity
15 years	100,00	86,54	83,24	100,00
16 years	100,00	92,91	79,91	100,00
17 years	91,73	93,14	76,51	100,00
18 years	84,22	100,00	72,35	100,00

Table 3 - Test Sensitivity and Specificity for P05 (low weight) and P85 (Overweight) students female adolescents in southern Sergipe

AGE	UNDERWEIGHT		OVERWEIGHT	
	Sensibility	Specificity	Sensibility	Specificity
15 years	100	73,23	81,99	100
16 years	100	84,86	77,52	100
17 years	100	89,90	72,18	100
18 years	100	95,67	63,31	100

The tests of sensitivity and specificity are used to measure the ability of a test must measure what he intends to (JEKEL; KATZ; ELMORE, 2005; MEDRONHO et al., 2006), however, the choice of cut-off points more specific or more sensitive, depends on the purpose for which determined. According to Reiff and Vieira et al. (2006), cut-off points lower and therefore more sensitive than the NCHS / WHO, is more precise to identify adolescents at nutritional risk, thus shortening the time for effective preventive measures, but high rates of sensitivity increase the chance of detecting false positives, which can overwhelm and burden the public health services.

The Figures 1 and 2 shows a graphical representation of the cut-off points most suitable for the detection of low weight and overweight in the population studied. Compared with the lines of the NCHS / WHO, one can observe an underestimation of these values in relation to overweight, suggesting possible inadequacies in the intervention actions to prevent and combat the overweight adolescents.

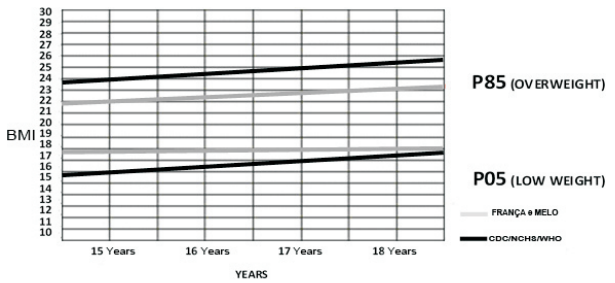

Figure 1 - Reference curve BMI for age is proposed for the population of adolescent males in the southern state of Sergipe, compared with the curve segment corresponding to age (CDC / NCHS / WHO).

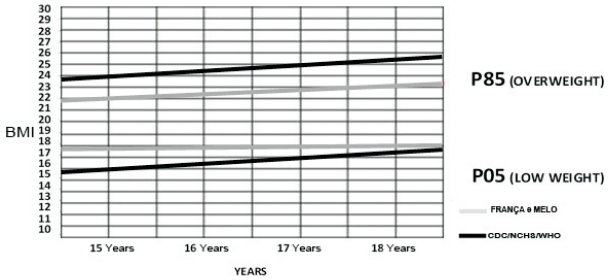

Figure 2 - Reference curve BMI for age is proposed for the population of female adolescents in the southern state of Sergipe, compared with the curve segment corresponding to age (CDC / NCHS / WHO).

The curves of the evolution of BMI according to age of adolescent students in southern Sergipe are similar to the population curves proposed by NCHS / CDC (1977) and adopted by WHO in 1995, but the BMI of cuts for overweight (P85) in both genders, are significantly lower compared to the first ($p < 0.05$) and even with rising behavior similar to curve proposed in this study points to the need for greater attention to assessment of overweight, by the organs of public health, at risk of having that in the medium term, to mobilize large amounts of skilled labor and funds to combat obesity and its health in the future adults. The weight loss in males, the figures do not differ significantly from the curves of the NCHS / CDC (1977), however, among the females were recorded higher values, especially in younger individuals in the sample (15 and 16 years), showing that a portion of that population has been classified as eutrophic and is, in fact, low weight and no monitoring of public health services.

The deficit of BMI by age in the adolescent population of the southern state is an important indicator of chronic malnutrition, especially related to psychological factors (performance anxiety and depression) and cultural (physical activity) in contrast with the secular trend of low birth weight and malnutrition in the northeast that nutritional attributes this characteristic to socio-economic factors.

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LOW WEIGHT AND OVERWEIGHT IN ADOLESCENTS: A PROPOSAL OF THE CURVE OF REFERENCE FOR A STATE OF NORTHEAST BRAZIL

ABSTRACT

Environmental interference are factors that contribute to the changing situation of a healthy weight problems for overweight or underweight. With the help of anthropometric method, which appears as a tool for building tools based on mathematical models with high diagnostic power of various disorders of growth and development, this work, sectional and descriptive aims to propose a curve a reference BMI for age for adolescents from southern state of Sergipe, based on behaviors that influence the nutritional status of that population. The sample comprised 648 schoolchildren, was characterized as random and proportional by county, uniform and stratified by gender and age, class and intentional shift of classes with an average age of 16.50 ± 1.12 years. To determine the status of underweight and overweight was made use of BMI and was adopted as the reference for overweight and the 85th percentile for underweight 05. Of the subjects with changes in nutritional status is observed a higher incidence of overweight (> 8.50%) in both genders and all ages in relation to low birth weight (<3.09%). To determine the validity of the points proposed cuts were carried out with sensitivity and specificity. Studies on the prevalence of overweight and underweight and their relationship to socio-economic, environmental and physiological systems should be performed in various regions, thus generating better knowledge in order to drive adoption of guidelines and more effective strategy to combat to nutritional disorders.

KEYWORDS: Underweight, overweight, Reference curve, Adolescent Nutritional Disorders

FAIBLE POIDS ET L'EMBONPOINT EN ADOLESCENTS: UNE PROPOSITION DE LA COURBE DE REFERENCE POUR UN ETAT DU BRÉSIL DU NORD

RÉSUMÉ

Interférences de l'environnement sont des facteurs qui contribuent à l'évolution de la situation d'un des problèmes de poids sain pour les poids excessif ou insuffisant. Avec l'aide de la méthode anthropométrique, qui apparaît comme un outil pour les outils de construction basée sur des modèles mathématiques avec la puissance diagnostique élevée de divers troubles de la croissance et le développement, ce travail, en coupe et objectifs descriptifs de proposer une courbe une référence de l'IMC pour l'âge pour les adolescents de l'Etat sud de Sergipe, basée sur les comportements qui influent sur l'état nutritionnel de cette population. L'échantillon comprenait 648 élèves, a été caractérisé comme aléatoire et proportionnelle par comté, uniforme et stratifiées par sexe et par âge, la classe et de transfert intentionnel de classes avec un âge moyen de 16,50 ± 1,12 années. Pour déterminer l'état de l'insuffisance pondérale et de l'embonpoint a été fait usage de l'IMC et a été adopté comme référence pour le surpoids et le 85e percentile pour le 05 une insuffisance pondérale. Parmi les sujets à des changements de l'état nutritionnel est observé une incidence plus élevée de la surcharge pondérale (> 8,50%) dans les deux sexes et de tous âges par rapport au poids insuffisant à la naissance (<3,09%). Pour déterminer la validité des points réductions proposées ont été réalisées avec la sensibilité et la spécificité. Les études sur la prévalence du surpoids et de l'insuffisance pondérale et de leurs relations avec les systèmes socio-économiques, environnementaux et physiologiques doivent être effectués dans diverses régions, générant ainsi une meilleure connaissance en vue de favoriser l'adoption de lignes directrices et plus efficace stratégie de lutte contre à des troubles nutritionnels.

MOTS-CLÉS: Insuffisance pondérale, surpoids, courbe de référence, adolescent, troubles nutritionnels

BAJO PESO Y SOBREPESO EN LOS ADOLESCENTES: UNA PROPUESTA DE LA CURVA DE REFERENCIA PARA EL ESTADO DE DEL BRASIL

RESUMEN

Interferencias ambientales son factores que contribuyen a la evolución de la situación de un peso saludable problemas de sobrepeso o bajo peso. Con la ayuda del método antropométrico, que aparece como una herramienta para la construcción de herramientas basadas en modelos matemáticos con alto poder de diagnóstico de diversos trastornos de crecimiento y desarrollo, este trabajo transversal y descriptivo tiene como objetivo proponer una curva una referencia de IMC para la edad de los adolescentes a partir de sureño estado de Sergipe, en base a comportamientos que influyen en el estado nutricional de la población. La muestra fue de 648 niños en edad escolar, se caracterizó por ser aleatoria y proporcional por condado, uniforme y estratificada por sexo y edad, la clase y el cambio intencional de clases con una edad media de 16,50 ± 1,12 años. Para determinar la validez de los puntos de los recortes propuestos se llevaron a cabo con sensibilidad y especificidad. Los estudios sobre la prevalencia de sobrepeso y el bajo peso y su relación con los sistemas socio-económicos, ambientales y fisiológicas deben realizarse en diversas regiones, generando así un mejor conocimiento con el fin de impulsar la adopción de directrices y la estrategia más eficaz para luchar contra la a los trastornos nutricionales. De los sujetos con los cambios en el estado nutricional se observa una mayor incidencia de sobrepeso (> 8,50%) en ambos sexos y de todas las edades en relación con el bajo peso al nacer (<3,09%).

PALABRAS CLAVE: Bajo peso, sobrepeso, curva de referencia, adolescentes, desórdenes nutricionales

BAIXO PESO E SOBREPESO EM ADOLESCENTES: UMA PROPOSTA DE CURVA DE REFERÊNCIA PARA UM ESTADO DO NORDESTE BRASILEIRO

RESUMO

Interferências ambientais são fatores que contribuem para a mudança de situação de um peso saudável para problemas com sobrepeso ou baixo peso. Com o auxilio do método antropométrico, que configura-se como a ferramenta para a criação de instrumentos, baseados em formulações matemáticas com elevado poder diagnóstico de vários distúrbios de crescimento e desenvolvimento, este trabalho, seccional e descritivo, tem como objetivo propor uma curva de referência IMC/Idade para adolescentes do sul do estado de Sergipe, baseada em comportamentos que influenciam o estado nutricional daquela população. A amostra, composta por 648 escolares adolescentes, foi caracterizada como aleatória e proporcional por município, uniforme e estratificada por gênero e idade, intencional por turma e turno de aulas com média de idade de 16,50±1,12 anos. Para a determinação do estado de baixo peso e sobrepeso fez-se uso do IMC e adotou-se como referência de sobrepeso o percentil 85 e para baixo peso o percentil 05. Dos sujeitos que possuem alterações do estado nutricional observa-se uma maior ocorrência de sobrepeso (> 8,50%) em ambos os gêneros e em todas as idades em relação ao baixo peso (< 3,09%). Para determinar a validade dos pontos de cortes propostos, foram realizados testes de sensibilidade e especificidade. Estudos sobre a ocorrência de sobrepeso e baixo peso e suas relações com fatores sócio-econômicos, ambientais e fisiológicos, devem ser realizados em várias regiões, gerando com isso, conhecimento mais adequado de modo a conduzir a adoção mais efetiva de orientações e estratégia de combate aos distúrbios nutricionais.

PALAVRAS CHAVE: Baixo peso, sobrepeso, Curva de referência, Adolescente, Distúrbios Nutricionais