# 33 - THE PREVALENCE OF OBESITY AND OVERWEIGHT AND FLEXIBILITY IN TEENS LEVELS OF 14 TO 18 YEARS 

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## INTRODUCTION

The children and adolescents obesity is growing rapidly across the globe. Over time, the habits of man, influenced by its current fast-paced lifestyle, the fast food, the stress of contemporary life, the reduction in energy expenditure through work activities (or leisure) among others, has placed before a situation of hiperadiposidade, or excess fat mass. As a result of excess body weight, adolescents may suffer effects of so-called metabolic syndrome (MORENO et al., 1998; SOAR et al., 2004; BENSIMHON, KRAUS and Donahue, 2006). Obesity juvenile has some specific aspects of this population. Besides the sedentary lifestyle and intake of foods with high calorie, obesity relate to this stage the hours of use of television, video games and computers (MISRA AND KURANA, 2008), driven by a lack of safe places for leisure, little time that parents have for family interaction, physical inactivity and exposure to the world of advertising consumerist (MILLER, aND SILVERSTEIN ROSEMBLOOM, 2004). In addition to the metabolic effects, obesity can reduce the functional capacity in this population. It is known that excess body fat in addition to being a risk factor for several diseases affect physical performance because it limits the movements and leads to early fatigue due to overload that imposes the body (ACSM, 2000). This scope has flexibility, a capacity more negatively influenced by the excess body weight. In adolescents, specifically, the flexibility decreases until puberty and increases during adolescence, reaching a plateau and then decrease again (ALTER, 1999; GUEDES And GUEDES, 1997). Varies by gender, with girls generally have a greater capacity to articulate (Lamari, CHUEIRE AND LAMB, 2005; Seckin et al., 2005).

Research of differences in flexibility between individuals have taken into account some influencing factors such as anthropometric measurements (Grant et al., 2001), body composition (GUEDES And GUEDES, 1997), genetics (Grahame, 2001), culture (GUEDES And GUEDES, 1997) and pathologies (Tsang and MAK, 2004). Therefore, the characterization of the flexibility of an individual is multifactorial. The Sit and Reach Test is the most widely accepted (TSANG AND MAK, 2004). The impairment of flexibility can lead to serious health problems, such as postural changes, muscle pain, breathing difficulties, decreased motor skills in daily among others. For this, it is necessary to identify those individuals at greater risk of developing complications of excess weight and take steps to protect them (PERGHER et al., 2010). Based on this information, this study aimed to identify the influence of children and adolescents body weight through body mass index (BMI), flexibility of the posterior chain muscles of the back and legs, through your evaluation by test and sit-reach and its association with variables, height, age, sex and body mass in adolescents in the city of Imperatriz, Maranhão, Brazil. Since it is possible that the increase in body weight can influence levels of flexibility and this influence eventually cause discomfort and postural problems, it is necessary to study this problem.

The lack of study of this nature and this target audience reinforces the need for a scientific deepening under the influence of obesity and overweight levels of flexibility in adolescents. The research involved a sample of 118 students aged between 14 and 18 years, enrolled in high school and frequent, coming from a public school chosen by availability. Students were selected by simple random sampling and underwent two evaluations: an anthropometric (weight, height and BMI) and flexibility.

## METODOLOGY

The study has a cross-sectional descriptive and analytical. The population of the study were students of both sexes, aged 14 to 18 years, a state school in the municipality of Empress (Maranhão). After the sample identified the researcher conducted a brief explanation of the research instruments and their goals. Each student received two copies of the Statement of Consent (IC) to obtain permission from a guardian. Data were collected during school hours, on school premises, combined with prior appointment with the Director of the School and the students participating in the research. Selected for the study were 118 students, volunteers. Students underwent an anthropometric assessment of weight and height to calculate the body mass index (BMI), and an assessment of flexibility.

The body mass was measured with the appraised standing with his back to the scale of the balance, with lateral spacing of the feet, standing on the platform between them. Then put yourself in the center and on the platform, standing with eyes fixed on a point in front of you. We performed only one measure (SON FERNANDES, 1999; PROESP-BR, 2009). At the height measurement the individual remained in the standing position (PO): a person standing upright, arms at your sides, feet together, trying to touch the instrument to measure the posterior surface of the heel, pelvic girdle, scapular and occipital region. The measurement was made with the individual maximal inspiratory breath-hold, to minimize possible variations in results and head oriented at the Frankfurt plane, parallel to the ground (SON FERNANDES, 1999; PROESP-BR, 2009). As was the cursor at an angle of $90^{\circ}$ relative to the scale. In this study was used to measure weight and height, a scale Soehnle Professional 7755, precisely 100 grams, with embedded Asimed meter height, with a minimum height of 95 centimeters (cm). The machine has a maximum capacity of 200 kg for body weight and 230 cm for height. The evaluated were advised to wear shorts and shirt, and remain barefoot during assessments (weight and height). For body mass index was calculated: body mass in kilograms (kg) divided by height in meters $(\mathrm{m})$ squared ( $\mathrm{kg} / \mathrm{m} 2$ ). Then for determining the rate of overweight and obesity among adolescents was applied to classification of Conde and Monteiro (2006).

The flexibility was measured by testing Sit-and-reach without the Bank Wells (PROESP BR-2007). For this test, a measuring tape was stretched on the ground, the 38.1 cm mark this tape was placed a piece of tape at 45 cm perpendicular to the tape. The subject sat evaluated with zero end of the tape measure between the legs, ankles almost touch the tape in the 38.1 cm mark and separated about 30 cm . With your legs straight and hands overlapping, the appraised leaned slowly and held his hands forward as far as possible. The subject remained in that position long enough to be recorded by the distance evaluator. The result was measured in centimeters from the farthest position that the student could achieve in scale with the fingertips. The best result was recorded between two runs with one decimal notation on. To follow results table was used SPORT DESIGN BRAZIL (2007).

The study data were analyzed by GraphPadPrism 5.0. Was used for data analysis using descriptive statistics of mean, standard deviation, minimum, and maximum frequency. For the correlation of analytical results used statistics by testing Spearman nonparametric test. The results are shown in tables using descriptive statistics.

## RESULTS

The table 1 shows the anthropometric characteristics of the participants. Are 118 teenagers, aged between 14 and 18 years, and of this total, 53 (fifty three) males and 65 (sixty-five) females. The average age was 16.05 ( $\pm 1.04$ ) years. For anthropometric data were observed average height of $1.63( \pm 0.09)$ meters and weight average of $55.78( \pm 10.68) \mathrm{kg}$. In the use of anthropometric data may identify the BMI of the sample, generally with an average of $20.84( \pm 2.96) \mathrm{kg} / \mathrm{m} 2$.

TABLE 1. Anthropometric characteristics and age of the sample.

| GENERAL |  |  |  |
| :--- | ---: | ---: | ---: |
| Características | Mean | DP | N |
| Age (years) | 16,05 | 1,04 | 118 |
| Weight (kg) | 55,78 | 10,68 | 118 |
| Height $(\mathrm{m})$ | 1,63 | 0,09 | 118 |
| IMC $\left(\mathrm{kg} / \mathrm{m}^{2}\right)$ | 20,84 | 2,96 | 118 |

After identification of the IMC, adolescents were classified as underweight, normal weight, overweight and obesity. Table 2 shows the classification consists of $3(2.5 \%)$ subjects in the underweight group, $98(83.0 \%)$ in the normal weight group, 15 ( $12.8 \%$ ) in the overweight group and 2 ( $1.7 \%$ ) in the obesity group.

TABLE 2. IMC Rating, general and by genre.

|  | GENERAL |  | MALE |  |  | FEMALE |  |
| :--- | :---: | :---: | :---: | :---: | :---: | ---: | :---: |
| Characteristics | Frequency | $\%$ | Frequency | $\%$ | Frequency | $\%$ |  |
| Low weight | 3 | $2,5 \%$ | 1 | $1,9 \%$ | 2 | $3,0 \%$ |  |
| Normal weight | 98 | $83,0 \%$ | 39 | $73,6 \%$ | 59 | $91,0 \%$ |  |
| Overweight | 15 | $12,8 \%$ | 12 | $22,6 \%$ | 3 | $4,5 \%$ |  |
| Obesity | 2 | $1,7 \%$ | 1 | $1,9 \%$ | 1 | $1,5 \%$ |  |
| Total | 118 | $100 \%$ | 53 | $100 \%$ | 65 | $100 \%$ |  |
| Overweight+Obesity | 17 | $14,5 \%$ | 13 | $24,5 \%$ | 4 | $6,0 \%$ |  |

In Table 03, the results achieved in testing flexibility by adolescents were classified as: Very Poor, Poor, Fair, Good and Very Good Sample data for the identified group Very Poor: 22 adolescents ( $18.7 \%$ ); Weak : 19 adolescents ( $16.1 \%$ ) Average: 34 adolescents (28.9\%); Good: 19 adolescents (16.1\%) and Very Good: 24 adolescents (20.3\%).

TABLE 3. Rating levels of flexibility, overall and by gender.

|  | GENERAL |  | MALE |  | FEMALE |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| Characteristics | Frequency | $\%$ | Frequency | $\%$ | Frequency |  |
| Very poor | 22 | $18,7 \%$ | 9 | $17,0 \%$ | 13 | $20,0 \%$ |
| Poor | 19 | $16,1 \%$ | 8 | $15,1 \%$ | 11 | $16,9 \%$ |
| Fair | 34 | $28,8 \%$ | 11 | $20,7 \%$ | 23 | $35,4 \%$ |
| Good | 19 | $16,1 \%$ | 9 | $17,0 \%$ | 10 | $15,4 \%$ |
| Very good | 24 | $20,3 \%$ | 16 | $30,2 \%$ | 8 | $12,3 \%$ |
| Total | 118 | $100 \%$ | 53 | $100 \%$ | 65 | $100 \%$ |

In Table 4, with the intention of seeking relationships between levels of flexibility with BMI of adolescents was assessed averaged in centimeters reached during the test sit and reach of each track BMI, underweight, normal, overweight and obesity. In assessing the flexibility of the muscles of the posterior chain, the overall average in centimeters achieved was 33.4 ( $\pm$ $10.5) \mathrm{cm}$ for males was $34.6( \pm 10.7) \mathrm{cm}$ in females and $32,5( \pm 10.3) \mathrm{cm}$.

TABLE 4. Average rating levels of flexibility, according to IMC overall and by gender.

|  | GENERAL |  |  | MALE |  |  | FEMALE |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Characteristics | Mean | $\pm$ | N | Mean | $\pm$ | N | Mean | $\pm$ | N |
| General | 33,4 | 10,5 | 118 | 34,6 | 10,7 | 53 | 32,5 | 10,3 | 65 |
| IMC low weight | 26,0 | 3,6 | 3 | 25,0 | 0 | 1 | 26,5 | 4,9 | 2 |
| IMC Normal | 33,7 | 10,4 | 98 | 35,4 | 10,2 | 39 | 32,5 | 10,5 | 59 |
| IMC overweight | 33,6 | 12,1 | 15 | 33,5 | 12,9 | 12 | 34,0 | 10,0 | 3 |
| IMC Obesity | 31,5 | 6,4 | 2 | 27,0 | 0 | 1 | 36,0 | 0 | 1 |

## DISCUSSION

In the current study we found that IMC in the population sample of 118 individuals is predominantly classified as normal weight adolescents with 98 ( $83 \%$ ), with 39 males and 59 females, the second highest result was classified as overweight with 15 adolescents ( $12.8 \%$ ), 12 males and 3 females, the other two percentages of IMC research showed that only 3 children $(2.5 \%)$ were underweight, with 1 male and 2 females and 2 children ( $1.7 \%$ ) were obese, and 1 of each sex, such a situation before we can highlight the strong presence of male adolescents in classifying overweight and a greater amount of female adolescents with normal weight, and highlights the prevalence of both sexes in their normal body mass index.

The research is consistent with national data provided by the Brazilian Institute of Geography and Statistics - IBGE (Household Budget Survey 2008-2009 - Anthropometry and nutritional status of children, adolescents and adults in Brazil),
where it highlights that the greatest percentage of teens aged 14 to 19 years old are at normal weight, another smaller portion is overweight and a minority are obese or underweight and also highlighted the presence of a greater number of male adolescents the age group 14-17 years in the ratings "overweight," "underweight" and "obese" in the counterpart female adolescents age 18 have a higher incidence of overweight and obesity than the male adolescents.

Finally IBGE related cases of anthropometry and nutritional status of adolescents with income, where the prevalence of overweight showed a strong increase with income. In a study conducted by Marcelo Conte (2000) highlights the prevalence of overweight ( $21.42 \%$ ) students in a public school in the city of Sorocaba / SP, exceeding this study showed that only $12.8 \%$ adolescents in this classification, whereas the study by Fonseca (1998) which recorded $31.10 \%$ of overweight among students in private school in Niterói / RJ was far superior to our research. However this study was higher than the $10.7 \%$ reported by Souza (1998) research on adolescents in outpatient nutrition and adolescent service of the Secretariat of Health of the State of Pernambuco. Probably the explanation of the prevalence of overweight schoolchildren in the state of Maranhão, São Paulo, Rio de Janeiro and Pernambuco differentiate reflects the different realities to which these youths are inserted, showing this process the presence of economic and social indicators as for example, income per capita, purchasing power, access to health care and housing.

Regarding the assessment of flexibility in school children of Empress was noted that of the 118 individuals surveyed are predominantly classified as "Average", with 34 adolescents ( $24.8 \%$ ), 11 males and 23 females, the second highest result was classified as "Very Good" with 24 adolescents (20.3\%), 16 males and 8 females, the third highest percentage 18.7\% (22 adolescents) were attributed results "very weak ", 9 males and 13 females, while the other two percent of survey Flexibility showed that the values for" weak "and" good "have the same percentage ( $16.1 \%$ ), with 8 male and 11 females totaling 19 individuals for "weak" and 9 males and 10 females resulting in 19 adolescents to "good", we notice a predominance in classifying Average and Very good, reflecting a majority of students having a classification front good levels of flexibility in starting noted against a considerable amount of individuals with poor flexibility compared to the parameters for age. In research conducted by Glory (2011) found that the level of flexibility among boys and girls is similar. From 13 to 16 years old had lost both levels, but the boys had a better rate with a small gap on girls, in this study we found that the flexibility of adolescent males were superior to classification of "good" and "very good", while females were higher on ratings of "very weak", "weak" and "reasonable", realizing a higher concentration of female students in categories of flexibility medians and bad, while the male concentrated in the categories above average. In a study by Lamari (2007) also noted that there may be a variation of test results in sit-reach, which showed different results for the test performed slowly and for the test performed quickly, thus adding one more variable results for the classification of flexibility in adolescents in this study was not taken into account the speed of test execution, and he may have been executed without such speed restrictions. The results showed that not always researches relating flexibility involving both sexes, females did not show superiority in all age groups, contradicting what many think independent cases, women are always more flexible than men.

Relating the results of body mass indices with the flexibility was noted that there were considerable differences in the results of the tests of flexibility, where the sit and reach test adolescents with normal weight had the value of 33.7 cm , the 33.6 cm of overweight and obesity with 31.5 cm , so that values are not present discrepancy between them, contrary to the common sense idea that flexibility is directly related to body mass index; in a study by Afonso (2009) in adolescents aged 15 to 19 years is reported that there is no significant relationship between the level of physical activity and flexibility, speculating that the behavior of joint mobility or flexibility should be determined by the pattern of physical activity, ie what kind of movement is routinely performed in order to adapt to mechanical movements, leading to better mechanical efficiency (lower energy) and improving the specific performance. However, it is valid to point out that the presence of stretches that help provide subsidies in the presence of health-related benefits and non-interference with her considerable values of body mass index does not mean it does not present the same importance for the maintenance and improvements in health, on the contrary, these two elements combined can certainly contribute a lot to the welfare healthy.

## CONCLUSION

The results of this study suggest that the prevalence of overweight and obesity in adolescents assessed is present mainly in males, a fact that shows us how important it is to be watching often the emergence of changes in body weight of adolescents. Regarding the levels of flexibility, the results show that most of the sample has reached or exceeded the minimum mark on the test, while only females showed a slight tendency towards poor flexibility, this shows that the body weight, general had no effect on the test results of flexibility.

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## THE PREVALENCE OF OBESITY AND OVERWEIGHT AND FLEXIBILITY IN TEENS LEVELS OF 14 TO 18

## YEARS

## ABSTRACT

Society today lives with the problems of obesity and overweight, especially with teens by their habits of contemporary life. From this observation, set up this cross sectional study was carried-analytical in town and Empress - MA and had a population sample of 118 adolescents aged 14 to 18 years. The aim was to relate the influence of body weight through the juvenile body mass index in the posterior muscle chain flexibility of the back and legs, through your evaluation by test sit-and-reach. According to data obtained body mass index, there was a prevalence of normal weight: 98 ( $83 \%$ ), followed by overweight: 15 $(12.8 \%)$. In the classification by gender, the prevalence of normal weight: Male 39 ( $73.6 \%$ ) female and 59 ( $93.0 \%$ ) and overweight: male 12 (22.6\%) and females (4.5\%). Assessing the flexibility, the present study demonstrated that most teenagers fits the classification of "reasonable" 34 (28.8\%), while 24 ( $20.3 \%$ ) in classification "very good" and 22 others (18, $7 \%$ ) in classification "very weak" and yet, 19 (16.1\%) are in the classification of weak and another 19 (16.1\%) were classified as "good". The relationship between BMI and the assessed level of flexibility not found any evidence was proportional or inversely proportional between these variants. Thus, the results showed no significant influence related to body mass index with levels of flexibility, since adolescents with normal weight and overweight, achieved results in sit and reach test statistically close.

KEYWORDS: adolescence, flexibility, IMC.

## PRÉVALENCE DE L'OBÉSITÉ ET LE SURPOIDS ET SOUPLESSE DES NIVEAUX DE ADOS 14 À 18 ANS

 RÉSUMÉReconnaissant les difficultés de la société moderne avec les problèmes d'obésité et de l'embonpoint, surtout par les habitudes des adolescents de la vie contemporaine, le maintien d'une habitude de vie saine et active, ainsi que des possibilités de pratique fréquente d'une activité physique pour le développement du moteur meilleure cognitif, affectif et social ensemble jusqu'à ce descriptive transversale-analytique qui a eu lieu dans la ville et de l'impératrice - MA et avait un échantillon de population de 118 adolescents âgés de 14 à 18 ans, afin de relier l'influence du poids corporel juvénile par l'indice de masse corporelle dans la flexibilité de la chaîne musculaire postérieure du dos et des membres inférieurs de leur évaluation par le test de sit-and-portée. Selon les données obtenues indice de masse corporelle était la prévalence de poids normal: 98 ( $83 \%$ ), suivie par le surpoids: 15 ( $12,8 \%$ ), dans la classification par genre par la prévalence d'un poids normal: 39 hommes ( $73,6 \%$ de femmes) et $59(93,0 \%)$ et le surpoids: hommes $12(22,6 \%)$ et les femmes (4,5\%), l'évaluation de la souplesse de cette étude ont montré que la plupart des adolescents s'inscrit dans la classification «raisonnable» $34(28,8 \%)$, tandis que $24(20,3 \%)$ dans la classification «très bonne» et $22(18,7 \%)$ dans la classification "très faible", encore 19 ans (16,1\%) sont la classification des faibles et 19 autres $(16,1 \%)$ ont été classés comme «bon». La relation entre l'IMC et l'évaluation du niveau de flexibilité trouvé aucune preuve était proportionnelle ou inversement proportionnelle entre ces variantes, et les résultats connexes n'ont montré aucune influence significative de l'indice de masse corporelle avec des niveaux de flexibilité, car les adolescents ayant un poids normal ou en surpoids résultats obtenus dans le test de flexion du tronc statistiquement proche.

MOTS-CLÉS: de l'adolescence, de la souplesse, IMC.

## LA PREVALENCIA DE OBESIDAD Y SOBREPESO Y FLEXIBILIDAD EN LOS NIVELES DE ADOLESCENTES DE

 14 A 18 AÑOSRESUMEN
Reconociendo las dificultades de la sociedad moderna a los problemas de la obesidad y el sobrepeso, sobre todo por los hábitos de los adolescentes de la vida contemporánea, manteniendo un hábito de vida saludable y activo, así como las posibilidades de la práctica frecuente de actividad física para mejorar el desarrollo motor cognitivo, afectivo y social conjunto
esta sección transversal descriptivo-analítico, que se celebró en la ciudad y la Emperatriz - MA y tenía una muestra de población de 118 adolescentes de 14 a 18 años, con el fin de relacionar la influencia del peso corporal juvenil por el índice de masa corporal en la flexibilidad de los músculos de la cadena posterior de la espalda y las extremidades inferiores mediante su evaluación por la prueba de sit-and-reach. Según los datos obtenidos índice de masa corporal de la prevalencia de peso normal: 98 (83\%), seguido por exceso de peso: 15 (12,8\%), en la clasificación por género por la prevalencia de peso normal: 39 hombres ( $73,6 \%$ mujeres) y 59 ( $93,0 \%$ ) y sobrepeso: masculino 12 ( $22,6 \%$ ) y mujeres ( $4,5 \%$ ), la evaluación de la flexibilidad de este estudio mostraron que la mayoría de los adolescentes se ajusta a la clasificación "razonable" 34 ( $28,8 \%$ ), mientras que 24 (20,3\%) en la clasificación de "muy buena" y 22 (18,7\%) en la clasificación de "muy débil", sin embargo, 19 (16,1\%) son la clasificación de los débiles y otros $19(16,1 \%)$ fueron clasificados como "bueno". La relación entre el IMC y el nivel evaluado de flexibilidad que no se encuentra ninguna evidencia era proporcional o inversamente proporcional entre estas variantes y resultados relacionados no mostró influencia significativa del índice de masa corporal con los niveles de flexibilidad, ya que los adolescentes con peso normal y con sobrepeso resultados obtenidos en la prueba de sentarse y llegar estadísticamente cerca.

PALABRAS CLAVE: IMC, la adolescencia la flexibilidad,.

# A PREVALÊNCIA DA OBESIDADE E SOBREPESO E NÍVEIS DE FLEXIBILIDADE EM ADOLESCENTES DE 14 A 

 18 ANOS
## RESUMO

Reconhecendo as dificuldades da sociedade atual com os problemas de obesidade e sobrepeso, em especial os adolescentes pelos seus hábitos da vida contemporânea, de manter um hábito de vida saudável e ativo, bem como as possibilidades da prática frequente de atividade física para um melhor desenvolvimento motor, cognitivo, afetivo e social; configura-se esse estudo transversal descritivo-analítico que foi realizado na cidade e Imperatriz - MA e contou com uma população amostra de 118 adolescentes entre 14 a 18 anos, o objetivo de relacionar a influencia do peso-corporal infanto-juvenil através do índice de massa corporal na flexibilidade da cadeia muscular posterior do dorso e membros inferiores através de sua avaliação pelo teste de sentar-e-alcançar. Segundo os dados do Índice de massa corporal obtidos houve a prevalência de peso normal: $98(83 \%)$, seguido por sobrepeso: $15(12,8 \%)$, na classificação por gênero a prevalência por peso normal: masculino 39 ( $73,6 \%$ ) e feminino 59 ( $93,0 \%$ ); e no sobrepeso: masculino 12 ( $22,6 \%$ ) e feminino ( $4,5 \%$ ), avaliando a flexibilidade o presente estudo apresentou que a maioria dos adolescentes enquadra-se na classificação de "razoável" 34 ( $28,8 \%$ ), enquanto 24 $(20,3 \%)$ na classificação "muito bom" e outros 22(18,7\%) na classificação "muito fraco", ainda 19 (16,1\%) estão na classificação de fraco e outros $19(16,1 \%)$ foram classificados como "bom". As relaçõ̃es entre o IMC e o nível de flexibilidade dos avaliados não foi constatado nenhuma evidência proporcional ou inversamente proporcional entre essas variantes, assim os resultados relacionados não apresentaram influencia significativa do índice de massa corporal com os níveis de flexibilidade, pois adolescentes com peso normal e sobrepeso alcançaram resultados no teste de sentar e alcançar estatisticamente próximos.

PALAVRAS CHAVES: adolescência, flexibilidade, IMC.

