79 - POSTURAL ALIGNMENT AND OVERWEIGHT IN 11 TO 14 YEARS OLD STUDENTS FROM AN PUBLIC SCHOOL IN TERESINA CITY, PIAUI STATE

GILVANA CÉLIA TELES DE SOUSA[1]
MARIA DO CARMO DE CARVALHO E MARTINS[1,2]
FABRÍCIO TAPETY[1]
MARIA ELIETE BATISTA MOURA[1,2]
GERARDO VASCONCELOS MESQUITA[1,2]
1. Faculdade NOVAFAPI, Teresina, Piauí, Brasil.
2. Universidade Federal do Piauí, Teresina, PI, Brasil.
e-mail:carminhacmartins@yahoo.com.br

INTRODUCTION

School age coincides with an important period in human development in some aspects. Motor changes occur and changes in eating habits are evident and the child and the adolescent may suffer injury in body composition, leading them to overweight and obesity, which can contribute to imbalances in the human musculoskeletal system. In addition overweight and obesity are considered global public health problems.

Several studies show data evidencing a Brazilian nutritional transition in recent decades. In the last 30 years the prevalence of malnutrition among adolescents presented a fall at about 70% and, on the other hand, the overweight increased by approximately 350% in the masculine gender and 105% in female gender (MASCARENHAS, 2007).

The human posture represents the relationship between kinematic positions of complex joints of the body at a given time. Spinal stability is ensured by the traction forces exerted by intrinsic and extrinsic muscles and ligaments of the trunk. Postural changes occur when deforming forces are acting on the structure of the vertebral column during childhood and adolescence. In these growth steps deforming forces may lead to a vertebral acunhamento, which causes unbalance that may produce deformities or accelerate its progression (PEREIRA, 2006). Scoliosis is a postural deviation that presents high incidence and prevalence in adolescents (DÖHNERT, 2008).

Whereas the increase in body mass, notably increased body fat deposition, leverages the risk factors for noncommunicable and chronic diseases, excess body weight could contribute to deviations in posture, this study was conducted to investigate the relationship between body alignment and overweight in adolescents.

METHODOLOGY

School-based cross-sectional study conducted with 56 students from 6th to the 9th year of elementary public school located in the eastern region of Teresina, Piaui state. Prior to the start of data collection it was performed an educational lecture about body postures for the school community aimed at raising awareness and partnership with the school. Data collection was held in May 2011.

The population of the study is represented by 194 male and female students from the urban area and enrolled in the academic year 2011. Inclusion criteria considered were: to be enrolled in elementary school II, age between eleven and fourteen years, agreed to be part of the study, and presence of authorization by their parents or guardians by signing the end of free and informed consent (TCLE). The TCLE was delivered by the students themselves to parents or guardians who authorized the participation of the student through the signing of consent. 75 students who were excluded presented below the age of 11 or more than 14 years, 54 lacked to school in the period of data collection, by the absence of permission from parents or guardians, or by refusing to participate in the study, and nine for truancy. There was not found cases of musculoskeletal disease, limiting physical disabilities and/or musculoskeletal deformities structural.

The instrument used to record the data collected was a schedule established by the researcher, divided into three blocks of information, being the first student identification, according to records of anthropometric measures and nutritional state and the third for postural evaluation.

To antropometric assessment, measures of weight and stature were held with thes students in orthostatic position, arms outstretched and aligned sideways to the body, and look on the horizon, using analog balance brand CAMRY with a capacity of 130 kg and a tape measure fixed on the wall. The boys trajaram bermuda and had chest and nude girls, top trajaram bikini BRA, bathroom or at the top of the trunk and bermuda and kept trapped hairs. In all measures the subject remained barefoot.

For evaluation of postural alignment photographic images were obtained in reserved environment where students used the same costumes previously cited for anthropometric measures. Students were brought in groups of four and separated by gender. To standardize the images, the wall was lined with rubberized tatami mats. The markers of adhesive surfaces were spherical 13 mm in diameter, placed in anatomical points from which were delineated the leveling values of body surface. For the abstraction of the images was used a digital camera branded SONY 10.1 Megapixel, fixed on a table the 1.10 m tall from the ground and the 2.5 metres of teenager who was the 15 cm from the back wall. (DÖHNERT, 2008).

The photographic images were made in the plans front and dorsal in orthostatic position. Anatomical references were based on Protocol SAPo (software of postural assessment). In the previous view points 5, 6 and 7 (left and right acromion, acromion manubrium of the sternum, respectively); 12 and 13 (right anterior superior iliac spine, anterior superior iliac spine left, respectively); 17 and 20 (medial point of patella medial point right and the left patella, respectively); 18 and 21 (tuberosidade of the right tibia and tuberosidade of left tibia); In the rear view point 3 and 4 (left and right acromion); 15 (C7 vertebra), 18 (T5 vertebrae), 20 (T9 vertebrae), 22 (vertebrae T12), 26 (L5 vertebra); 9 and 10 (póstero iliac spine-top right and left); 30 point (line articulate the right knee), 31 (left knee articular line); point 37 (calcaneus right) and 41 (calcaneus left).

For measuring the flatness of the girdle were considered the points 5 and 6 in the previous view, and 3 and 4 in the vista later. The pelvic belt references were the previous points 12 and 13, and 9 and 10 for the later. Once quantified, the angles were compared and sorted. Double bends were classified in the presence of the combination of the above variables.

Opted to analyze only the previous view of the photographic record of the pupil, on grounds of possible divergent results in relation to the previous view and later, what could characterize bias in the study.

Inauguration of photographic records of students, the leveling values and alignments were the software analysed using COREL DRAW x 5. Considering the biomechanical rationale where bone anatomical references pairs (contralateral) must be flattened, parallel to the ground, which represents an angle of between 0º leveling itself and both the 90 of the ground, and that

odd references too (homolateral) should be aligned with each other, forming a line perpendicular to the ground, forming an angle of between 0º leveling itself and both the 90° to the longitudinal axis x parallel with the ground, the cutoff point considered for flattening corporal was of 3 (three degrees) in relation to 90 of plotting axes y and x, as a measure of abscissas tolerance or physiological, functional height differences and values above this angulation were classified as pathological body unevenness (DÖHNERT, 2008).

The nutritional status of adolescents was sorted by percentile of body mass index (BMI), based on the table suggested by Cole et al (2000), in which the appropriateness of weight for height is classified according to gender and age. Percentiles above p95 were considered for definition of overweight, those below p5 as low weight, and those who were between p5 and p95 were classified as ideal weight (COLE et al., 2000).

Statistical analysis was descriptive, with presentation of measures of central tendency and dispersion, absolute and relative frequency and for the quantitative variables. Analysis of relationship among the variables used the linear Pearson correlation test. The significance level was established at $p < 0.05$.

The research project was approved by the Ethics Committee prior to the completion of the study NOVAFAPI.

RESULTS

In table 1 are the socio-demographic characteristics of school children searched. Among the 56 schoolchildren assessed noted that just over half was in the feminine (55.3%), over the age of 12 years (57.1%). The average age was 1.02 ± 13 years. Anthropometric measures, the average body weight was 41.3± 8.6 kg and the average stature 1.53 ± 0.08 m.

Table 1: socio-demographic Characteristics of students from 11 to 14 years of a State public school of the city of Teresina-PI, 2011.

Variable	n	%
Genus		
Male	25	44.6
Female	31	55.3
Age (years)		
11	5	8.9
12	19	33.9
13	18	32.1
14	14	25.0

Postural deviations were identified of girdle in 10 (17.9%) teenagers, corresponding to 20% in boys and girls in 16.1% (table 2). The deviations in the pelvic girdle occurred at 14.3% of the students, corresponding to 16% in the masculine gender and 12.9% in female gender (Table2). It is noteworthy that 10 (55.6%) of 18 cases of pathological unevenness were girdle. Were considered as double curvature where deviations from the above two measures, appeared on being such a situation observed in a student of the masculine gender and none in female.

Table 2: alignment of the pectoral girdle and Pelvic belt of students from 11 to 14 years of a State public school of the city of Teresina-PI, 2011.

Vertical type	Male		Female		General	
	n	%	n	%	N	%
Unevenness of pectoral girdle						
Physiological (≤3º)	20	80.0	26	83.9	46	82.1
Pathological (> 3)	5	20.0	5	16.1	10	17.9
Unevenness of pelvic girdle						
Physiological (≤3º)	21	84.0	27	87.1	48	85.7
Pathological (> 3)	4	16.0	4	12.9	8	14.3

In relation to nutritional status sorted based on the percentile of BMI, as shown in Table 3, it was noted that most school (83.9%) ranked euphotic, corresponding to 76% of boys and 90.3% of the girls. On the other hand, 3.6% were excess body weight (BMI percentile > 95).

Table 3: classification of the overall nutritional status of the second percentile body mass index (BMI) of students from 11 to 14 years of a State public school of the city of Teresina-PI.

Overall nutritional status	Male		Female		General	
	n	%	n	%	n	%
Low weight	5	20.0	2	6.4	7	12.5
Eutrofia	19	76.0	28	90.3	47	83.9
Excess weight	1	4.0	1	3.2	2	3.6

Not statistically significant correlations were found between alignment of girdle or pelvic variables with BMI, age, gender or body weight (table 4).

Table 4: correlation between alignment of pelvic and pectoral girdle with sociodemographic characteristics and body mass index (BMI) in 11 to 14 years students of a school of public network state of the city of Teresina-PI.

Variables analysed	Correlation coefficient	P value
Age X alignment of pectoral girdle	0.005	0.970
Age X pelvic alignment	0.198	0.144
Weight X alignment of pectoral girdle	0.049	0.673
Weight X pelvic alignment	0.057	0.717
BMI X alignment of pectoral girdle	0.010	0.941
BMI X pelvic alignment	-0.053	0.696
Genus X alignment of pectoral girdle	-0.097	0.476
Genus X pelvic alignment	-0.219	0.104

DISCUSSION

Currently the postural deviations are common due to the action of agents external stressors in daily life of individuals. Second Pereira et al (2006), postural deviations are the most common disorders of the spine, which could be justified by the fact that the spine is considered one of the structures that most suffer with physical inativity and poor posture. Of the more common

scoliosis postural deviations presents itself with high incidence and prevalence in teenagers, demonstrating the importance of research that they can investigate situations of risk for this frame.

Adolescent idiopathic scoliosis is a dimensional change of the vertebral column, whose etiology is still unknown and that has its beginning at puberty, having your big moment of progression associated with the stretch of growth (DÖHNERT, 2008). The idiopathic scoliosis primarily affects the female teenager and produces a thoracic curve to the right, with bulge right rib; and its etiology may involve genetic tendencies, hormonal imbalances, neuromuscular imbalances and various types of childhood stresses, be they physical or emotional (TIDSWELL, 2001).

The conventional radiographic examination identifies the deformities of the spine, but its use in basic school survey is not recommended, because it puts at risk the child and/or teenager exposing them to radiation and generate costs (DÖHNERT, 2008). Faced with this limitation, for the present study we opted to use the biofotogrametria for the detection and documentation of bodily alignment. Inthe relationshipbody alignment it was found that 17.9% of teens have submitted pathological unevenness of the pectoral girdle and 14.3% of the pelvic girdle, demonstrating that most teenagers did not present structural misalignment.In addition, the results here found demonstrating greater proportion of unevenness of girdle (55.6%) in respect of pelvic girdle are in agreement with other studies. In this sense, Santos (2009) on postural evaluation study with 247 public elementary school in Jaguariúna-SP has shown that the deviations were found more postural imbalances shoulder (50.2%). Tidswell (2001) predominance of postural deviations in girls school, however among the evaluated in this study the proportions of pelvic and scapular deviations, respectively, were higher in boys (20% and 16%) when compared with the proportions found among girls (16.1% and 12.9%).

Although the gold standard for diagnosis of scoliosis is the x-ray of the spine, the postural evaluation of postural misalignment as identification is accomplished in this study may be conducted in schools screening method for identifying cases suggestive of scoliosis and therefore enable referrals needed for early diagnosis and treatment of children with idiopathic scoliosis. The computed biofotogrametria allows fast, accurate and reliable diagnosis based on static image as photography (PITA, 2007), and in school age can be used as a resource to indicate possible postural deviations to suggest further investigation through appropriate investigations in clinical environments.

The BMI is an indicator of nutritional status that classifies the individual through the relationship of its mass (weight) and height (meters) in Member-if dicando is in ideal body weight, overweight or obesity measures (PIMENTA, 2001). For nutritional evaluation of the child the global indicator of nutritional status used as a reference is the percentile of BMI, in which the fitness weight/stature is sorted through pre-established values in tables according to age and gender (MELLO, 2004). The majority of teens surveyed (83.9%) had normal body weight percentile of BMI, the second being the proportion of overweight equal to 3.6% and the low weight of 12.5%. Such results are different from those found in studies of Balaban (2001) among teenagers of medium/high class school of Recife, where the prevalence of overweight was 26.6%, and in Ramos' study 1,334 adolescents, ages 11 to 18 years, enrolled in schools teaching State network of 5 series to 3 high school, in which malnutrition (P < 5) was found at 3.4% of teens and overweight and obesity (P > 95) was 3.5%.

Second Pimenta (2001), obesity carries influences on postural system, generating abnormal forces on the locomotor apparatus of individuals. However, this study has not been shown the presence of correlation between body alignment and excess weight. However, the reduced sample size as well as the fact of having been used only a method for identifying body unevenness and a method of comprehensive evaluation for the presence of excess weight may be limitations to obtaining conclusive results about possible relationship between these variables.

Studies using other methods to postural assessment and evaluation of nutritional status of school at this stage of development and greater sample size are required to test for the existence of relationship among the variables studied.

REFERENCES

BALABAN, G. Prevalência de sobrepeso e obesidade em crianças e adolescentes de uma escola da rede privada de Recife. Jornal de Pediatria. v.77, n.2, p.96-100, 2001.

COLE, T. J. et al. Establishing a standard definition for child overweight and obesity worldwide: international survey. British Medical Journal. v. 320. p.1-6, 2000.

DÖHNERT, M. B., Tomasi E. Validade da fotogrametria computadorizada na detecção de escoliose idiopática adolescente. Revista Brasileira de Fisioterapia. v.12, n.4, p. 290-7, 2008.

MASCARENHAS, L. P. G. Estado nutricional de meninos de 9 a 11 anos da cidade de Curitiba. Revista Mackenzie de Educação Física e Esporte. v. 6, n.3, p. 73-78, 2007.

MELLO, E. D. et al. Obesidade infantil: como podemos ser eficazes? Jornal de Pediatria. v. 80, n.3, p. 173-82, 2004.

PEREIRA, V. C. G. et al. O rastreamento de alterações posturais nas escolas como ferramenta ergonômica na prevenção de afecções da coluna vertebral. Curitiba-PR. ABERGO - Asso. Bras. de Ergonomia, 2006.

PIMENTA, A. P. A. A; PALMA, A. Perfil epidemiológico da obesidade em crianças: relação entre televisão, atividade física e obesidade. Rev. Bras. Ciência e Movimento. v. 9 n. 4 p. 19-14, 2001.

PITA, M. C.; PASCHOARELLI, L. C.; SILVA, J. C. P. Biofotogrametria Computadorizada: Aplicação na Avaliação Postural Fisioterapêutica e sua Contribuição para o Design Ergonômico. Anais do VII ERGODESIGN e VII USICH. Balneário Camboriú/SC: NPDESIGN - UNIVALI, v. 1, 2007.

SANTOS, C. I. S. et al. Ocorrência de desvios posturais em escolares do ensino público fundamental de Jaguariúna, São Paulo. Revista Paulista de Pediatria; v.27, n. 1, p.74-80, 2009.

TIDSWELL, M. Ortopedia para Fisioterapeutas. London: Ed. Premier, 2001.

Correspondência para
MARIA DO CARMO DE CARVALHO E MARTINS
(RuaVitorino Orthigues Fernandes, 6123,
BairroUruguai. CEP: 64.073-505, Teresina –Piauí)
e-mail:carminhacmartins@yahoo.com.br

POSTURAL ALIGNMENT AND OVERWEIGHT IN 11 TO 14 YEARS OLD STUDENTS FROM AN PUBLIC SCHOOL IN TERESINA CITY, PIAUI STATE

ABSTRACT

Background: The school age coincides with an important phase in human development at some aspects. Many changes occur in the motor activities and eating habits are evident, and in children and adolescents may present a disproportionate increase of body mass and pathological changes in body structure. Objective: To investigate the possible

relationship between body alignment and overweight in students of elementary education from a public school. Method: This is a descriptive cross-sectional survey realized with students aged between 11 and 14 years. The sample consisted of 56 male and female students which were evaluated at the school. The overall nutritional status was classified based on the percentile of body mass index (BMI). The postural alignment was evaluated by photogrammetry. The leveling values and alignments were the software analysed using COREL DRAW x 5. The cutoff point considered for flattening corporal was of 3 (three degrees) in relation to 90 of plotting axes y and x, as a measure of abscissas tolerance functional or physiological unevenness. In the analysis of relationship among the variables used the linear Pearson correlation test. Results : There were deviations in girdle waist in 17.9% of students and in the pelvic waist at 14.3%. Overweight was observed in 3.6% of the students. There were no significant statistical correlations among alignment of girdle or pelvic waist and body mass index, gender or age. Conclusion: In the group of children studied there was not relation between postural alignment and overweight.

KEY WORDS: postural Deviations, body alignment, overweight.

ALIGNEMENT POSTURAL ET SURPOIDS DANS LES ELEVES DE 11 A 14 ANS DE L'ECOLE AU RESEAU PUBLIC de TERESINA, PIAUÍ.

RÉSUMÉ

Introduction: L'âge scolaire coïncide avec une période importante dans le développement humain dans les divers aspects. Motor changements se produisent et changements dans les habitudes alimentaires sont évidents, et les enfants et les adolescents peuvent soumettre augmentation disproportionnée de changements de masse et pathologiques de corps dans la structure de l'organisme. Objectif: étudier les relations possibles entre l'alignement du corps et le surpoids dans les écoles élémentaires (II) une école publique l'État du Minnesota. Méthode: il s'agit d'une recherche de nature descriptive transversale avec une approche quantitative à l'école âgés de 11 à 14 ans. L'échantillon était composé de 56 étudiants des deux sexes, qui ont été évaluées dans l'école elle-même. L'état nutritionnel global a été classé basé sur le percentile de l'indice de masse corporelle (IMC). Alignement postural a été évalué par la méthode biofotogrametria. Les valeurs et les alignements de nivellement étaient le logiciel analysés à l'aide de COREL DRAW x 5. Le point de coupure pour le caporal aplatissement était de 3 (trois degrés) à 90 de traçage axes y et x, comme mesure de la dénivellation fonctionnelle ou physiologiques tolérance d'abcisse. Dans l'analyse des relations entre les variables utilisées les expériences de corrélation linéaire Pearson. Résultats: Inégalité dans la ceinture ont été retrouvés à 17,9 % des élèves et la ceinture pelvienne à 14,3 %. Excès de poids chez 3,6 % de l'école. Corrélations pas statistiquement significatives ont été trouvées entre la mise à niveau de la ceinture ou pelviennes et indice de masse corporelle, sexe ou l'âge. Conclusion: Groupe scolaire étudié n'était pas une relation démontrée entre alignement postural et l'excès de poids.

MOTS CLÉFS : déviations posturales, alignement du corps, en surpoids.

LA ALINEACIÓN POSTURAL Y EL EXCESO DEL PESO CORPORAL EN UN GRUPO DE ESTUDIANTES ENTRE LOS 11 Y LOS 14 AÑOS DE EDAD EN UNA ESCUELA DE LA RED PÚBLICA DE TERESINA, PIAUÌ

RESUMEN

Introdución: La edad escolar (coincide) con un período importante en el desarollo humano sobre varios aspectos. Acontecen alteraciones motoras y los cambios de los costumbres alimentares son evidentes, y el niño y el adolescente pueden presentar um aumento desproporcional de la masa corporal y alteraciones patológicas en la estructura corporal. OBJETIVO: Analizar la posible relación entre la alineación corporal y el exceso del peso en los alumnos de la enseñanza fundamental de una escuela pública estadual. Método: Se trata de una investigación descriptivo- trasversal por medio de un abordaje cuantitativo en alumnos entre los 11 y los 14 años de edad. La muestra ha sido compuesta por 56 alumnos de ambos géneros, y que han sido evaluados en la misma escuela. El estado nutricional global ha sido clasificado según los critérios del índice de la masa corporal (IMC). La alineación postural ha sido evaluada por el método de la biofotogrametria. Las nivelaciones y las alineaciones han sido analizadas utilizando el software COREL DRAW X5. El punto del corte considerado para la nivelación corporal ha sido de 3 (tres grados) en relación a los 90 grados de las (abscisas X y de las ordenadas Y), como medida de tolerancia funcional o de desnivelación fisiológica. La relación entre las variables ha sido evaluada por medio del test de correlación linear Pearson. Resultados: Han sido encontradas unas desnivelaciones en la cintura escapular en el 17,9% de los estudiantes y denivelaciones en la cintura pélvica en el 14,3% de ellos. El exceso del peso corporal ha sido observado en el 3,6% de los estudiantes. No fueron encontradas correlaciones estadisticamente significativas entre la nivelación de la cintura escapular o pélvica y el índice de masa corporal, género o edad. Conclusión: En el grupo de alumnos estudiados no fue encontrada ninguna relación entre la alineación postural y el exceso del peso corporal.

PALABRAS-LLAVES: Desvíos posturales, alineación corporal, exceso de peso.

ALINHAMENTO POSTURAL E EXCESSO DE PESO EM ESTUDANTES DE 11 A 14 ANOS DE ESCOLA DA REDE PÚBLICA DE TERESINA, PIAUÍ.

RESUMO

Introdução: A idade escolar coincide com um período importante no desenvolvimento humano em vários aspectos. Ocorrem alterações motoras e as mudanças nos hábitos alimentares são evidentes, e a criança e o adolescente podem apresentar aumento desproporcional de massa corpórea e alterações patológicas na estrutura corporal. Objetivo: Investigar possível relação entre o alinhamento corporal e o excesso de peso em escolares do Ensino Fundamental II de uma Escola Pública Estadual. Método: Trata-se de uma pesquisa de natureza descritiva transversal com abordagem quantitativa em escolares com idade entre 11 e 14 anos. A amostra foi constituída por 56 alunos de ambos os gêneros, os quais foram avaliados na própria escola. O estado nutricional global foi classificado com base no percentil do índice de massa corporal (IMC). O alinhamento postural foi avaliado pelo método de biofotogrametria. Os nivelamentos e alinhamentos foram analisados utilizando o software COREL DRAW X5. O ponto de corte considerado para o nivelamento corporal foi de 3º (três graus) em relação aos 90º dos eixos das ordenadas y e abscissas x, como medida de tolerância funcional ou desnivelamento fisiológico. Na análise de relação entre as variáveis utilizou-se o teste de Correlação linear de Pearson. Resultados: Foram encontrados desnivelamentos na cintura escapular em 17,9% dos estudantes e na cintura pélvica em 14,3%. Excesso de peso corporal foi observado em 3,6% dos escolares. Não foram encontradas correlações estatisticamente significativas entre nivelamento da cintura escapular ou pélvica e índice de massa corporal, gênero ou idade. Conclusão: No grupo de escolares estudados não foi demonstrada relação entre alinhamento postural e excesso de peso corporal.

PALAVRAS–CHAVE: Desvios posturais, alinhamento corporal, excesso de peso.