



ISSN: 2230-9926

Available online at <http://www.journalijdr.com>

IJDR

International Journal of Development Research

Vol. 11, Issue, 01, pp. 43641-43644, January, 2021

<https://doi.org/10.37118/ijdr.20834.01.2021>



RESEARCH ARTICLE

OPEN ACCESS

OBSESITY AND FLEXIBILITY IN CHILDREN AND TEENAGERS: A LITERATURE REVIEW

***¹Cristianne Confessor Castilho Lopes, ²Daniela dos Santos, ²Eduarda Zamboni Locatelli, ²Eduardo Barbosa Lopes, ³Lucas Castilho Lopes, ²Vanessa da Silva Barros, ²Marivane Lemos, ⁴Paulo Sérgio Silva, ⁵Youssef Elias Ammar and ⁶Heliude de Quadros**

¹Universidade da Região de Joinville - Joinville – SC, ²Universidade Alto Vale do Rio do Peixe - Caçador – SC, ³Universidade Federal de Santa Catarina - Florianópolis – SC, ⁴UniSociesc/Joinville – SC, ⁵Universidade do Sul de Santa Catarina/Tubarão – SC; ⁶Alto Vale Rio do Peixe University

ARTICLE INFO

Article History:

Received 04th October, 2020

Received in revised form

06th November, 2020

Accepted 11th December, 2020

Published online 30th January, 2021

Key Words:

Childhood obesity; flexibility; children; prevention

*Corresponding author:

Cristianne Confessor Castilho Lopes

ABSTRACT

Childhood obesity has become a problem of increasing concern worldwide, characterized as a chronic non-communicable disease, and in view of its appearance, concerns related to child development arise. Among the factors most affected by obesity, flexibility is one of the most important, because the body constitution significantly interferes with its development. The aim of this study was to relate childhood obesity to flexibility. This study was a bibliographic review, in which the words childhood obesity and flexibility and their correspondence in English, “childhood obesity” and “flexibility” were consulted in the electronic databases Pubmed, Google Acadêmico and Scielo. Articles with the presence of the words cited in the full article and articles that fit the theme chosen in the title were included, and articles published before the year 2000 or that did not fit the topics researched were used as exclusion criteria. In total, 20 articles were selected to read the abstract and / or the full article and those that did not say about the objective of this study were excluded. At the end, only 09 articles were selected to carry out the discussion on the proposed objective. In the results section, it was possible to observe that children diagnosed with obesity have changes in the levels of flexibility when compared to individuals considered eutrophic. It's possible to conclude that healthy eating habits associated with regular physical activity have a positive influence on children's flexibility.

Copyright © 2021, *Cristianne Confessor Castilho Lopes et al.* This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: *Cristianne Confessor Castilho Lopes, Daniela dos Santos, Eduarda Zamboni Locatelli, Eduardo Barbosa Lopes, Lucas Castilho Lopes, Vanessa da Silva Barros, Marivane Lemos, Paulo Sérgio Silva, Youssef Elias Ammar and Heliude de Quadros, 2021. “Obesity and flexibility in children and teenagers: A literature review”, International Journal of Development Research, 11, (01), 43641-43644*

INTRODUCTION

Obesity can be defined as a chronic non-transmissible disease (CNCD) and is characterized by excessive accumulation of fat, which causes health problems and can be associated with other complications, especially those related to coronary risk (Cuppari, 2009). Obesity is the most worrying nutritional problem that affects children. Studies show that the worldwide obesity rate has been gradually increasing. In the United States, for example, over a period of 15 years, obesity in children aged 6 to 11 years increased by 67% among boys and 41% among girls. Regarding the economic situation, in Brazil the children most affected are those who belong to the most privileged social classes (Campos; Leite; Almeida, 2006). The increase in the prevalence of childhood obesity is due to several factors, such as early weaning, inappropriate lifestyle and eating habits, eating disorders, the low cost and variety of some products where they have

a high caloric value and low nutritional value. (Sichieri, 2006). Genetic, physiological and metabolic factors also contribute to the development of obesity (Rosenbaum; Leibel, 1998). Obesity, in addition to adding several health risks, is one of the most serious health problems in the world. This is because excess fat makes the individual more susceptible to chronic-degenerative diseases that lead to high rates of morbidity and mortality, directly resulting in quality and life expectancy (Guedes; Guedes, 2003). When it comes to obesity, lack of flexibility is one of the topics that are associated. This is because body composition directly affects flexibility, another factor that negatively influences the concentration of adipose tissue around the joints. Flexibility is a physiological characteristic that allows the individual to perform voluntary movements with maximum angular amplitude of the joints within morphological limits (Dantas, 1999). Being a combination of joint range of motion and muscle flexibility, which is influenced by genetic and environmental factors, it presents differences between sexes and ages (Penha; João, 2008). Flexibility

brings several benefits to the individual, which can include more ease in carrying out sports movements and gestures with greater amplitude and effectiveness. It also makes possible to perform daily exercises more easily as well (Dantas, 1999), prevents the occurrence of injuries, prevents and evaluates the late sensation of muscle pain after exhausting activities (Farinatti, 2000), decreases muscle tension which increases blood pressure and wastes mechanical energy (Achour, 1999). The present study aimed to review the bibliography between the relationship between childhood obesity and flexibility.

METHODOLOGY

This work was elaborated from a literature review in the databases Pubmed, Google Acadêmico and Scielo in the period between 2000 to 2020. The words used in the search for articles were: childhood obesity and flexibility and their correspondence in English, "childhood obesity" and "flexibility". The criteria for inclusion of articles were the presence of the words cited in the article in full and articles that fit the theme chosen in the title, and the exclusion criteria were articles published before 2000 or that did not fit the topics surveyed. Twenty articles were selected to read the abstract and / or the entire article and those that did not say about the purpose of this study were excluded. At the end, only 09 articles were selected to carry out the discussion on the proposed objective. Table 1 - Articles used to perform the bibliographic review.

RESULTS AND DISCUSSION

Sulzbach and Bosco (2012), after reviewing the literature, conclude that the childhood obesity index increases significantly every year. Obesity should be treated as a complex of factors that involve the presence of physical, psychological and social changes, since with its development, there is great concern with the appearance of many chronic diseases. In addition, eating habits are difficult to control, especially when it comes to children. Feeding should be done at appropriate times, with a high nutritional index and low in calories. The inclusion of physical activities in the routine of children in the development phase is a great ally in the treatment and prevention of obesity. Among the problems that can be developed as a result of obesity, Brandalize and Leite (2010), emphasize orthopedic problems. From their study, they were able to analyze that obese individuals are more likely to develop orthopedic disorders, the main ones being: postural changes, such as lumbar hyperlordosis, valgus knees, hyperextended knees and flat feet. In terms of articulation, pain in the lumbar spine and lower limbs is highlighted as the most frequent. As treatment and prevention, they also agree that physical activity associated with other factors, such as nutrition and changing habits, are the best options. The significant increase in the rate of childhood obesity is very worrying, as it may be related to metabolic alterations, such as dyslipidemia, hypertension and glucose intolerance, mainly because they are risk factors for the development of type II diabetes

Table 1 - Articles used to perform the bibliographic review

Authors	ArticleName	Methodology	Results
Penha, P. J; João, S. M. A.	Assessment of muscle flexibility among boys and girls aged 7 and 8 years	Cross-sectional and descriptive study, conducted with children from the municipal network of Amparo, SP. After explaining the procedure, the legal representative of each child signed the free and informed consent form. The Ethics Committee of the Faculty of Medicine of the University of São Paulo approved this study.	There was no significant difference in mass, height or BMI between groups ($p > 0.05$). The values found for muscle flexibility showed a significant difference only between the sexes ($p = 0.05$) and, therefore, two groups were formed: one composed only of girls and another of boys, of both age groups (Table 3). Girls showed greater distance from the 3rd finger to the ground than boys, both at 7 and 8 years old. The values found take into account the height of the wooden base where the test was performed. There was no statistically significant difference between ages ($p = 0.725$).
Narezzi, D; Simões, F. A.R.; Chagas, L. A. O.; Zúcaro, P. M. D.	Analysis of flexibility in children from 9 to 11 years of age who practice stretching in physical education classes	Children from 9 to 11 years old, students from a state school in the city of São José dos Campos - SP participated in this study. These children were submitted to a test and a retest from the Bank of Wells, between the test and the retest the children participated in a period of 45 days of stretching classes 3 times a week. For the classes, one to three movements were elaborated for the main muscle groups, namely: posterior, adductor and anterior thigh; glutes; calf; trunk; chest; arm; forearm and neck. For the present work, static stretching was used, in which the muscle group moves slowly, up to a certain range of motion with slight muscle tension (discomfort) and remains in position (ACHOUR, 1999). In this stretching method, the ideal time to remain in the stretching position according to Anderson, 1991 (apud MONTEIRO) is 15 to 30 seconds.	There was a significant increase (Paired Student T-Test: $p = 3.61 E-7$) in the number of children who presented the classification of Medium and Good in the Wells Bank. Concomitantly showing a decrease in the number of children classified as Regular and Weak. In general, these results show a significant improvement in flexibility in the evaluated group. The results show that even when the group of boys was evaluated in isolation, it also showed a statistically significant difference ($p = 2.64 E-4$) when comparing the Test and Retest. When the group formed by the girls was evaluated in isolation, it also showed similar results to the boys. In other words, there is a statistically significant increase in flexibility when the Test and Retest are compared.
Borba da. Ferreira Junior, Martini A, Coelho L, Coelho D. Vieira Ca.	Analysis of physical abilities in children from seven to ten years of age	After the parents' written consent, 232 children of both sexes between the ages of seven and ten years old, belonging to two public schools, participated in the study. This study was approved by the Research Ethics Committee of the Federal University of Minas Gerais (ETIC 306/08). The procedures respected the rules established by the National Health Council (Resolution 196/96) involving research with human beings.	There was no effect of age ($F = 1.48$; $p = 0.22$) and sex ($F = 0.32$; $p = 0.57$) on the flexibility of the back muscles and posterior thigh muscles. The distance reached in the horizontal jump was significantly greater in boys compared to girls ($F = 7.71$; $p < 0.001$). There was an effect of age on this variable, in which the ages of ten, nine and eight years showed similar values between themselves and significantly higher compared to the age of seven years ($F = 14.27$; $p < 0.001$). The number of sit-ups performed was significantly higher in boys compared to girls ($F = 20.83$; $p < 0.001$). In addition, the number of sit-ups at the ages of ten, nine and eight was significantly higher than at the age of seven ($F = 6.45$; $p < 0.001$). The time to walk 30 meters was significantly shorter for boys compared to girls ($F = 24.93$; $p < 0.001$). The ten-year-old group had less time to walk the 30 meters compared to the other ages and the ages of nine and eight years old showed shorter running time compared to the age of seven years old ($F = 27.36$; $p < 0.001$).

Authors	ArticleName	Methodology	Results
Sulzbach, E. A. G.; Bosco, S. M.D.	Childhood obesity - a literature review	For the construction of this review article, searches were carried out using the electronic databases Medline, Google Acadêmico and Scielo in order to check the bibliographic reference on the topic of childhood obesity in the period from 2000 to 2011. In addition to the search for scientific articles, four textbooks were used: Nutritional Therapy in Pediatrics, Bioavailability of Nutrients, and Nutrition from Pregnancy to Aging and Food Nutrition and Diet Therapy. The words used in the search for articles were: prevalence and incidence of childhood obesity, childhood obesity and risk factors for children, prevention and treatment and others related to childhood obesity. The criteria for the inclusion of articles were the presence of the words cited in the full article and articles that fit the themes chosen in the title. Only articles were requested from 2003 to 2010.	We conclude, through this literature review, that the number of children with obesity is increasing every year.
Brandalize, M.; Leite, N.	Orthopedic changes in obese children and adolescents	The MEDLINE, SciELO, LILACS, ISI and Stanford University databases were consulted, with the combination of the following descriptors: "obesity", "complications", "child", "musculoskeletal pain", "posture", "orthopedic changes", "march" and their respective synonyms in English.	It could be observed that obese children and adolescents are more predisposed to presenting these orthopedic complications than eutrophic individuals, and the main problems reported were postural changes, such as lumbar hyperlordosis and valgus knees, and musculoskeletal pain, especially in the lumbar spine, and lower limbs. The main factors that cause these problems are not well defined, but include increased joint overload associated with bone fragility in the growth phase and decreased postural stability, which leads to increased regional mechanical needs.
Graciosa, M.D.; Coelho, J.J.; Da Costa, L. M. R.; De Medeiros, D. L.; Martinello, M.; Ries, L. G. K.	Effect of physical inactivity, nutritional profile and sex on schoolchildren's flexibility	Sixty schoolchildren of both sexes aged between five and 14 years were evaluated, divided into two groups: normal flexibility (n = 21) and reduced flexibility (n = 39). The students' flexibility was assessed by means of photogrammetry through the LL elevation test in extension considering the angle of the leg. The level of physical activity was assessed using the Physical Activity Questionnaire for Children and the classification of the nutritional profile was performed using the Body Mass Index by age and with respect to sex.	The groups with normal and reduced flexibility, did not present significant differences regarding age, weight and height (p > 0.05). There were no differences (p > 0.05) in the leg angles in the comparison between sedentary and active groups; obese and non-obese, and between female and male groups.
Perondi, J.I.; Roman, E. P.	Indices of overweight, obesity and flexibility of girls from 7 to 10 years of age	This is a cross-sectional study conducted in 2014 with 178 girls. All the requirements requested were complied with, following resolution 196/96, which deals with research involving human beings. Data analysis was performed using descriptive statistics with mean values, standard deviation.	It was found that the highest mean of flexibility was obtained in the 07-year-old age group (28.8 cm ± 5.9). The highest percentage of BMI within the normal range (normal weight) was observed in the age group of 09 years old (65.2%). The highest percentage of overweight girls was found at 08 years of age (20%) and obese at 10 years of age with 26.8%, within the four criteria for classification of nutritional status. The values of flexibility tend to remain very close, showing the highest mean values in girls with low weight (28.0 ± 3.4) and obese with (27.4 ± 6.4).
De Oliveira, C. L.; Fisberg, M.	Childhood and adolescent obesity - a real epidemic		The importance of implementing interventionist measures to combat and prevent this nutritional disorder in younger individuals is perceived. Some areas deserve attention, with education, the food industry and the media being the main vehicles for action. Educational and informative measures, through the school curriculum and the mass media, as well as the control of advertising of unhealthy foods, aimed mainly at children and the inclusion of a minimum percentage of fresh foods in the program national school feeding and reduction of simple sugars are actions that must be practiced. Regarding the food industry, we must seek support for the production and marketing of healthy foods.
Formighieri, F.S.M.; Oliveira, D.E.; Roman, E.P.	Overweight, obesity and flexibility in adolescent girls: a literature review	This is a bibliographic search based on books and articles consulted mainly in the electronic database of the Scientific Eletronic Library Online (SciELO-Brazil) for selection and review of articles in English and Portuguese, published between 1999 and 2015.	It is considered that physical inactivity, inappropriate eating habits, socioeconomic status of families, the growth of urbanization and early sexual maturation are factors that contribute to overweight and obesity. It should be noted that the school has a strategic function so that programs can be implemented that provide answers and so that we can improve the quality of life of adolescents. However, it is also necessary that public policies are adopted so that we have healthy people not only in the current stage, but mainly in the future stage.

and many other cardiovascular diseases. From this, the importance of intervening with measures to combat and prevent obesity in children and adolescents is remarkable. Some areas need to pay attention, such as education, the food industry and the media, because from information it is possible to create a preventive program (Oliveira; Fisberg, 2013). Lack of physical activity, inadequate diet with a small amount of fruits and vegetables and a high index of carbohydrates and sugar and the socioeconomic condition are factors mentioned when it comes to the causes of childhood obesity. Obesity and overweight directly relate to flexibility, already interfering in the body composition of individuals. Flexibility is an important factor in preventing injuries and musculoskeletal diseases. It is essential to inform and encourage the practice of physical activities, not only for

treatment, but for the prevention of obesity and many other pathologies. It is known that overweight adolescents are very likely to have cardiovascular complications and that in addition to physical activity, changing nutritional and educational habits are essential for treatment programs (Formighieri; Oliveira; Roman, 2015). The results obtained in the study by Perondi and Roman (2014) report that obesity can bring many health problems and also predispose these children to become obese adults and who may suffer from chronic diseases. In addition, obese children usually perform less when related to eutrophic children, which can interfere in playful and sporting activities. Flexibility when related to nutritional status is not significant. Graciosa *et al.* (2013) in their study on the effect of physical inactivity, nutritional profile and sex on the flexibility of

schoolchildren highlight the need to include physical fitness as an essential factor in physical education classes. aim at flexibility, muscle strength and cardiorespiratory condition. They also concluded that sex, physical inactivity and nutritional profile were not influential factors in the flexibility of the evaluated students.

In a study on physical capacities in children aged seven to ten, Borba *et al.* (2012), show concern with the physical performance of these children, since they do not exceed what would be expected, it is important to emphasize that it is essential for the prevention, conservation and improving functional capacity and, consequently, children's health. They conclude that, due to the results found in their studies, it is of utmost importance to encourage and create exercise programs so that there is an improvement in the physical performance of children to prevent possible future health disorders. Since flexibility is an important factor in the general development of children and adolescents, the implementation of stretches within physical education classes is an initiative that can positively influence the degree of flexibility of children. The indicated would be that the exercises lasted longer than the normal stretching period so that there is a really significant increase (Narezzi *et al.*, 2007). Penha and João (2008), in an assessment of children's muscle flexibility, reported the fact that children have more flexibility than adults and that stretching programs possibly make these children have less loss of this factor with age.

CONCLUSION

After analyzing the results, it was possible to conclude that obesity and overweight relate to numerous health disorders and the degree of flexibility in children and adolescents. These may show developmental changes during growth. Being of extreme necessity and importance, intervention programs that aim to prevent and avoid possible complications. Finally, it is essential to address the issue from the early stages of development in childhood so that in the future they do not become obese adults.

REFERENCES

- Borba, Diego Alcantara; Junior ,João Batista Ferreira; Maritini, AngeloRuedignerPisani; Coelho, Leo nardo Gomes Martins; Coelho, Daniel Barbosa; VIEIRA, Carlos Alexandre. Análise das capacidades físicas em crianças dos sete aos dez anos de idade. Revista Brasileira de Ciência e Movimento, v.20 , n.4 , p.84-91, dezembro de 2012. Disponível em:. Acesso em: 11 de julho de 2020.
- Brandalize, Michelli.; Leite, Neiva. Alterações ortopédicas em crianças e adolescentes obesos. Fisioterapia em Movimento. Curitiba, v. 23, n. 2, p. 283-288, junho de 2010. Disponível em:<https://www.scielo.br/pdf/fm/v23n2/11.pdf>. Acesso em: 20 de junho de 2020.
- Formighieri, Fábio Souza de Marcel; Oliveira, Daiana de Emer; ROMAN, Everton Paulo. Sobrepeso, obesidade e flexibilidade em meninas adolescentes: uma revisão bibliográfica. Anais do 13º Encontro Científico Cultural Interinstitucional, 2015. Disponível em: [https://www.fag.edu.br/ upload/ecci/anais/5babc6e3687de.pdf](https://www.fag.edu.br/upload/ecci/anais/5babc6e3687de.pdf). Acesso em: 11 de julho de 2020
- Graciosa, MaylliDaiani et al. Efeito do sedentarismo, perfil nutricional e sexo na flexibilidade de escolares. Revista Brasileira de crescimento desenvolvimento humano, São Paulo , v. 23, n. 2, p. 144-150, 2013 . Disponível em: http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S0104-12822013000200004&lng=pt&nrm=iso. Acesso em: 20 de junho de 2020.
- Narezzi, Débora; SIMÕES, Fabiane Alves Rodrigues; CHAGAS, Leandro Auguste Osses; ZÁCARO. Patrícia Mara Danella. Análise da flexibilidade em crianças de 9 a 11 anos de idade praticantes de alongamento nas aulas de educação física. XI Encontro Latino Americano de Iniciação Científica e VII Encontro Latino Americano de Pós-Graduação - Universidade do Vale do Paraíba, 2007. Disponível em: http://www.inicepg.univap.br/cd/INIC_2007/trabalhos/saude/inic/INICG00129_01C.pdf. Acesso em: 20 de maio de 2020.
- Oliveira, Cecília L. de; Fisberg, Mauro. Obesidade na infância e adolescência: uma verdadeira epidemia. Arquivos Brasileiros de Endocrinologia e Metabolismo, São Paulo, v. 47, n. 2, pág. 107-108, abril de 2003. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0004-27302003000200001&lng=en&nrm=iso. Acesso em :30 de dezembro de 2020.
- Penha, Patrícia Jundi; JOÃO, Sílvia Maria Amado. Avaliação de flexibilidade entre meninos e meninas de 7 e 8 anos. Fisioterapia e Pesquisa, São Paulo v.18, n.4, p.387-91. out/dez.2008. Disponível em: <https://www.scielo.br/pdf/fp/v15n4/12.pdf>. Acesso em : 22 de maio de 2020.
- Perondi. J.I; Roman. E.P. Índices de sobrepeso, obesidade e flexibilidade de meninas de 7 a 10 anos de idade. Anais do 13º Encontro Científico Cultural Interinstitucional, 2014. Disponível em: https://www.fag.edu.br/upload/ecci/ anais/559538461_9437.pdf. Acesso em: 23 de junho de 2020.
- Sulzbach. ElenAline Giovane; Dal Bosco. Simone Morelo. Obesidade infantil-uma revisão bibliográfica. Revista Destaques Acadêmicos, Vol. 5, N. 3, 2012 - CCBS/UNIVATES. Disponível em:<http://univates.br/revistas/index.php/destaques/article/view/156#:~:text=A%20obesidade%20infantil%20teve%20um,danos%20%C3%A0%20sa%C3%BAde%20das%20crian%C3%A7as>. Acesso em: 08 de junho de 2020.
