Available online at www.rajournals.in

RA JOURNAL OF APPLIED RESEARCH
ISSN: 2394-6709
DOI:10.47191/rajar/v8i10.03
Volume: 08 Issue: 10 October-2022

International Open Access

Impact Factor- 7.108

Page no.- 725-733

Levels of Flexibility and Habitual Physical Activity in High School Schools

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ARTICLE INFO

Published Online:
04 October 2022

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ABSTRACT

The objective of this study was to evaluate the level of flexibility and the level of habitual physical activity in high school students in the cities of Teresina and União, Piauí. A cross-sectional descriptive study was carried out, consisting of a sample of 105 schoolchildren aged 15 to 17 years of age in both genders, 55 high school students from Zacarias de Góis state college (Piauí high school) in Teresina-pi and 50 Filinto Rêgo school unit, located in the center of the city of Union-Piauí. To verify the flexibility of the students, the sit-and-reach flexibility test of the Brazilian sport project test and evaluation manual (2016) was applied. To verify the habitual physical activity level, the questionnaire in order to verify the economic class, it was used the questionnaire determined by the Brazilian economic classification criterion, proposed by the Brazilian Institute of Geography and Statistics by the national association of research companies. Analyzing the results, it is possible to verify that, 83 students are considered in the healthy zone, being 47% female and 53% male. Of the 22 students who are in the risk zone, 72.7% are female and only 27.3% are males, indicating that as the level of physical activity increases, the level of flexibility of the students is improved. significant difference ($p < 0.05$). Most high school students presented levels of flexibility within the healthy zone and are moderately physically active.

KEYWORDS: Flexibility, habitual physical activity, schooling.

I. INTRODUCTION

There is strong evidence from scientific studies on the importance of the relationship between physical activity levels and the occurrence of diseases, especially those related to lifestyle, such as type II diabetes mellitus, arterial hypertension, chronic respiratory diseases, obesity, cancer (Riebe et al., 2015; Garber, 2011). That said, these diseases, among others, can be minimized by changing healthy lifestyle habits, such as physical activity, leaving aside the consumption of alcoholic beverages, and obesity (Malta et al. 2017).

Even so, there is still a large part of society with a high prevalence of physical inactivity, which indicates a higher risk of early death from complications related to chronic non-communicable diseases (Michell et al., 2017).

Much has been discussed about the different positive repercussions of physical activity and the level of sedentary lifestyle of individuals with these diseases, as well as effective protocols capable of evaluating these precepts and relating them to these diseases.

The literature already points to the importance of the role of prevention and treatment of chronic non-communicable diseases (NCDs) in adult life, but also, the regular practice of physical activity is a relevant factor for the psychomotor, intellectual, social and functional development for children and adolescents (Lima et al., 2018).

Thus, one of the components related to health is flexibility, which can be defined as the ability of the joint to develop a range of motion in accordance with the muscles involved (Mendes & Cols., 2014).

Studies that deal with the relevance of flexibility indicate that good levels of flexibility help in the performance of any sport, in the prevention of injuries, in the performance of daily tasks, improving performance with less energy expenditure, in addition to providing wide movements with greater safety. and efficiency, and will bring significant benefits to performance in physical education classes (Galdino, 2013;

Cardoso et al., 2015; Perfeito, 2014; Montenegro & Carvalho 2014).

From this perspective, it is clear that it is important to evaluate the Physical Education student, as it allows the teacher to measure the student's physical capacity level, which can verify possible joint or muscular dysfunctions, pathological predispositions of movement, in addition to advances in practices or in functional recovery that can be detected.

It is worth mentioning that, due to hormonal and osteomyoarticular issues, children have a greater ability to acquire and maintain high degrees of flexibility when compared to adults (Perfeito, 2014).

During childhood, flexibility peaks and declines with age. Studies show that flexibility appears for both sexes around 12 to 13 years old, although girls have stability in flexibility throughout their childhood and adolescence, however with the onset of puberty there is a decrease in flexibility due to hormonal changes and growth (Montenegro & Carvalho, 2014).

II. METHODOLOGY

A descriptive cross-sectional study was carried out, consisting of a sample of 105 schoolchildren aged 15 to 17 years of both genders, 55 high school students from Colégio Estadual Zacarias de Góis (Liceu Piauiense) in Teresina-PI and 50 from the School Unit Filinto Rêgo, located in the city of União-PI. The sample was selected for convenience.

The development process of this study was carried out following some steps. Initially, the objectives of the study and the procedures to be carried out were exposed to the school management. After authorization from the direction, a Free and Informed Consent Term (ICF) was delivered to the parents, through the students included in the study, which authorized their children's participation in the study and to the students a Term of Assent (TA) so that the could sign, assuring their participation, it is still important to note that all information would be confidential and the anonymity of the participants preserved.

All participants received information about the investigations carried out by the researchers, mainly about the data collection methodology, ensuring that the risks involved in the study would be minimized as much as possible.

In order to carry out the study, some inclusion and exclusion criteria were established. Inclusion Criteria: only individuals aged between 15 and 17 years, regularly enrolled in school, who were present on the day, who agreed to take the test, who were authorized by the guardian and who were able to perform the tests. Exclusion Criteria: Refusal to participate in data collection, non-authorization of parents or guardians, non-attendance to school on the day scheduled for data collection, failure to perform the proposed test, as well as any acute or chronic condition such as orthopedic disease, rheumatology related to the lower limbs, pelvis or lumbar spine that would prevent the test, thus avoiding compromising the results.

To verify the economic class, the questionnaire determined by the criterion of economic classification Brazil (CCEB), proposed by the national association of research companies - ANEP was used, which is based on the purchasing power of urban people and families to determine the socioeconomic level and allows stratifying the population in five economic classes (from A to E), based on the interviewee's answers, regarding the possession of goods, presence of a monthly employee and level of education of the head of the family. A number of points were assigned to each answer, according to the CCEB points system. For this study, classes A1, A2, B1 and B2 were considered to be of high economic level and classes C, D and E of low economic level.

To verify the level of habitual physical activity, the Pate Questionnaire was used (Russel R. Pate – University of Sout Carolina/USA translated and modified by M. V. Nahas (2001) – NUPAF/UFSC) structured with 11 questions that identify the levels of occupations daily activities and the level of leisure activity, the answers being directed to a score of points that classifies the individual as inactive (0-5 points), little active (6-11 points), moderately active (12-20 points) and very active. (21 or more points).

The Sit and Reach Flexibility Test from the test and evaluation manual (2016) of Projeto Esporte Brasil (PROESP-Br) was applied to verify the flexibility of students. A measuring tape was extended on the ground and at the 38 cm mark of this tape a piece of adhesive tape of 30 cm was placed perpendicularly, fixing it to the ground. The subject was barefoot, heels touching the tape at the 38 cm mark and 30 cm apart. With knees extended and hands overlapping, the subject slowly bent over and extended his hands forward as far as possible. The same had to remain in this position for the time necessary for the distance to be noted, two attempts were made for each student. The result was measured in centimeters from the furthest position that the student reached on the tape measure with the fingertips and the results were recorded to one decimal place after the comma. The PROESP-BR Project (2016) establishes as a cut-off point or critical values for the age and sex of children and adolescents a categorical scale of two degrees: health risk zone and healthy zone, with values below the established cut-off point being considered health risk zone and above are considered healthy zone.

The flexibility levels of the evaluated students were compared with the cutoff values proposed by PROESP-br (2016). Data were tabulated and calculated using the Microsoft Excel 2007 program.

To characterize the population, an analytical descriptive statistical study of the sample was carried out through absolute (n) and relative (%) frequencies and dispersion measures (mean and standard deviation), as well as the Shapiro-Wilk test was used to verify if the data will follow a Normal distribution.

To verify the difference between the frequencies of the variables, the Chi-Square Adherence test was used. The

association was made by Pearson's Chi-Square and Fisher's Exact tests. To compare the means, the Mann-Whitney U test was used for variables with two categories and the Kruskal-Wallis H test for variables with three categories or more. To analyze the relationship between the variables, Spearman's correlation was used.

Data were tabulated in a Microsoft Office Excel spreadsheet and analyzed using the IBM Statistical Package for the Social Sciences version 20.0 program. The significance level adopted was $\alpha = 0.05$. To present the results, tables and graphs were used.

III. RESULTS AND DISCUSSION

The sample was characterized by a total of 105 individuals, being 55 (52.4%) female and 50 (47.6%) male, with a mean age of 16.12 years.

Table 1 - Profile of high school students from the public school system in Teresina and União-PI

Variables	n = 105	%	Average ± SD	p-value
Sex				
Feminine	55	52,4		0,625
Male	50	47,6		
Age				
15	21	20,0	16,12 ± 0,72	0,002
16	50	47,6		
17	34	32,4		
School				
União	50	47,6		0,625
Teresina	55	52,4		
Series				
1	60	57,1		0,143
2	45	42,9		
Economic class				
A2	4	3,8		<0,001
B1	8	7,6		
B2	13	12,4		
C	53	50,5		
D	27	25,7		

DP = Standard Deviation. p-value = Chi-square test of Adherence. Source: Direct Search.

It is observed that the highest prevalence of students belongs to economic class C (50.5%) and the smallest part belongs to economic class A2 (3.8%). There was a significant difference ($p<0.05$) in the age and economic class of the students (Table 1).

Through the analysis of the habitual activity level of the participants of this study, it was verified that adolescents with lower economic classes are more physically active when compared to the higher classes, with a significant difference between them. Hallal et al. (2013), evaluated the physical activity of 4,452 adolescents, where 49% among boys and 67% among girls, with physical inactivity being higher in high socioeconomic levels. The study by (2015) shows that students enrolled in public schools and with lower socioeconomic levels had higher levels of physical activity, when compared to those in the public network and with a higher socioeconomic level.

In line with this, Morais et al. (2015) in their study that aimed to estimate the prevalence of physical inactivity in adolescents (14 to 17 years old) in the city of Maringá/PR and

to explore its association with demographic, socioeconomic, behavioral variables and nutritional status indicators, shows that adolescent students of public schools and lower socioeconomic levels are less physically active. A similar finding was found in studies by Silva and Silva (2014) in which students of high socioeconomic level (33.7%) were classified as more active than those of medium (22.9%) and low (23.9%) levels. %).

Table 2 shows a significant difference ($p<0.05$) between the classification of the students' flexibility level, in which 21% are in the health risk zone and 79% are considered in the healthy zone. However, no significant difference was found between the classifications of the students' habitual physical activity level.

Table 2 - Level of habitual physical activity and flexibility of high school students from the public school system in Teresina and União-PI.

Variables	n	%	Average ± SD	p-value
Physical Activity Level				
Inactive	20	19,0	14,30 ± 8,66	0,358
Moderately active	32	30,5		
Very active	29	27,6		
Little active	24	22,9		
Flexibility Level				
Risk Zone	22	21,0	36,51 ± 11,78	**<0,001**
Healthy zone	83	79,0		

DP = Standard Deviation. p-value = Chi-square test of Adherence. Source: Direct Search.

This study shows that there is a higher prevalence of students classified as moderately active and very physically active. Regarding the level of flexibility, most of the sample is classified in the healthy zone.

In the same perspective Barbosa et al. (2016) when evaluating 20 adolescents from a public school in the city of Palmas-TO, found a high level of moderately active and very active adolescents, 95% of the sample. Moraes et al. (2008) in their study sought to analyze levels of physical activity in adolescent schoolchildren, between 12 and 16 years of age, in the city of Cotia, São Paulo, it was observed that approximately 79.9% of those surveyed had a level of physical activity that varies between fair and very good and the remaining 20.1% are below the level.

From another perspective, Silva and Silva (2014) sought to verify the pattern of physical activity during leisure time among students in Aracajú, with a sample of 974 young people from the state public network, with an average of 15 to 17 years of age, 546 of whom were of the sex. female and 428 male, presented, through descriptive statistics, 74.7% of students were classified as not very active in leisure time; females were less active (81.5%) than males (66.1%).

In a survey carried out by Oliveira (2012) the results showed that most of the students evaluated have good levels of flexibility, most being classified by PROESP-Br as a healthy zone. While in the study by Muniz et al. (2014), 59 out of a total of 76 students were classified as having high performance, that is, "healthy zone". Novello and Frigeri (2017) found a positive result in their study, as 93 students are classified as in a "healthy zone", while 43 are in a "risk zone".

On the other hand, Pelegrini et al. (2011) showed that the flexibility evaluated through the Sit and Reach test (PROESP-Br) in 7,507 schoolchildren did not meet the minimum criteria of established values for health, not being in the healthy zone. Gouveia et al., (2017) found results indicating lower levels of flexibility, so that a possible tendency of Brazilian children

and adolescents to have low levels of health-related physical fitness can be speculated.

Table 3 shows the association of physical activity with the profile of students, with a significant difference ($p<0.05$) between genders and economic class.

Table 3 – Association of physical activity level with the profile of high school students from the public school system in Teresina and União-PI.

	Physical Activity Level										
	Inactive		Moderately active		Much Active		Little Active		Total		p-value
	n = 20	%	n = 32	%	n = 29	%	n = 24	%	n	%	
Sex											
F	14	(70,0)	14	(43,8)	10	(34,5)	17	(70,8)	55	(52,4)	0,015[1]
M	6	(30,0)	18	(56,3)	19	(65,5)	7	(29,2)	50	(47,6)	
Year											
15	4	(20,0)	6	(18,8)	4	(13,8)	7	(29,2)	21	(20,0)	0,438[2]
16	10	(50,0)	12	(37,5)	15	(51,7)	13	(54,2)	50	(47,6)	
17	6	(30,0)	14	(43,8)	10	(34,5)	4	(16,7)	34	(32,4)	
School											
União	6	(30,0)	17	(53,1)	18	(62,1)	9	(37,5)	50	(47,6)	0,098[1]
Teresina	14	(70,0)	15	(46,9)	11	(37,9)	15	(62,5)	55	(52,4)	
Séries											
1	9	(45,0)	18	(56,3)	19	(65,5)	14	(58,3)	60	(57,1)	0,560[1]
2	11	(55,0)	14	(43,8)	10	(34,5)	10	(41,7)	45	(42,9)	
Economic class											
A2	3	(15,0)	1	(3,1)	-	-	-	-	4	(3,8)	0,019[2]
B1	5	(25,0)	1	(3,1)	1	(3,4)	1	(4,2)	8	(7,6)	
B2	1	(5,0)	5	(15,6)	3	(10,3)	4	(16,7)	13	(12,4)	
C	7	(35,0)	18	(56,3)	18	(62,1)	10	(41,7)	53	(50,5)	
D	4	(20,0)	7	(21,9)	7	(24,1)	9	(37,5)	27	(25,7)	

P-value = 1Pearson's Chi-square test. 2 Fisher's Exact test. Source: Direct Search.

There is a higher prevalence of female students classified as little active and among male students they are classified as moderately active and very active.

Such findings are in agreement with those of Voser et al. (2017) that investigates the measurement of the physical activity level of students from the public school system in the city of Pelotas-RS, with 105 adolescents, 56 female and 49

male, between 15 and 17 years of age, finding a statistically significant difference between female and male adolescents. Girls had a higher rate of physical inactivity 53.6%, compared to boys 26.5%.

Results found are similar to another study by Silva et al. (2018) who investigated the associations between the level of physical activity and the sociodemographic, environmental and school factors of adolescents (2,545 young people aged 14 to 18 years) in the municipalities of Grande Florianópolis. The prevalence of inactive young people was 48.6%, being higher in females (53.9%).

On the other hand, Pelegrini (2009), in a cross-sectional study, showed the prevalence of sedentary lifestyle in 25.4% of a sample of adolescents aged 14 to 17 years old, enrolled in public high school in Florianópolis-SC. Specifically, 21.9% of male adolescents and 27.1% of female adolescents were classified as sedentary, with no significant difference between them.

When analyzing the association of flexibility with the students' profile (Table 4) it is noted that 83 students are considered to be in the healthy zone (ZS), with 47% female and 53% male. Of the 22 students who are in the risk zone, 72.7% are female and 27.3% male. There is a significant difference only in economy class.

Table 4 - Association of the level of flexibility with the profile of high school students from the public school system in Teresina and União-PI

	Flexibility Level (cm)						
	ZR		ZS		Total		p-value
	n = 22	%	n = 83	%	N	%	
Sex							
Feminine	16	(72,7)	39	(47,0)	55	(52,4)	0,056[1]
Male	6	(27,3)	44	(53,0)	50	(47,6)	
Year							
15	4	(18,2)	17	(20,5)	21	(20,0)	0,817[2]
16	12	(54,5)	38	(45,8)	50	(47,6)	
17	6	(27,3)	28	(33,7)	34	(32,4)	
School							
União	7	(31,8)	43	(51,8)	50	(47,6)	0,153[1]
Teresina	15	(68,2)	40	(48,2)	55	(52,4)	
Series							
1	12	(54,5)	48	(57,8)	60	(57,1)	0,972[1]
2	10	(45,5)	35	(42,2)	45	(42,9)	
Economic class							
A1	4	(18,2)	-	-	4	(3,8)	<0,001[2]
B1	5	(22,7)	3	(3,6)	8	(7,6)	
B2	3	(13,6)	10	(12,0)	13	(12,4)	
C	5	(22,7)	48	(57,8)	53	(50,5)	
D	5	(22,7)	22	(26,5)	27	(25,7)	

P-value = 1Pearson's Chi-square test. 2 Fisher's Exact test. Source: Direct Search.

It is noted that in this study, when classified as a risk zone, girls showed a higher percentage than boys, and when classified as a healthy zone, the values for both sexes are similar, with no significant difference between them.

In the study by Araújo and Oliveira (2013), the sample consisted of 288 high school students, of which 146 were male and 142 were female, aged between 14 and 17 years, there were no significant differences in the comparisons between the two. groups.

On the other hand, Silva and Oliveira (2013), in a descriptive cross-sectional study comprising a sample of 50 schoolchildren aged between 14 and 17, using the Sit and Reach Flexibility Test from the Test and Assessment Manual (2012), found that flexibility of girls was higher than that of boys.

In the present study, when analyzing flexibility levels by economic classes, it is observed that adolescents from more vulnerable economic classes have better levels of flexibility compared to more affluent classes.

These findings are corroborated by studies by Guimarães (2013), which aimed to investigate, through comparison between groups, whether there is a relationship between socioeconomic status and flexibility levels in adolescents of both genders aged between 13 and 17 years. It concluded that the lower classes have a greater number of adolescents who reached normal levels or above those recommended by PROESP (2012).

Table 5 shows the correlation between the level of habitual physical activity and the level of flexibility, with a significant difference between them, and no difference when correlating physical activity with grade or age.

Table 5 - Correlation of the level of habitual physical activity with age, grade and level of flexibility of high school students from the public school system in Teresina and União-PI

	Physical Activity Level	
	R	p-value
Year	0,149	0,130
Series	-0,097	0,324
Flexibility	0,504	**<0,001**

R = correlation coefficient. p-value = Spearman correlation. Source: Direct Search.

In this study, a positive correlation was found between the level of physical activity and the level of flexibility, indicating as the level of physical activity increases, the level of flexibility of the students improves. In this way, physical activity can be seen as an excellent strategy to improve the level of flexibility.

In this study, the findings are similar to the studies by Guadagnine (2014) who, when analyzing adolescents, comparing the flexibility of practitioners and non-practitioners of physical activities regularly confirms that there was a significant difference between the measures, and also prove that the lack of physical activity causes muscle shortening.

Oliveira (2012) in his study that sought to identify, evaluate and compare the flexibility levels in students, practitioners and non-practitioners of Taekwondo, in the city of Sapucaia do Sul - RS, each group was composed of 44 boys aged between 14 and 14. 17 years. The study concluded that students who practice this sport have much higher levels of flexibility than students who do not practice.

In contrast, in the study by Lima et al. (2016) when evaluating the flexibility level of 15- and 17-year-old students, practitioners and non-practitioners of volleyball, did not find differences between the groups.

IV. CONCLUSION

Based on this study, it can be concluded that the level of physical activity of school adolescents from the public school system in the municipalities of Teresina and União-PI was satisfactory, in which most of the subjects evaluated were moderately active.

Regarding the level of flexibility, most students were considered in the healthy zone according to the values of PROESP-Br.

A positive correlation was found between the levels of physical activity and flexibility, indicating that as the level of physical activity increases, the level of flexibility of the students improves. In this way, physical activity can be seen as an excellent tool to improve the level of flexibility.

The sit and reach flexibility test, as it is an easily accessible test and has a very practical handling, becomes an important tool for physical education teachers who, through body practices, can enable students to achieve better levels of physical activity and consequently better levels of flexibility.

It is suggested that new studies be carried out in the school environment with adolescents, seeking to encourage them to practice regular physical activities, with a larger sample and with different age groups to enable a comparison between ages, genders and also using the sit and sit test. achieve for flexibility assessment.

In addition, these findings can be used to encourage an increase in the regular frequency of physical activity, mainly to encourage greater adherence to physical activity, with adequate facilities and spaces for such practice being essential.

REFERENCES

1. Alberto, A. A. D., Júnior, A. J. F. Prevalence of physical inactivity in adolescents and its association with sociocultural variables. Think Practice. v. 19. n. 4. 2016.
2. American College of Sports Medicine. ACSM's. Guidelines for exercise testing and prescription; 9th edition. Lippincott Williams & Wilkins. 2014.
3. Araújo, S.; Oliveira, A. Physical fitness in schoolchildren in Aracajú. Rev Bras Kinanthropometry and Human Performance. v.10, n.3, p. 271-276. 2013.
4. Barbosa, T.; Zica, M.; Quaresma, F.; Sonati, J.; Maciel, E. Relationship between body composition and physical fitness in a group of high school students in Brazil. UIIPS Magazine. v. 4. n. 2. p. 273-284. 2016.
5. Cardoso, I. M.; Silva, A. S.; Sérgio Ayama.; Alonso, A. C. Evaluation of the muscular flexibility of the posterior chain in judokas and in individuals not practicing physical activity. CPAQV Magazine. v. 7. n. 3. 2013.

6. Galdino, F. F. S. Stretching and flexibility: a study on concepts and differences. efdeportes.com, Digital Magazine. Buenos Aires, year 17, n.176, enero. 2013.
7. Garber, C. E.; Blissmer, B.; Deschenes, M. R.; Franklin, B. A.; Lamonte, M. J.; Lee, I.; Nieman, D. C.; Swain, D. P. Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness. In: Apparently healthy adults: guidance for prescribing exercise. Medicine & Science in Sports & Exercise. Madison, v.43, n.7, p.1334-1359. 2011.
8. Gaya, A..; Gaya, A. Projeto Esporte Brasil: Test and evaluation manual. Porto Alegre: UFRGS. 2016.
9. Gouveia, E. R.; Freitas, D. L.; Maia, J. A.; Beunem, G. P. (2017). Physical activity, fitness and overweight in children and adolescents: "the study of wood growth". Brazilian Journal of Physical Education and Sport, São Paulo, v.21, n.2, p. 95-106. 2017.
10. Guadagnine, P. Comparison of flexibility in elderly practitioners and non-practitioners of physical activities. Digital Magazine, Buenos Aires, Year 10, n. 69, Feb. 2014.
11. Guimarães, C. D. O. The influence of socioeconomic status on flexibility in 13 and 17 year old children. Rev Movement. Ipatinga: Unileste-MG, v.1 - aug. /dec. 2013.
12. Hallal, P. C.; Bertoldi, A. D.; Gonçalves, H.; Victoria, C. G. Prevalence of sedentary lifestyle and associated factors in adolescents aged 14-16 years. Cad Public Health. v.22, n.6, p.177-87. 2013.
13. Lima, K. M.; Reis, M. D. S.; Lisbos, T.; Beltrame, T. S. Comparison of the flexibility level in adolescents who practice and do not practice volleyball in a public school. Rev Bras Presc Fisiol Exercise. São Paulo, v.10. no. 60. p. 519-523. Jul./Aug. 2016.
14. Lima, W. S. L.; Teixeira, R. V.; Queiroz, J. B.; Lima, E. J. Level of flexibility in adolescents who practice strength training. Motricity. v. 14, n.1, p. 240-244. 2018.
15. Luciano, A. P.; Bertoli, C. J.; Adami, F.; Abreu, L. C. Physical activity level in healthy adolescents. Rev Bras Med Esporte. v. 22. n. 3. p.191-194. 2016.
16. Malta, D.C.; Bernal, R. T. I.; Andrade, S. S. C. A.; Silva, M. M. A.; Velasquez-Melendez, G. Prevalence of adults and associated with self-reported high blood pressure factors in Brazilian. Rev. Public Health (Online). 2017;51(Suppl 1):1-11s. https://DOI.ORG/10.1590/S1518-787.2017051000006.
17. Mendes, A. C..; Muniz, M. M.; Silva, R. G. M.; Lopes, R. S. D.; Carvalho, F. T. Comparison of myofascial release after passive muscle stretching and neural mobilization on ROM of the hip. Manual Therapy, Posturology; Rehabilitation Journal. v. 12. 2014.
18. Mitchell, J.A.; Dowda, M..; Pate, R. R., Kordas, K..; Froberg, K.; Sardinha, L. B., Kolle, E.; Page, A. Physical Activity and pediatric obesity: A quantile regression analysis. Medicine & Science in Sports & Exercise. Madison, v.49, n.3, p. 466-473. 2017.
19. Montenegro, C. M.; Carvalho, G. A. Evaluation of flexibility in elementary school students in the city of Manaus-AM. Brazilian Journal of Science and Movement. v. 22. n. 2. p.5-12. 2014.
20. Moraes, A. C. F.; Fernandes, C. A. M.; Elias, R. G. M.; Nakashima, A. T. A.; Reichert, F. F.; Falcão, M. C. Prevalence of physical inactivity and associated factors in adolescents. Rev Assoc. Med Bras. v. 55, no. 5, p. 523-8. 2015.
21. Moraes, E. A.; Sassarrão, J. F. S. L. D. S.; Chierighini, R. A. A. T. D. R. L.; Martinez, R. P. Physical activity level in adolescents aged 12-16 years. Digital Magazine. Buenos Aires, no. 127. 2008.
22. Nahas, M. V. Physical activity, health and quality of life: concepts and suggestions for an active lifestyle. 7. ed. Florianópolis, Ed. by the Author, 2017.
23. Novello, E. C.; Frigeri, E. R. Flexibility levels of students from a rural school in Barra Bonita, SC. Unoesc & Science. ACHS Joaçaba, v. 8, no. 2, p. 175-182, jul./dec. 2017.
24. Oliveira, D. D. Comparison of flexibility levels between taekwondo practitioners and non-practitioners. Digital Magazine - Buenos Aires, year 13, n. 119, April. 2012.
25. Pelegrini, A. Prevalence of sedentary lifestyle, overweight and body image dissatisfaction in adolescents from Florianópolis, SC. Rev Bras Cinanthropom Performance Hum. v. 11, no. 2, p. 254. 2009.
26. Pelegrini, A.; Augusto, D.; Silva, S.; Petroski, E. L.; Glaner, M. F. Health-related physical fitness: Data from the Sport Brasil Program. Rev. Brazil Med. Sport, v .17, n. 9. p. 92-96. mar./apr. 2011.
27. Perfeito, R. S. Relationship between motor skill levels and flexibility in schoolchildren aged 11 to 12 years in the state of Rio de Janeiro: a descriptive cross-sectional study. Brazilian Journal of Exercise Prescription and Physiology. v.17, n.9, p.92-96. 2014.
28. Proesp-Br. Brazil Sport Project. Health and sports performance indicators in children and young people. Manual for the application of somatomotor measurements and tests. 2007.
29. Ribeiro, R. Q. C.; Lotufo, P. A.; Lamounier, J. A.; Oliveira, R. G.; Soares, J. F.; Botter, D. A. Additional cardiovascular risk factors associated

with overweight in children and adolescents. The study of the heart of Belo Horizonte. Arch Bras Cardiol. v. 86, no. 6, p. 408-18. 2015.

30. Riebe, B.A.; Franklin, P. D.; Thompson, C.E.; Garber, G. P.; Whitfield, M.; Magal, L.S.; Pescatello. Updating ACSM's Recommendations for exercise preparticipation health screening. Medicine & Science in Sports & Exercise. Madison, v.47, p. 2473-2479. 2015.
31. Santos, G. G.; Farias, G. O.; Azevedo Guimarães, A. C.; Dos Santos Correia, P. M.; Marinho, A. Obesity and adolescence: an analysis of studies published in the Brazilian Journal of Physical Activity & Health. Body Consciousness Magazine. v.20, no. 2, p. 57-71. 2016.
32. Silva, D. A. S.; Silva, R. J. S. Pattern of leisure-time physical activity and associated factors in students from Aracaju-SE. Brazilian Journal of Physical Activity & Health. v.13, n. 2, p. 94-101. 2014.
33. Silva, D. J.; Oliveira, B. Flexibility in adolescents - a contribution to global assessment. Brazilian Journal of Kinanthropometry & Human Performance. v.8, n.1, p.72-79. 2013.
34. Silva, J.; Andrade, A.; Capistrano, R.; Tailine Lisbon, T.; Andrade, R. D.; Felden, E.P.G.; Beltrame, T. S. Insufficient levels of physical activity in adolescents associated with sociodemographic, environment and school factors. Science & Collective Health, v. v. 23, no. 12. p. 4277-4288. 2018.
35. Voser, R. C.; Lima, D. V.; Voser, P. E. G.; Duarte Júnior, M. A. S. Measurement of the physical activity level of schoolchildren in the public school system in the city of Pelotas-RS. Brazilian Journal of Exercise Prescription and Physiology, São Luís, v.11, n.70, p. 820-5. 2017.