Research Article
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Prevalence of insufficient levels of physical activity and associated factors in adolescents of the Northern Brazil

Abstract

Introduction: Scientific evidence shows that the prevalence of insufficient levels of physical activity is associated with a higher risk of chronic degenerative diseases at an early stage. Objective: To describe the prevalence of insufficient levels of physical activity in elementary school II adolescents residing in the city of Macapá, Amapá and identify the associated factors. Methods: The sample consisted of 595 elementary school II students of both genders with age between 10 and 15 (51.3% female). The insufficient levels of physical activity were measured with a short IPAQ and defined as practicing moderate or vigorous physical activity for a period ≥ 300 minutes/week. The independent variables analyzed were: age, residence with or without a backyard, type of building material of the residence, school transportation form, living with parents and/or other people and parents encouragement. Multivariable logistic regression was used to verify the factors associated with prevalence of insufficient levels of physical activity. Results: The prevalence of insufficient levels of physical activity in adolescents was 64.1% (CI 95%: 60.7-66.9), being higher in girls with 65.1% (CI 95%: 61.8-67.3). The factor associated with the prevalence of insufficient levels of physical activity was the use of automotive school transportation in adolescents of both genders. The male adolescents in younger ages, the residents in wood-built houses and the female who lives only with their mothers and do not receive encouragement from their parents to practice physical activity were the most exposed to prevalence of insufficient levels of physical activity. Conclusion: The prevalence of insufficient levels of physical activity was high, leading to suggest that educational programs could act as facilitators in a regular practice of physical activity, especially in lower income regions.

Keywords: physical inactivity, risk factors, adolescence

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Introduction

Insufficient levels of physical activity consists in one of the main risk factors in the development of chronic non-transmissible diseases, for being frequently associated with excessive accumulation of body fat, adverse changes in the blood lipids profile, high level of blood pressure, beside the fact that they are responsible for 10% of deaths in the world.[1] In a systematic review by Morais et al.[2] The prevalence of insufficient levels of physical activity varied of 18.7% to 90.6% in adolescentes, having by definition of insufficient levels of physical activity as to accumulate less than 60 minutes/day of moderate or vigorous physical activity.

Considering this scenery, many programs of physical activities, sports and leisure practice are associated with initiatives to reduce insufficient levels of physical activity, especially among adolescents. However, these intervention strategies in reducing risk behaviors appear to be ineffective. It has been widely described that the improvement in the effectiveness of these programs should consider not only the biological, biomechanical or psychological variables, since other factors of different dimensions with intrapersonal, interpersonal, social, cultural, economic and environmental are associated with physically active behaviors. The Brazilian reality, supported by epidemiological surveys, demonstrates the prevalence of insufficient levels of physical activity during adolescence, especially when associated with environmental, demographic-biological and socio-cultural factors.[3–6] However, these studies were conducted with adolescents from the Northeast, Southeast and South regions, and no studies were found that evaluated the multi factorial aspects associated with the prevalence of insufficient levels of physical activity among adolescents living in the Northern region of Brazil, especially in the city of Macapá, Amapá.

The identification of the prevalence of insufficient levels of physical activity in adolescents and the magnitude of the association between factors that influence this behavior represent important information to guide the planning, development and evaluation of programs to promote the regular practice of physical activity.

In this sense, because Brazil is considered a continental country, with many social differences and considering the scarcity in the national literature on this topic among Amazonian adolescents, this study aimed to describe the prevalence of insufficient levels of physical activity in elementary school II adolescents residents of the city of Macapá, Amapá and identify the associated factors.

Methods

This is a cross-sectional study of the descriptive type, carried out with elementary school II adolescents of state public schools in the city of Macapá, Amapá, in 2013. According to information provided by the State Secretariat of Education of Amapá, the number of students enrolled in the final years of elementary school II in state public schools in the year 2013, in the city of Macapá, Amapá was 16.360 students.

The sample selection was made by conglomerates in two stages (schools and classes). In the first stage, with a nominal relation provided by the Amapá State Secretariat of Education, eight schools were selected that offered the final grades of elementary school II of the 25 existing ones in the city of Macapá, Amapá distributed proportionally in the peripheral region. In compliance with the second stage, 14 classes were selected, proportionally distributed per shift and grade of the elementary school II of the schools in the peripheral region.

The estimated sample size followed the following criteria: A) 95% confidence interval; B) sample error of 3%; C) prevalence of insufficient levels of physical activity expected of 50%; D) increase of 10% for losses and refusals. The final sample consisted of 595 adolescents, aged between 10 and 15 years, 305 girls and 290 boys, distributed in 25 state public schools located in the peripheral zone of the city of Macapá, Amapá. All adolescents of both genders between 10 and 15 years old, regularly enrolled in state public schools located in the peripheral zone of the city of Macapá, Amapá, were considered eligible. Adolescents with special needs were excluded and those who did not present the Free and Informed Consent signed by the person in charge. This study complied with the ethical aspects of the Human Research Protocol established by CNS-196/96 and was approved by the Research Ethics Committee of Universidade São Judas Tadeu under Protocol 100/2011.

Data collection was carried out in the classroom of the school itself between August and December 2013, by a team composed of students of Physical Education previously trained and supervised by the researcher in charge. The data were composed of the following variables: assessment of the levels of insufficient physical activity (dependent variable); Information on the factors associated with inactive behavior physically.

Insufficient levels of physical activity were assessed using the International Physical Activity Questionnaire (IPAQ) short version, which contains questions pertaining to weekly frequency and duration of physical activity in light intensity (walking), moderate and vigorous. In this study, the adolescents who participated for less than 300 minutes per week of physical activity in a structured or unstructured form were considered with insufficient levels of physical activity, according to the current recommendation for adolescents.[7]

The information on the associated factors (independent variables) to the prevalence of insufficient levels of physical activity was collected through a questionnaire containing questions about: adolescents' ages (grouped into three groups: 10-11, 12-13 and 14-15years), Residence of adolescents with or without a backyard; Type of residence construction (wood, masonry or mixed); Form of school transport (walking / cycling or by motor transport); Housing (with father and mother together, only with the mother, only with the father or with other people); Encouragement from the parents to practice physical activity.

The statistical analysis of the data was described by the absolute frequency (n) and the relative frequency (%). In the crude analysis, the prevalence of insufficient levels of physical activity was calculated for the categories of each independent variable. The level of significance between the proportions was assessed using the chi-square test ($\chi 2$) for heterogeneity or for linear trend. In the multivariate analysis, Stepwise logistic regression was used. The magnitude of the association between the associated factors and the prevalence of insufficient levels of physical activity was expressed in Odds Ratio (OR) and respective 95% confidence intervals (CI: 95%). All statistical processing was performed in R software, version 3.0.1 and the level of significance was maintained at 5%.

Results

The study sample consisted of 595 elementary school students with mean age of 12.52±1.34 years, n =290 (48.7%) males and 305 (51.3%) females.

The prevalence of insufficient levels of physical activity measured by IPAQ in adolescents between 10 and 15 years of age and of both genders was high. Of the total sample studied, 64.1% (CI 95%: 60.7-66.9) did not perform physical activity≥300 min/wk, with similarity between adolescents of both genders, although the highest levels were found in females with 65.1% (CI 95%: 61.8-67.3). Regarding age, insufficient levels of physical activity were more pronounced in male adolescents between 12 and 13 years of age, with 81.1% and 74.1% among females aged 14-15 years.

(Table 1) (Table 3) present the results of logistic regression for gross and adjusted association among the variables associated with the prevalence of insufficient levels of physical activity in adolescents of both genders. In boys, the gross analysis shows an inverse association between the prevalence of insufficient levels of physical activity and age, type of residence, residence with backyard, school transportation, housing, and parents' incentive regarding physical activity practice (Table 2).

Table 1 Distribution of stratified sample by sex of adolescents. Macapá/AP, 2013

	Male		Female	
Variables	**n**	**%**	**n**	**%**
Age				
11-Oct	100	34.5	115	37.6
13-Dec	92	31.7	109	35.6
14 - 15	98	33.8	82	26.8
Residence has backyard				
Yes	230	79.3	249	81.6
No	60	20.7	56	18.4
Tipe of residence				
Masonry	205	70.7	190	62.3
Wood	45	15.6	49	16.1
Mixt	40	13.7	66	21.6
School transportation				
Walking/bicycle	187	64.5	225	73.8
Car/bus/boat	103	35.5	80	26.2
Living with				
Father and mother	187	64.4	203	66.5
Mother	76	26.2	65	21.3
Father	10	3.5	15	4.9
Others	17	5.9	22	7.3
Parents Encouragement				
Receive	52	17.9	170	55.7
Do not receive	238	82.1	135	44.3
Total	**290**	**100**	**305**	**100**

Table 2 Gross and adjusted prevalence of insufficient levels of physical activity in male adolescents.Macapá/AP, 2013

Insufficient levels of physical activities						
Variables	**n**	**%**	**Gross or (CI95%)**	**p**	**Adjusted or(CI95%)**	**p**
Age (years)				0.001*		
11-Oct	41	41	1		1	
13-Dec	73	81.1	6.18 (3.19 – 11.97)		19.93 (3.69 – 32.36)	0.001*
14-15	64	67.4	2.97 (1.65 – 5.34)		2.34 (1.03 – 5.33)	0.043*
Residence has backyard				0.002*		
Yes	130	57.1	1			
No	48	80	0.34 (0.17 – 0.68)			
Type of Residence				0.013*		
Masonry	122	61	1		1	
Wood	36	80	2.56 (1.17 – 5.61)		11.72 (2.77 – 49.62)	0.001*
Mixt	20	50	0.64 (0.32 – 1.26)		0.69 (0.24 – 2.02)	0.503
School Transportation				0.001*		
Walk/bicycle	92	49.7	1		1	
Car/bus/boat	86	86	6.21 (3.29 – 11.71)		22.39 (7.41 – 67.78)	0.001*
Living with				0.064		
Father and Mother	113	61.1	1			
Mother	45	60	0.92 (0.55 – 1.64)			
Father		100	6.32 0.77 – 32.43			
Others	10	66.7	1.05 (0.43 – 3.37			
Parents Encouragement				0.054		
Receive	34	65.5	1			
Do not receive	144	62.3	0.55 (0.33 – 1.01)			

*p<0.05, chi-square test ($\chi 2$) for heterogeneity

Table 3 Gross and adjusted prevalence of insufficient levels of physical activity in female adolescents. Macapá/AP, 2013

Insufficient levels of physical activity						
Variables	**n**	**%**	**Gross or (CI95%)**	**p**	**Adjustedor (CI95%)**	**p**
Age (years)				0.002*		
11-Oct	51	43.6	1			
13-Dec	75	62	1.73 (1.02 – 2.93)			
14-15	63	74.1	3.03 (1.63 – 5.63)			
Residence has backyard				0.004*		
Yes	146	57	1			
No	43	78.2	0.37 (0.19 – 0.74)			
Type Of Residence				0.43		
Masonry	115	60.5	1			
Wood	34	68	1.39 (0.72 – 2.69)			
Mixt	40	56.3	0.84 (0.49 – 1.46)			

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Table Continued....

Insufficient levels of physical activity						
Variables	**n**	**%**	**Gross or (CI95%)**	**p**	**Adjustedor (CI95%)**	**p**
School Transportation				0.001*		
Walk/bicycle	126	54.5	1		1	
Car/bus/boat	63	78.8	3.09 (1.71 – 5.61)		3.91 (1.39 – 11.1)	0.010*
Living with				0.001*		
Father and Mother	115	55.8	1		1	
Mother	50	76.9	2.45 (1.37 – 4.86)		13.23 (4.34 – 40.3)	0.001*
Father	14	93.3	5.49 (1.39 – 42.06)		7.86 (0.91 – 68.87)	0.063
Others	10	40	0.49 (0.23 – 1.32)		0.18 (0.05 – 0.64)	0.008*
Parents encouragement						
Receive	96	54.5	1	0.010*	1	0.009*
Do not receive	93	68.9	0.54 (0.34 – 0.87)		0.25 (0.09 – 0.71)	

*p<0.05, chi-square test ($\chi 2$) for heterogeneity

The adjusted analysis shows that higher levels of insufficient physical activity are associated with the 12-13 year age group (OR = 19.33; CI 95%: 3.69-32.36), with the fact that the students live in houses without a backyard (OR = 5.72; CI 95%: 1.45-22.57), reside in houses built of wood (OR = 11.72; 95% CI: 2.77-49.62) and, if they travel by car/bus/boat (OR = 22.39; 95% CI: 7.41-67.78). In girls, the crude analysis shows that insufficient levels of physical activity are associated with age, residences without a backyard, school transportation, housing, and stimulus to practice physical activity (Table 3).

After adjustment for the confounding variables, these indices remained associated with the fact that the adolescents lived in houses without a backyard (OR=0.18;CI 95%: 0.06-0.49), moved by car/bus/boat (OR=3.91;CI 95%: 1.39-11.1), living only with the mother (OR=13.23;CI 95%: 4.34-40.33) and not encouraged by parents to the practice of physical activity (OR=0.25; CI 95%: 0.09-0.71).

Discussion

The present study demonstrated the prevalence of insufficient levels of high physical activity (64.1%) in the adolescents evaluated, similar to the values described in national studies[4,8–10] and international studies[2,11] which used the same criterion for classifying insufficient levels of physical activity. As described in other studies,[11,12] the present study also identified higher levels of insufficient physical activity in females (65.1%) compared to males (63.1%). It is believed that socio-cultural and biological factors condition the participation of boys in physical activity of more vigorous intensity and of girls in physical activities of lesser intensity. According to Farias Junioret al,[3] culturally, girls are always encouraged to engage in activities of lesser physical effort, justified by the fact that some activities may influence their femininity, while boys are encouraged to participate in more vigorous physical activities, seeing in them strong bodies, an image of greater virility, courage and greater ability.

The results of the present study demonstrated that the prevalence of insufficient levels of physical activity in male adolescents is associated with the ages, the type of construction material used in the residences, the type of residence and the form of transportation to school.

Regarding the ages, these alterations were only identified in adolescents aged 12-13 years. Some studies[13–15] that identified a prevalence of insufficient levels of physical activity with this age group suggest that the transition from the initial phase of 11 and 12 years to the second phase of adolescence of 14 and 15 years represents a critical period for reductions in the insufficient levels of physical activity among adolescents. It is believed, therefore, that the implementation of intervention strategies that result in the reduction of the prevalence of insufficient levels of physical activity can be improved for the adolescents in the biological and behavioral transition, as described in the present study, between 10 and 15 years in both genders.

The fact that the adolescents live in houses built in wood was associated with a greater chance of insufficient levels of physical activity compared to those living in houses constructed of masonry or mixed (wood and masonry). It is important to mention that we have not found in the literature studies that evaluated the relationship between the type of material of the construction of the residence of adolescents and the prevalence of insufficient levels of physical activity. It is believed that this association is determined by factors such as socio-cultural and socioeconomic condition. The accelerated urbanization process and the intensification of disordered occupations in the city of Macapá, Amapá, determine the organization of new urban conglomerates, usually on the outskirts of the city, where most of the houses are built with low-cost wood, Abundance of this existing building material in the Amazon. However, they are precarious housing without infrastructure, which is contrary to the concept of housing, because territorial elements present in the area of residence or the perception about their existence (existence of equipment, spaces for walking, green spaces, security in the public space, etc.) seem to contribute to more active behaviors.[16,17]

There was an inverse and significant association between a higher prevalence of insufficient levels of physical activity and the fact that adolescents travel by car, confirming previous findings.[17,18] These results can be explained by inadequate traffic signaling, lack of sidewalks conducive to commuting, lack of cycle paths and perceived insecurity may be associated with adolescent mobility. Although all of these points were not evaluated in the present study, it was the

subject of different studies,[3,19] suggesting that the improvement of the environmental conditions can stimulate the increase of the active displacements among the adolescents.

In girls, the variables associated with the prevalence of insufficient levels of physical activity were the use of automotive transportation, living with only the mother and not being encouraged by parents to practice physical activities. Regarding the use of automotive transports as a form of transportation to school, similar data were found in studies by Bastos et al.[19] and Davison et al.[20] who found that girls were less prone to active displacement compared to boys. By the other hand, McDonald[21] states that gender has little influence on the choice of trips to school, since other factors may interfere with the choice of active trips such as distance from home to school, mobility depending on the parent and the age of the adolescents.[22]

In relation to the association between the prevalence of insufficient levels of physical activity and the fact that the girls reside only with the mother, although national studies such as Moraes et al.[23] and Tenório et al.[24] did not observe this association, the present study suggests that the adolescents are probably influenced by the increase in the number of families led by women[25] and the construction of the feminine identities in the relation with the practice of physical activity.

The study of Gonçalves et al.[26] showed that mothers oriented their daughters to confine themselves only to the spaces of the house or the neighborhood, as well as from the adolescence to assign to the women functions related to the household chores. Consequently, with these standards, girls would be at a disadvantage compared to boys in terms of opportunities for physical activity.

The lack of incentive of the parents for the practice of physical activity was associated with the prevalence of insufficient levels of physical activity, a finding similar to that of another study.[27] This result suggests an indirect influence, since insufficiently active parents tend not to encourage their children to practice physical activities. Thus, this study argues that parents can play a decisive role in the practice of physical activity of adolescents, both through direct access of their children to this practice and indirectly providing necessary information about the importance of active lifestyle. Social support from parents is considered an important predictor of sufficient levels of physical activity in adolescents.[15]

Because it is a cross-sectional study, it is not possible to establish a cause-effect relationship between the variables studied. On the other hand, the results of this study present important evidence on the prevalence of insufficient levels of physical activity and associated factors for a significant part of adolescents in the city of Macapá, Amapá.

Conclusion

The prevalence of insufficient levels of physical activity was high and was associated with the use of motorized school transport in both sexes. The results also indicate that younger male adolescents, those living in wooden houses and female residents who only live with the mother and do not receive incentives from their parents to practice physical activity were more exposed to prevalence of insufficient levels of physical activity. Therefore, it is necessary to intervene in order to increase the levels of physical activity in the age group under study. Finally, it is suggested that new studies may better elucidate the association between variables by testing the impact of different factors associated with the prevalence of insufficient levels of physical activity in adolescents, especially in lower income regions.

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Conflict of interest

Author declares there is no conflict of interest in publishing the article.

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