Original Articles

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Physical activity practice and associated factors in adolescents in Northeastern Brazil

ABSTRACT

OBJECTIVE: To estimate the proportion of physically active adolescents and identify associated factors.

METHODS: The sample was composed of 2,874 high school students (public and private schools) aged 14 to 19 years in the city of João Pessoa, Northeastern Brazil. Physical activity level was measured by means of a questionnaire and considered physically active if $\geq$ 300 minutes/week. Sociodemographic variables were analyzed, as well as nutritional status, sedentary behavior, self-report of health status and participation in physical education classes. The prevalence ratio was used as association measure, estimated by means of Poisson regression.

RESULTS: The prevalence of physical activity was 50.2% (95%CI: 47.3;53.1). Male adolescents were more physically active than female adolescents (66.3% vs. 38.5%; p<0.001). The factors directly associated with practice of physical activity were: father's higher level of schooling for the male sex and mother's higher level of schooling for the female sex, positive self-reported health status, and participation in physical education classes.

CONCLUSIONS: The majority of the adolescents was classified as physically active, particularly the male youths. Adolescents with parents whose level of schooling was higher, with positive health status perception, and who participated in physical education classes were more likely to be physically active.

DESCRIPTORS: Adolescent. Motor Activity. Physical Education and Training. Sedentary Lifestyle. Health Behavior. Socioeconomic Factors.

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INTRODUCTION

Physical inactivity is considered one of the most important public health problems of the 21st century.[3] Besides being an important component for a healthy lifestyle and for health promotion, physical activity plays a role in the prevention of chronic non-communicable diseases.[25]

Adolescence is a critical period in relation to physical activity. The proportion of physically inactive adolescents is high,[16] even though this is considered the most physically active population group.

The health risks associated with low levels of physical activity in adolescents are well known, as well as the benefits deriving from this practice, when it is performed in a sufficient and regular way.[11,20] The individual's physical activity

habits during adolescence can predict the level of physical activity practice in adulthood.[11]

Several recommendation guidelines on physical activity for youth have been suggested and published in the last decades. According to the current recommendations, adolescents should practice 60 minutes or more per day of physical activities of moderate to vigorous intensity; muscular resistance/strength and stretching activities should be included at least three days a week.[25]

Studies with adolescents from diverse countries reveal that 13.7%[18] to 56.0%[12] practiced physical activities in accordance with the current recommendations.[25] In Brazil, despite the increasing number of studies about the theme,[4,23] information on the proportion of physically active adolescents ($\geq$ 300 minutes/week) in a sample of national representativeness is limited. Data from *Pesquisa Nacional de Saúde do Escolar* (PeNSE – National School-Age Adolescent's Health Survey), carried out with students in the ninth grade of junior high school of public and private institutions, shows that 43.1% of the adolescents are sufficiently active.[a] Generally speaking, the available data come from studies most of which do not have representative samples. These studies show that 13%[15] to 63.5%[8] of the adolescents practiced 300 min/week or more of moderate to vigorous physical activities.

In spite of the methodological differences observed in the studies, the prevalence of physical inactivity in adolescents is high, which justifies studies about physical activity practice and the identification of groups with higher frequency of exposure to this outcome.

In view of the scarcity of data on the proportion of Brazilian adolescents that comply or not with the physical activity recommendations, mainly in the Northeast region,[23] the present study aimed to estimate the prevalence of adolescents who comply with the current physical activity recommendations and to identify associated factors.

METHODS

Cross-sectional, school-based epidemiological study conducted with high school adolescents from public and private schools in the municipality of João Pessoa, Northeastern Brazil, in 2009. The municipality has a population of 723,515 inhabitants, gross domestic product of 5,966,595 thousand, infant mortality rate of 12.7 deaths per one thousand live births and human development index of 0.78 (medium).

Two-stage cluster sampling was performed (schools, classes) with probability proportional to size (number of students). In the first stage, 30 schools were randomly selected (16 public and 14 private), proportionally distributed over the four regions of the municipality (north, south, east, west). In the second stage, 135 classes were randomly selected, proportionally distributed per period and High School grade. The number of drawn classes in each school was determined considering that, on average, 20 students would be found per class in the public schools and 25 in the private schools.

The following parameters were considered for the calculation of sample size: estimated prevalence of 50% ($\geq$ 300 minutes/week of physical activity); acceptable error of three percentage points; level of confidence of 95%; design effect (deff) = 2; addition of 30% for losses and refusals. This resulted in a sample of 2,686 students. This sample also has power to detect as significant prevalence ratios equal to or higher than 1.30, with outcome prevalence varying from 32.5% to 97.5% in the exposed individuals and from 25% to 75% in the non-exposed.

All students regularly enrolled in the drawn classes and who were present in the classroom in at least one of the three visits of the collection team were invited to participate in the study. The adolescents who did not present the consent document signed by father/mother or guardian (< 18 years of age), those who did not want to participate or who were not present in the classroom on the day of data collection were considered losses.

The adolescents who had some limitation for the practice of physical activities, those who were <14 and >19 years of age and those who left many questions unanswered or with "improbable" or "impossible" answers were excluded. Of the 3,220 adolescents who answered the questionnaire, 231 were excluded because they were <14 or >19 years of age, 105 did not inform the age, five had some physical disability that limited or prevented the practice of physical activity, and five did not answer the questionnaire adequately (many unanswered questions). Overall, 70 refusals and 187 losses (adolescents absent from school on the days of data collection) were registered. The final sample was composed of 2,874 adolescents (mean age = 16.5; SD= 1.2; 57.8% of the female sex; 15 did not inform the sex).

Data collection was performed from May to September 2009 by a team composed of six interns of the Physical Education Program who had been previously trained and were supervised by the researcher in charge.

A standardized, anonymous, self-administered questionnaire was used. To reduce the number of losses, the questionnaire was administered from Tuesday to Thursday, on the second class of the day. The questionnaire included questions about: age, skin color, economic class, father's and mother's level of

schooling, sedentary behavior, adolescent's nutritional status, occupational situation, health perception, and participation in physical education classes.

Skin color was determined by the adolescent, according to the categories proposed by the *Instituto Brasileiro de Geografia e Estatística* (IBGE – Brazilian Institute of Geography and Statistics): mixed-ethnicity (black and white), black, white, yellow, Indian. For the analysis, they were grouped into white and non-white. The adolescents' economic class was established according to the methodology of the *Associação Brasileira de Empresas de Pesquisa* (ABEP – Brazilian Association of Research Companies):[b] A1 (highest level), B, C, D and E (lowest level).

The father's and mother's level of schooling was investigated through the question "Up to which school grade did your father/mother study?" The adolescent's occupational situation was verified through the question: "Do you work?"

Sedentary behaviors were measured through pre-coded questions about TV time and time of use of computer + videogame, separately for weekdays and weekend days.

The adolescents' nutritional status was evaluated by means of the body mass index (BMI = weight [kg] height [m²]), based on self-reported measures. Overweight was defined based on the criteria of Cole et al.[5]

Health perception was measured by means of the question "How do you rate your health status?", and the answers were grouped into "negative health perception (poor, regular) and "positive health perception" (good, very good, excellent).

The adolescents also informed about their participation in physical education classes during a typical week.

Physical activity was measured by another questionnaire. The instrument was previously adapted to the characteristics of the study's target population and tested in a sample that did not participate in the main study (reproducibility = 0.88; 95%CI: 0.84;0.91; validity: Spearman's rho= 0.62; p<0.001; kappa= 0.59).

The adolescents informed the frequency of practice (days/week) and the duration (hours, min/day) of the physical activities performed in the previous week based on a list of 24 activities. They could add two more activities to this list.

The dependent variable was physical activity level, which was determined based on the sum of the product of the time spent in these activities and their respective frequencies of practice. The adolescents who reported physical activity practice $\geq$ 300 min/week were considered "physically active", and the others, "physically inactive".[6]

The Wald test for heterogenity or linear trend was used to compare the prevalence of physical activity by categories of the independent variables. Prevalence rate (PR) was used as a measure of association, and estimated Poisson regression and the Wald test were employed to evaluate statistical significance in the adjusted analysis.

The adjusted analysis followed a five-level hierarchical model. In the first (1), the demographic variables were introduced (age, skin color); in (2), the socioeconomic variables (economic class, father's and mother's level of schooling, occupational situation); (3) sedentary behaviors; (4) nutritional status; and (5) health perception and participation in physical education classes. All the variables were analyzed in the adjusted model, and those with p < 0.20 remained in the model. Variables with p $\leq$ 0.05 were considered factors associated with physical activity.

The data were entered in duplicate into the program EpiData 3.1, with automatic check on consistency and breadth of values and utilization of the program's tool "validate double entry".

The statistical analyses were performed in Stata 10.1, taking into account the cluster sampling strategy ("svy"). The calculation for determination of deff (design effect) size was performed *a posteriori*. A deff equal to 1.90 was observed, a value that was lower than the one adopted in the determination of minimum sample size. The level of significance that was adopted was 5% for two-tailed tests.

The study was approved by the Ethics Committee for Research involving Human Beings of Universidade Federal da Paraíba (Protocol no. 0062/2009). All the adolescents younger than 18 years who participated in the study had been authorized by parents or guardians.

RESULTS

Most of the adolescents were aged 16 to 19 years (89.3%), did not work (86.9%), belonged to intermediate (46.1%) or low (8.1%) economic levels and their parents completed at least High School (father: 50.1%, mother: 51.1%) (Table 1).

The prevalence of overweight was 13.2%; a little more than 50% of the adolescents spent >2h/day watching TV and approximately 40% spent >2h/day in the computer/ videogame; 84.2% self-rated their health status in a

[b] Associação Brasileira de Empresas de Pesquisa. Critério de Classificação Econômica Brasil. São Paulo; 2009 [cited 2009 Nov 26]. Available from: http://www.abep.org/novo/Content.aspx?SectionID=84

positive way and 66.9% said that did not participate in physical education classes (Table 1).

A little more than half of the adolescents (50.2% [95%CI 47.3;53.1]) were classified as physically active, twice as high in the male sex compared to the female sex (66.3% *vs*. 38.5%, p<0.001).

The prevalence of physical activity was higher in students whose parents had higher level of schooling (the father, in the case of the male sex, and the mother, in the female sex); in middle-class female students and in female students who spent up to 2h/day watching TV on a weekend day; and in students who reported positive health perception and who participated in physical education classes.

In the crude analysis, the variables associated with physical activity practice in the male sex were: father's level of schooling, health status perception and participation in physical education classes (Table 3). To the female sex (Table 4), the variables were the following: economic class, mother's level of schooling, time spent watching TV on a weekend day, health status perception and participation in physical education classes.

In the adjusted analysis, all the variables remained associated with the physical activity levels (Tables 3 and 4). The youths who achieved the physical activity recommendations were those whose parents had higher level of schooling (the father for the male youths and the mother for the female youths), middle-class youths and those who watched TV up to 2h/day on a weekend day (female sex), those who perceived their health status in a positive way and those who participated in one or more physical education classes.

DISCUSSION

The majority of the adolescents was classified as physically active (50.2%). However, the percentage of youths who did not practice physical activities in accordance with the recommendations of 300 minutes per week was high, mainly in the female sex and among adolescents who belonged to families of lower socioeconomic level. The adolescents who reported a positive perception of their health status and who participated in physical education classes were more likely to be physically active.

The prevalence of physical activity found in this study was higher than that reported in adolescents from Australia (13.7%),[18] the United States (34.7%)[7] and Spain (48.8%),[16] similar to that of Finnish youths (50.5%)[21] and lower than that of adolescents from China (56%).[12] In Brazil, the proportion of adolescents who practice physical activities according to the current recommendations are: Curitiba (southern) 14.5%;[15] Pelotas (southern) 30.2%;[2] Pernambuco (northeastern)

34.9%;[23] São Paulo (southeastern) 37.5%;[4] Maringá (southern) 43.1%;[14] Santa Catarina (southern) 63,5%.[8]

The higher prevalence of physical activity observed in the adolescents from João Pessoa may be due to the instrument used to measure physical activity in different contexts (leisure, school, travelling); sample characteristics (adolescents from public and private schools) and possibly to the characteristics of the city, which favor the practice of physical activity (weather, level of urbanization, infrastructure, traffic).

The elevated proportion of youths who do not practice moderate to vigorous physical activities or who practice them below the recommendation has led to the consideration that the promotion of physical activity in adolescence is a priority in public health, and this goal has been included in the health agendas. Physical inactivity is among the four main risk factors for global mortality, being surpassed by high blood pressure, smoking and high blood glucose.[25]

As previously described in other studies, both national[2,4,8,23] and international,[7,16] the present study also identified higher levels of physical activity in males compared to females. This association does not depend on the instrument that measures physical activity (objective vs. subjective measures), on the socioeconomic condition, on the cut-off point adopted to classify physical activity, nor on the adolescents' age.[24]

Higher levels of physical activity in males may be explained by biological differences, sociocultural ones, body perception differences and gender attributes. Since childhood, social roles are attributed according to gender and these roles influence the choices concerning practice of physical activity. Already in early ages, for cultural reasons, girls are instructed to engage in light activities, justified by the body's frailty, delicacy, grace, cooperation and tenderness. In turn, boys are stimulated to participate in vigorous physical activities, justified by the perception that they have strong bodies and by the image of greater virility, courage and ability.

An ethnographic study carried out with adolescents has shown that boys are raised with greater freedom than girls.[9] It was also perceived that the mothers were more concerned about their daughters being restricted to the spaces of the house or neighborhood, and considered the street a male space. Being raised under these norms, the girls would be in disadvantage in relation to the boys in terms of opportunities to practice physical activity. This study also showed that, unlike the boys, the girls mentioned that they had started distinct physical activities. However, they were the ones who remained less time in those activities.[9] The most reported reasons for the abandonment were: less time to study and the need to help in the domestic chores.[9]

Table 1. Sample characteristics. João Pessoa, Northeastern Brazil, 2009.

Variable	Male		Female		All	
	n	%	n	%	n	%
Sex						
Male					1206	42.2
Female					1653	57.8
Age (years)						
14-15	453	37.6	671	40.6	1.128	10.7
16-17	612	50.7	817	49.4	1.438	50.0
18-19	141	11.7	165	10.0	308	39.3
Skin color						
Mixed ethnicity (black and white)	636	53.1	846	51.4	1.491	52.2
Black	87	7.3	74	4.5	163	5.7
White	368	30.7	561	34.1	930	32.5
Others	107	8.9	165	10.0	275	9.6
Occupational situation (work)						
Yes	194	16.5	170	10.5	366	13.1
No	981	83.5	1443	89.5	2.436	86.9
Socieconomic level						
A (highest)	119	11.3	117	8.0	237	9.3
B	416	39.4	506	34.4	924	36.5
C	446	42.1	717	48.9	1.167	46.1
D,E (lowest)	76	7.2	127	8.7	205	8.1
Father's level of schooling						
Elementary school - incomplete	309	26.3	563	35.2	877	31.5
Elementary school - complete	233	19.9	279	17.5	514	18.5
High School - complete	402	34.3	491	30.7	895	32.2
Higher education - complete	229	19.5	266	16.6	497	17.8
Mother's level of schooling						
Elementary school - incomplete	309	25.8	538	32.9	853	30.0
Elementary school - complete	221	18.5	315	19.2	538	18.9
High School - complete	399	33.4	502	30.6	906	31.8
Higher education - complete	266	22.3	283	17.3	550	19.3
TV – week days						
≤ 2h/day	400	33.3	565	34.3	965	33.9
> 2h/day	801	66.7	1083	65.7	1884	66.1

To be continued

Table 1 continuation

Variable	Male		Female		All	
	n	%	n	%	n	%
TV – weekend days						
≤ 2h/day	495	41.3	705	42.8	1200	42.2
> 2h/day	704	58.7	942	57.2	1646	57.8
Computer/videogame – week days						
≤ 2h/day	650	54.4	1087	66.4	1737	61.3
> 2h/day	544	45.6	551	33.6	1095	38.7
Computer/videogame – weekend days						
≤ 2h/day	639	53.2	1089	66.3	1728	60.8
> 2h/day	561	46.8	553	33.7	1114	39.2
Nutritional status						
Low weight/ Normal weight	927	81.7	1394	90.5	2321	86.8
Overweight	207	18.3	146	9.5	353	13.2
Health perception						
Negative	1067	10.3	325	19.9	449	15.8
Positive	122	89.7	1306	80.1	2385	84.2
Physical education classes						
Did not have or did not participate	368	30.8	566	34.5	942	33.1
1/week	270	22.6	440	26.9	712	25.0
≥ 2/week	557	46.6	632	38.6	1192	41.9

Since adolescence, functions related to care with the home and the family have been attributed to women, resulting in less available time to practice physical activities. Another aspect is that women value the practice of physical activity less because they think that it makes them sweat and affects their esthetics and beauty ("it ruins the hairdo and the makeup").

There are differences between sexes in relation to the determinants of physical activity practice. Male adolescents report greater social and friends' support to practice physical activities, perceive fewer barriers to engage in physical activity and have greater perception of self-efficacy. Female adolescents present more negative attitudes concerning the practice of physical activities, report more barriers to the practice of physical activities and perceive the environment in a more adverse way (less favorable to physical activity practice).[17,19,24]

No significant relations were observed between level of physical activity and age. Some studies have not identified significant alterations to the level of physical activity as age advances,[14,23] while others have reported reductions in both sexes[18] or in adolescents in general.[4,8] Some studies have reported reductions only in the female sex[2] or in the male one.[16]

Table 2. Prevalence of physical activity in adolescents. João Pessoa, Northeastern Brazil, 2009.

Variable	Male			Female		
	n	%	p	n	%	p
Age (years)			0.176*			0.392*
14-15	311	68.7		265	39.5	
16-17	398	65.0		315	38.6	
18-19	91	64.5		56	33.9	
Skin color			0.206**			0.365**
White	231	62.8		224	39.9	
Non-white	564	67.9		441	37.9	
Socioeconomic level			0.103*			0.006**
A (highest)	81	68.1		47	40.2	
B	289	69.5		199	39.3	
C	288	64.6		297	41.4	
D,E (lowest)	47	61.8		33	26.0	
Father's level of schooling			0.022*			0.126*
Elementary school - incomplete	193	62.5		35,4	193	
Elementary school - complete	156	67.0		40,1	156	
High School - complete	273	67.9		40,9	273	
Higher education - complete	161	70.3		40,2	161	
Mother's level of schooling			0.157*			0.022*
Elementary school - incomplete	203	65.7		182	33.8	
Elementary school - complete	131	59.3		117	37.1	
High School - complete	278	69.7		221	44.0	
Higher education - complete	182	68.4		112	39.6	
Work			0.126**			0.745**
Yes	117	60.3		68	40.0	
No	660	67.3		557	38.6	
TV – week days			0.650**			0.957**
≤ 2h/day	269	67.3		218	38.6	
> 2h/day	528	65.9		416	38.4	
TV – weekend days			0.478**			0.011**
≤ 2h/day	323	65.3		293	41.6	
> 2h/day	474	67.3		339	36.0	
Computer/videogame – week days			0.459**			0.087**
≤ 2h/day	425	65.4		400	36.8	
> 2h/day	367	67.5		229	41.6	
Computer/videogame – weekends			0.420**			0.332**
≤ 2h/day	418	65.4		407	37.4	
> 2h/day	380	67.7		223	40.3	
Nutritional status						
Low weight/Normal weight	623	67.2		543	39.0	
Overweight	140	67.6		54	37.0	
Health perception			0.003**			0.001**
Negative	64	52.5		95	29.2	
Positive	732	68.6		533	40.8	
Physical education classes			0.001*			0.001*
Did not have or did not participate	209	56.8		175	30.9	
1/week	187	69.3		159	36.1	
≥ 2/week	396	71.1		297	47.0	

*Wald Test for linear trend
**Wald Test for heterogeneity

Table 3. Prevalence and prevalence ratio of physical activity and associated factors in male adolescents. João Pessoa, Northeastern Brazil, 2009.

Variables	Crude analysis		Adjusted analysis	
	PR	95%CI	PR	95%CI
1st Level				
Age (years)				
14-15	1.06	0.94;1.20	1.06	0.94;1.20
16-17	1.01	0.90;1.13	1.01	0.90;1.13
18-19	1		1	
Skin color				
White	0.92	0.82;1.05		
Non-white	1			
2nd Level				
Socieconomic level				
A (highest)	1.10	0.86;1.40		
B	1.12	0.88;1.43		
C	1.04	0.81;1.34		
D, E (lowest)	1			
Father's level of schooling				
Elementary school - incomplete	1		1	
Elementary school - complete	1.07	0.94;1.22	1.07	0.94;1.22
High School - complete	1.09	0.98;1.21	1.08	0.97;1.20
Higher education - complete	1.13	1.01;1.27	1.12	1.02;1.26
Mother's level of schooling				
Elementary school - incomplete	1			
Elementary school - complete	0.90	0.73;1.12		
High School - complete	1.06	0.95;1.18		
Higher education - complete	1.04	0.91;1.19		
Work				
Yes	1			
No	1.12	0.97;1.29		
3rd Level				
TV – week days				
≤ 2h/day	1.02	0.93;1.12		
> 2h/day	1			
TV – weekend days				
≤ 2h/day	0.97	0.87;1.06		
> 2h/day	1			

To be continued

Table 3 continuation

Variables	Crude analysis		Adjusted analysis	
	PR	95%CI	PR	95%CI
Computer/videogame – week days				
≤ 2h/dia	0.97	0.89;1.06		
> 2h/dia	1			
Computer/videogame – weekend days				
≤ 2h/day	0.97	0.89;1.05		
> 2h/day	1			
4th Level				
Nutritional status				
Low weight/ Normal weight	0.99			
Overweight	1	0.89;1.11		
5th Level				
Health perception				
Negative	1		1	
Positive	1.31	1.10;1.55	1.30	1.09;1.55
Physical education classes				
Did not have/did not participate	1		1	
1 class/week	1.22	1.05;1.41	1.17	1.02;1.34
≥ 2 classes/ week	1.25	1.11;1.41	1.24	1.12;1.37

Differences in the adolescents' age, in the physical activities that were measured and in the statistical analysis may explain a large part of those divergences. The majority of the studies that identified a reduction in the levels of physical activity as age advances included younger adolescents (<14 years).[16,18] This seems to suggest that the transition from the initial phase (11-12 years) to the second phase of adolescence (14-15 years) represents a critical period for reductions in youths' levels of physical activities.[24]

Economic class was associated with level of physical activity in the female sex, but there was not a clear linear trend. The girls who belonged to the middle class (class C) were more likely to be more physically active when compared to those of the lowest economic class (E). These results are similar to those observed by Ceshine et al[4] in adolescents from São Paulo and Bastos et al.[2] in adolescents from Pelotas – in these studies, higher prevalences of low levels of physical activity were observed in poorer adolescents. Hallal et al[10] have found higher prevalences of sedentariness (<300 min/week of physical activity) in adolescents with better economic status. However, Moraes et al.[14] have not observed a significant association between economic class and insufficient levels of physical activity in school-aged adolescents at Maringá.

Table 4. Prevalence and prevalence ratio of physical activity and associated factors in female adolescents. João Pessoa, Northeastern Brazil, 2009.

Variable	Crude analysis		Adjusted analysis	
	PR	95%CI	PR	95%CI
1st Level				
Age (years)				
14-15	1.16	0.83;1.62		
16-17	1.14	0.84;1.54		
18-19	1			
Skin color				
White	1.05	0.94;1.18		
Non-white	1			
2nd level				
Socioeconomic level				
A (highest)	1.55	1.07;2.24	1.33	0.91;1.95
B	1.51	1.12;2.05	1.32	0.96;1.80
C	1.59	1.24;2.04	1.50	1.16;1.93
D,E (lowest)	1		1	
Father's level of schooling				
Elementary school - incomplete	1			
Elementary school - complete	1.14	0.97;1.33		
High School - complete	1.16	1.00;1.34		
Higher education - complete	1.14	0.91;1.43		
Mother's level of schooling				
Elementary school - incomplete	1		1	
Elementary school - complete	1.10	0.93;1.30	1.06	0.92;1.21
High School - complete	1.30	1.11;1.52	1.25	1.09;1.45
Higher education - complete	1.17	1.04;1.42	1.18	1.02;1.37
Work				
Yes	1			
No	0.97	0.77;1.20		
3rd level				
TV – week days				
≤ 2h/day	1.00	0.85;1.19		
> 2h/day	1			
TV – weekend days				
≤ 2h/day	1.15	1.04;1.29	1.21	1.05;1.39
> 2h/day	1		1	

To be continued

Table 4 continuation

Variable	Crude analysis		Adjusted analysis	
	PR	95%CI	PR	95%CI
Computer/videogame – week days				
≤ 2h/day	0.89	0.77;1.02		
> 2h/day	1			
Computer/videogame – weekend days				
≤ 2h/day	0.93	0.79;1.09		
> 2h/day	1			
4th level				
Nutritional status				
Low weight/ Normal weight	1			
Overweight	1.05	0.85;1.30		
5th level				
Health perception				
Negative	1		1	
Positive	1.40	1.17;1.67	1.28	1.09;1.50
Physical education classes				
Did not have/did not participate	1		1	
1 class/week	1.17	0.96;1.42	1.11	0.91;1.35
≥2 classes/ week	1.52	1.21;1.91	1.61	1.32;1.97

The results of the studies with adolescents about level of physical activity and socioeconomic status have proved to be inconsistent.[24] Many methods have been used to determine socioeconomic status (family income, professional occupation, parents' level of schooling, neighborhood's characteristics, combination of indicators) and levels of physical activity practice. Different socioeconomic indicators influence the physical activities that are practiced by the adolescents in a particular way. For example, while the poorer ones go to school or to work on foot more frequently and perform activities related to home chores more often, their richer peers have greater participation in leisure-time physical activities, which is explained by differences in the access to financial and material resources.

Different mechanisms can explain the relationship between parents' level of schooling and adolescents' practice of physical activity, which was found in this and in other studies.[16,18] First, the participation in many physical activities has some financial cost (for example, purchase of equipment, monthly payments and transport) which many times cannot be paid by poorer families.[17]

Families of higher socioeconomic status generally live in neighborhoods with better infrastructure for

the practice of physical activities (presence of parks, squares, running/walking paths, bike lanes). Besides, adults with higher level of schooling present higher levels of physical activity practice, particularly in leisure time.[c] This would have an indirect influence on the adolescents' physical activity, as parents who are more physically active tend to have children who are equally active.[19] Another plausible explanation to this association is that parents who are more physically active are more likely to give greater social support to their children's practice of physical activity.[19] Social support is one of the main predictors of the levels of physical activity practice in adolescents.[24]

There was an inverse and significant association between higher levels of physical activity and time spent watching TV on the weekend in the female youths, which confirms previous findings,[4,21] but contradicts others.[14,23] The meta-analysis[23] of studies about the relation between physical activity and sedentary behaviors has revealed a negative, significant, but of low magnitude relation in adolescents. The evidences that support the hypothesis that sedentary behaviors "substitute" the practice of moderate and vigorous physical activities are weak[13] and inconsistent.[24] This may be explained by the fact that sedentary behavior is a construct that is different from physical activity, with specific "determinants" and distinct implications for people's health. In a continuum of physical activity, sedentary behavior is not the lower extreme ("zero").

In this study, a positive relation was observed between health perception and level of physical activity. Physically active adolescents were more likely to perceive their health status in a positive way, a finding that was similar to that of another study.[1] This result suggests a positive effect of participation in moderate to vigorous physical activities on the adolescents' health. In addition, moderate to vigorous physical activity practice promotes a greater sensation of wellbeing.

Adolescents who reported to participate in one or more physical education classes during a typical week were more likely to be physically active than their peers who did not participate in these classes, corroborating previous findings.[4,23] Physical education classes may play an important role in adolescents' physical activity levels, both in a direct way, based on the offer of

physical activity practice during the classes, and in an indirect way, by stimulating this practice, favoring the access to knowledge and enabling positive experiences of physical activities. A systematic review of intervention studies (to increase physical activity levels) in the school environment has shown that the physical education classes effectively increased adolescents' levels of physical activity practice.[6]

Tassitano et al[22] have found that the adolescents who participated in physical education classes had higher odds of being physically active, presenting higher frequency of fruit consumption and lower frequency of consumption of soft drinks, and also higher odds of spending less time in sedentary behaviors.

One of the strong points of the present study was that it considered the sample selection procedure in the data analysis (cluster sampling procedure), which increased the accuracy of the estimates. Another positive point was the inclusion of students from the public and private networks, as the majority of the studies with Brazilian adolescents involved only students from state-run public schools and limited age groups.

This study has some limitations. As it is a school-based study, it is not possible to generalize the results to all the adolescents of João Pessoa, state of Paraíba. Some adolescents had age-school grade discrepancy, and others were outside the school system. Although the majority of the adolescents (50.2%) practice physical activity in accordance with the current recommendations, the other youths were classified as physically inactive, particularly those of the female sex and those adolescents who belonged to families of lower socioeconomic level (lower level of schooling). This shows that participation in physical activities presents gender and socioeconomic inequality, differences that should be considered in the development of programs of intervention in the practice of physical activity in this population group.

It is necessary to develop actions that are able to increase the adolescents' participation in moderate and vigorous physical activities, especially female youths and adolescents who are less socioeconomically favored. In this sense, the school emerges as an important means of promotion of physical activity, mainly through the physical education classes.

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