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Family context and the physical activity of adolescents: comparing differences

Contexto familiar e atividade física de adolescentes: cotejando diferenças

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ABSTRACT: ***Introduction:*** Family context plays an important role with regard to the physical activity (PA) of adolescents. Intense changes in family composition, including an increase of single-parent structures can affect behavior. ***Objective:*** To estimate the prevalence of PA, between boys and girls of 11-17 years old, and investigate its association with family context variables. ***Methods:*** A cross-sectional population-based study "The BH Health Study" was conducted in two health districts of Belo Horizonte. The outcome was PA (≥ 300 minutes/week), which was created from a score that combined time and frequency of cycling and walking to school and leisure time. The independent variables were family context, sociodemographic characteristics and nutritional status. Poisson regression was used with a robust variance and was stratified by gender. ***Results:*** 1,015 adolescents participated, 52.8% of whom were male, with a mean age of 14 (± 1.9) years old. The prevalence of PA was 38.8% for girls and 54.5% for boys. Among girls, the family context variables were not significantly associated with PA. Boys were more active when there was an adult in the household reported who did PA (PR = 1.26; 95%CI 1.02 – 1.55) and when living with a single mother (PR = 1.63; 95%CI 1.01 – 2.63). It was also observed that boys that live with their mother and father (PR=1.90; 95%CI 1.06 – 3.41) or only with their mother (PR = 1.82; 95%CI 1.01 – 3.27) reported did PA more frequently in their free time. ***Conclusion:*** The presence of an active adult in the household, mainly the mother, appears to be an important factor associated with boys' PA.

Keywords: Physical activity. Adolescents. Family make-up. Gender. Urban health. Prevalence.

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RESUMO: ***Introdução:*** O contexto familiar desempenha papel importante sobre a prática de atividade física (AF) de adolescentes. As intensas mudanças na composição familiar, com aumento das estruturas monoparentais, podem modular de maneira distinta esse comportamento. ***Objetivo:*** Estimar a prevalência de AF e associação da sua prática em meninos e meninas de 11 a 17 anos com variáveis de contexto familiar, ajustado por características sociodemográficas e estado nutricional. ***Métodos:*** Estudo transversal de base populacional, denominado "Saúde em Beagá", realizado em dois distritos sanitários de Belo Horizonte. O desfecho foi AF ≥ 300 minutos/semana, criado a partir de um escore que combinou tempo e frequência de deslocamento para a escola e AF de lazer. As variáveis do contexto familiar foram: presença dos pais e de adulto ativo no domicílio. Foi utilizada regressão de Poisson com variância robusta, estratificada por sexo. ***Resultados:*** Participaram 1.015 adolescentes, sendo 52,8% meninos e idade média de 14 (± 1,9) anos. A prevalência de AF foi de 38,8% para meninas e de 54,5% para meninos. Entre meninas, as variáveis de contexto familiar não foram significativamente associadas à AF. Meninos foram mais ativos quando havia um adulto no domicílio que praticava AF (RP = 1,26; IC95% 1,02 – 1,55) e quando moravam somente com a mãe (RP = 1,63; IC95% 1,01 – 2,63). Observou-se, ainda, que meninos que moravam com mãe e pai (RP = 1,90; IC95% 1,06 – 3,41) ou somente com mãe (RP = 1,82; IC95% 1,01 – 3,27) praticavam em maior frequência AF no seu tempo de lazer. ***Conclusão:*** A presença de adulto no domicílio, em especial a mãe, parece ser importante fator associado à prática de AF de meninos.

Palavras-chave: Atividade física. Adolescentes. Composição familiar. Sexo. Saúde urbana. Prevalência.

INTRODUCTION

Adolescence is a period marked by intense biological, emotional and social changes[1]. In this stage, adolescents are exposed to several risk factors, including physical inactivity, which is considered a global health problem[2,3]. Around the world, 81% of adolescents aged 11 to 17 years old were considered inactive by the World Health Organization (WHO)[2].

At all ages, including during adolescence, regular physical activity (PA) is a habit that should be stimulated, as it can provide several benefits, among them: the improvement of cardiovascular, bone and muscular health, better academic performance, and the reduced risk of developing obesity, chronic diseases and depression[2].

Among the factors correlated with the adoption of the regular practice of PA are those within the family context.[4] Family context characteristics have been highlighted in this process, since families have a set of values, knowledge and attitudes that can interfere in the PA of its members[5]. Adolescents' practice of PA can be molded not only by the presence of someone in the home who does PA, but also by the social support provided by the family, especially by the parents, for example through incentive, transportation and financial support[5,6].

However, support and encouragement may vary according to the family structure of the adolescent, especially when there are important changes in the composition of family[7]. It has also been identified that fathers and mothers do not tend to act in the same way when engaging the children in the regular practice of PA[8].

Thus, this study aimed to estimate the prevalence of PA, between boys and girls of 11-17 years old, and investigate its association with family context variables.

METHODS

THE STUDY DESIGN

The information from this research comes from a population-based household survey called "Saúde em Beagá". This study was developed by the Urban Health Observatory of Belo Horizonte, between 2008 and 2009, in of the nine sanitary districts of the city, which were chosen for their geographical proximity and for having a large internal heterogeneity in relation to several demographic, socioeconomic and health indicators. 24% of the 2,375,151 inhabitants of Belo Horizonte reside in the two districts[9].

The sampling design was probabilistic, stratified and by conglomerates in three stages. The stratification factor adopted was the Health Vulnerability Index (HVI)[10], which was used to guarantee the proportional presence of all socioeconomic levels in the sample. In each stratum of the HVI, the following were selected:

- Census tract, with different probabilities of selection and with a sample size that is proportional to the totality of sectors of the stratum;
- Household;
- Individual — an adult resident (≥ 18 years old) and an adolescent (11 to 17 years old), both at random.

The sample consisted of 4,048 households, of which 1,197 had at least one adolescent. Of these adolescents, 1,042 participated in the study. Losses (12,9%) did not significantly differ by gender or age, and they occurred because of refusal to participate.[11,12].

DATA COLLECTION

The household survey had a face-to-face questionnaire, which was applied to the adults and a self-administered one for the adolescents, for which two data collection instruments were developed: one for the age group of 11 to 13 years old, and another, aimed at adolescents between 14 and 17 years of age with behavior risk issues. Body mass index (BMI) of all the participants was obtained from weight measurements (using the TANITA Ironman BC 553 scale) and height measurements (using the WSC / Wood Compact / Cardiomed stadiometer) - according to recommendations of the Food and Nutrition Surveillance System (*Sistema de Vigilância Alimentar e* Nutricional)[13]. The interviews and measurements were performed by trained interviewers.

STUDY VARIABLES

The dependent variable was the practice of PA, obtained from questions based on the 1993 birth cohort in the city of Pelotas[14]. Adolescents who accumulated 300 or more minutes of PA in the week prior to the application of the questionnaire were considered active[15,16]. To classify PA, a score was created from two domains: transportation and leisure. The frequency and duration of time walking or cycling to school and leisure activities, with and without guidance from a teacher, were combined. Physical education classes were not added to the PA score, since the exercise done in the classes is usually considered to be of low intensity[17].

The two main independent variables of this study refer to the family context: active adult in the household (no and yes, which was obtained from the question: "Have you done any PA in the last 3 months?" and the presence of the parents in the household (single mother, mother and father, single father, neither father nor mother, which was obtained by combining the questions: "Do you live with your mother and do you live with your father?"). The adjustment variables were:

- Sociodemographic - age group (11 to 13, 14 to 15, 16 to 17 years old), type of school of the adolescent (private, public, does not study); family income (< 2, 2 - 3, 3 - 5, ≥ 5 minimum wages) and the schooling of the head of the family (0 to 4, 5 to 8, 9 to 11, ≥ 12 years);
- Nutritional status — overweight adult (no, their BMI < 25 kg / m2, and yes, their BMI ≥ 25 kg/m^2)[18] and overweight adolescent (no, their percentile < 85, and yes, their percentile ≥ 85)[19]. The stratification variable was the gender of the adolescent.

The "household income" and "active adult in the household" variables were informed by the adult that resided in the same household as the adolescent. The variable "overweight adult" was obtained by the measurement of weight and height of this adult and the subsequent calculation of the BMI. The adult was not necessarily the teenager's parents.

DATA ANALYSIS

Descriptive analyzes were carried out with the calculation of proportions, measures of central tendency and dispersion. To verify the univariate and multivariate association between the adolescent's PA and the independent variables, stratified by gender, a Poisson regression with robust variance was used to estimate the prevalence ratio (PR) and the 95% confidence interval (95%CI). A significance level of 5% was adopted. The complex sampling process was considered in the analyses using the "svy" command from Stata 12.0. The suitability of the models was verified through the goodness of fit test. Additionally, the association between presence of the parents in the household and family income and PA domains variables (leisure and transportation) were evaluated.

ETHICAL QUESTIONS

The study "The BH Health Study" was submitted and approved by the Research Ethics Committee of the Universidade Federal de Minas Gerais (UFMG). Participants were informed about the confidentiality and all of the characteristics of the study. The informed consent form was signed by the adults interviewed, by a parent or a person responsible for the adolescent, as well as by the participants aged 14 to 17 years old.

RESULTS

Of the 1,042 adolescents interviewed, 27 (3.2%) were excluded due to lack of information for the response variable, totaling a sample of 1,015 (484 girls and 531 boys). For both genders, the mean age was 14 years old (girls 14.0 ± 2.0 and boys 13.1 ± 1.9). Most of the adolescents studied in public schools (85.4% of the girls and 84.6% of the boys), and 55.7% of the girls and 53.1% of the boys lived in households with a family income of less than 3 minimum wages. For boys and girls, households with the presence of mother and father constituted the most common family structure, respectively 57.5 and 63.9%, followed by households with a single mother, 32.7 and 24.9% (Tables 1 and 2).

The prevalence of active adolescents was 47.1% (95%CI 43.5-50.6), 38.8% (95%CI 32.9-44.8) among girls and 54.5% (95%CI 49.3 - 59.8) among boys ($p < 0.001$). In the univariate analysis among girls, PA was significantly associated with younger age groups (from 11 to 15 years old) and those that studied in a private or public school. Among the boys, PA was associated with: the presence of an active adult in the household; the presence of a mother and father, and the presence of a single mother; a young age group (11 to 13 years old); and those studying in private or public schools (Tables 1 and 2).

In the multivariate analysis among girls, none of the family context variables were significantly associated with PA. While among boys, it was observed that they were more active when there was an adult in the household who did PA (RP = 1.3, 95%CI 1.0 - 1.5) and when they lived with a single mother (RP = 1.6; 95%CI 1.0 - 2.6), adjusted by sociodemographic and nutritional status variables (Table 3).

In order to understand the socioeconomic profile of the different family structures among boys, we investigated the association between presence of the parents in the household and income. A significant association was observed (p= 0.031). About 40% of those who lived with a single mother or who did not live with their parents had a family income of 2 or less minimum wages, while 34.5 percent of those who lived with a single father reported an income of more than 5 minimum wages. Income distribution was similar among those living with both their mother and father (Figure 1).

It was also investigated, among boys, the association between the presence of the parents in the household and leisure and transportation, separately (Figure 2). It was verified that the presence of the mother and father (PR = 1.9, 95%CI 1.1 - 3.4) or only the mother (PR = 1.8, 95%CI 1.0-3.3) was only associated with leisure PA.

Table 1. Prevalence and prevalence ratios of the physical activity of 484 girls, according to family context, sociodemographic aspects, and nutritional status variables. From the study "The BH Health Study", 2008 and 2009.

Variables	%	Prevalence (%)	PR (95%CI)
Family context			
Active adult in the household			
Yes	66.5	42.9	1.17 (0.90 – 1.52)
No	33.5	36.7	1.00
Presence of parents in the household			
Single mother	32.7	45.8	1.25 (0.61– 2.56)
Mother and father	57.5	35.1	0.96 (0.46 – 1.98)
Single father	3.4	40.4	1.10 (0.40 – 3.08)
Neither mother nor father	6.4	36.6	1.00
Sociodemograhic aspects			
Age (years)			
11 to 13	42.6	57.6	3.22 (2.03 – 5.09)*
14 to 15	30.0	32.8	1.83 (1.18 – 2.95)**
16 to 17	27.4	17.9	1.00
Type of school			
Private	14.3	37.7	4.99 (1.29 – 21.10)**
Public	80.4	40.8	5.40 (1.29 – 22.70)**
Does not study	5.3	7.5	1.00
Family income (mw)			
< 2	33.0	40.8	1.15 (0.75 – 1.79)
2 to 3	22.7	37.6	1.07 (0.66 – 1.73)
3 to 5	22.3	40.9	1.16 (0.72 – 1.89)
≥ 5	22.0	35.1	1.00
Schooling of the head of the family (years)			
0 to 4	31.7	33.5	0.73 (0.46 – 1.14)
5 to 8	29.0	34.4	0.75 (0.46 – 1.20)
9 to 11	28.6	43.4	0.94 (0.60 – 1.48)
≥ 12	10.7	46.0	1.00
Nutritional status			
Overweight adult			
Yes	23.9	38.0	0.98 (0.69 – 1.38)
No	76.1	39.0	1.00
Overweight adolescent			
Yes	52.5	36.3	0.87 (0.63 – 1.21)
No	47.5	41.5	1.00

*p < 0.001; **p < 0.05; RP: prevalence ratio; IC95%: confidence interval of 95%; mw: minimum wages.

Table 2. Prevalence and prevalence ratios of physical activity for 531 boys, according to family context, sociodemographic aspects and nutritional status variables. From the study "The BH Health Study", 2008-2009.

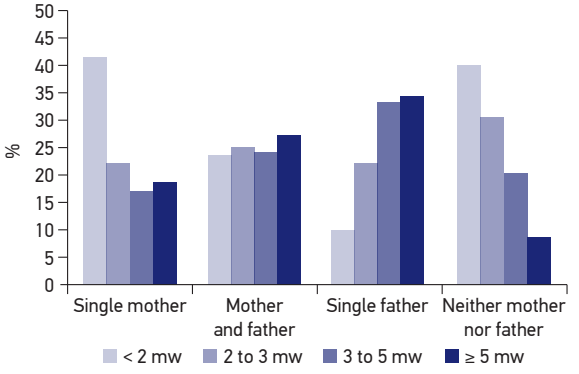
Variables	%		PR (95%CI)
Family context			
Active adult in the household			
Yes	39.4	62.9	1.29 (1.05 – 1.59)**
No	60.6	48.8	1.00
Presence of parents in the household			
Single mother	24.9	63.1	1.84 (1.15 – 2.94)**
Mother and father	63.9	54.7	1.60 (1.01 – 2.53)**
Single father	4.9	30.2	0.88 (0.36 – 2.18)
Neither mother nor father	6.3	34.3	1.00
Sociodemograhic aspects			
Age (years)			
11 to 13	41.3	67.7	1.67 (1.30 – 2.14)*
14 to 15	34.1	50.0	1.23 (0.92 – 1.65)
16 to 17	24.6	40.6	1.00
Type of school			
Private	15.5	52.1	10.51 (2.17 – 50.82)**
Public	80.0	57.4	11.58 (2.44 – 55.03)**
Does not study	5.5	5.0	1.00
Family income (mw)			
< 2	28.5	59.2	1.00 (0.77 – 1.28)
2 to 3	24.6	47.3	0.80 (0.60 – 1.05)
3 to 5	22.5	51.9	0.88 (0.65-1.17)
≥ 5	24.4	59.3	1.00
Schooling of the head of the family (years)			
0 to 4	29.4	55.4	1.24 (0.88 – 1.75)
5 to 8	30.5	55.2	1.23 (0.88 – 1.73)
9 to 11	28.3	57.0	1.27 (0.92 – 1.77)
≥ 12	11.8	44.7	1.00
Nutritional status			
Overweight adult			
Yes	18.3	57.2	1.07 (0.83 – 1.37)
No	81.7	53.7	1.00
Overweight adolescent			
Yes	49.4	51.5	0.90 (0.74 – 1.10)
No	50.6	57.2	1.00

*p < 0.001; **p < 0.05; RP: prevalence ratio; IC95%: confidence interval of 95%; mw: minimum wages.

Table 3. Multivariate analysis for physical activity of 1,015 adolescents, stratified by gender. From the study "The BH Health Study", 2008 and 2009.

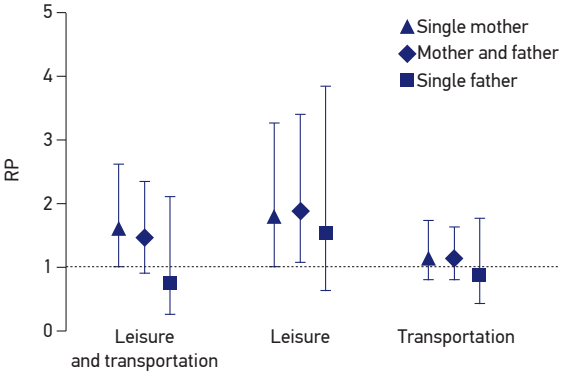
	Girls*			Boys*		
	PR	95%CI	p-value	PR	95%CI	p-value
Active adult in the household						
Yes	1.16	0.89 – 1.50	0.265	1.26	1.02 – 1.55	0.029
No	1.00			1.00		
Presence of parents in the household						
Single mother	0.74	0.41 – 1.35	0.322	1.63	1.01 – 2.63	0.045
Mother and father	0.63	0.34 – 1.16	0.139	1.47	0.92 – 2.35	0.109
Single father	0.85	0.32 – 2.29	0.754	0.75	0.27 – 2.10	0.586
Neither mother nor father	1.00			1.00		

PR: prevalence ratio; IC95%: confidence interval of 95%; *adjusted for age, type of school, Family income, schooling of the head of the family, overweight adolescent and adult.



mw: minimum wages.

Figure 1. Family income distribution of the boys' with regard to the presence of the parents in the household. From the study "The BH Health Study", 2008 and 2009.



Reference: Neither father nor mother

Figure 2. Prevalence ratio of boys' physical activity with regard to leisure and transportation, according to the presence of the parents in the household, and adjusted by active adult in the household, age group, type of school, family income, schooling level of the head of the family, and overweight adolescent and adult. From the study "The BH Health Study", 2008 and 2009.

DISCUSSION

Just under half of the adolescents in this study reached the recommendations of 300 minutes of PA per week, and the boys were more active than the girls. Among the girls, no association was found with regard to family context variables; boys were more active when there was an adult who practiced PA at home and when they lived with a single mother in the analysis adjusted by the sociodemographic and nutritional status variables.

In Brazil, in a recent update of a systematic review on PA and sedentary lifestyle, about 43% of the selected articles referred to children, adolescents or college students[20], demonstrating a concern with this group of people regarding the practice of PA. In another systematic review only with adolescents, it was reported that in just over half of the 48 eligible studies, participants did not meet the minimum recommendations for PA[21]. Similarly, in the present study, the prevalence of active adolescents was 47.1%, slightly different from those observed among adolescents from the National School Health Survey (43.1%)[22] and from the birth cohort in the city of Pelotas, Rio Grande do Sul (41.8%)[17].

When PA is compared between genders, girls tend to be more inactive[1,21]. In our study, this trend was also observed: 38.8% the girls were active compared to 54.5% of the boys. This difference is permeated, to some extent, by cultural factors that are rooted in different contexts to which children and adolescents are exposed, including at home and at school[6]. Social norms may exert some regulation on the practice of PA, so that since childhood, the stimulation of PA is different between boys and girls[6,23]. Boys tend to have greater self-efficacy, social support and, consequently, fewer barriers to the practice of PA[5,6,24].

Regarding family context, we observed that boys were more active when there was an adult in the household who did PA. It should be noted that 53.7% ($p < 0.001$) of these adults were male. This finding can be substantiated by the Social learning theory, in which actions come from the observation of other individuals' behavior[25]. Thus, attitudes and habits for the practice of PA of adolescents are potentially molded by the family[26,27], contributing, for example, to the fact that adolescents whose parents participate in PA are more likely to be equally active[6,8]. In contrast, this condition did not present the same result for girls, although 65.5% lived in a home with an active adult. This result indicates that family members may influence differently the teenage girls' practice of PA, with boys again being favored.

In the last few decades, family structure and even the concept of what is a family have undergone intense changes. Although still predominant, families considered traditional (a couple with a child) are in decline, in contrast to other arrangements, such as single parenting (one parent with child). In this case, the number of female heads of households and the expressive increase of the structure composed of mother and child stand out[7].

In our study, we did not find a significant association of PA with family structure among girls. The boys who live with single mothers were the most active. These findings lead us, once again, to possible biopsychosocial origins, in this case, the mother-child binomial. Because the mother is the closest parental figure, her role in the household stands out and shows that she is more responsible than the father in implementing educational practices[28] that contribute to the formation and adoption of healthy habits[29], including PA.

National surveys that have been conducted since 2006 indicate that adult women are less active compared to the opposite sex, especially with regard to leisure[30]. Thus, in an attempt to understand a little more about the mothers' contribution to the children's PA, additional analyses were performed. Consistent with the results found by the Institute of Applied Economic Research (*Instituto de Pesquisa Econômica Aplicada*-IPEA)[7], we observed that families made up of single mothers had a lower income compared to other family arrangements (Figure 1). Based on this, we hypothesized that adolescents who lived only with their mother would be more active in transportation, due to the less access to financial and material resources. However, in testing this hypothesis, we verified the opposite: boys residing with a single mother were more active for leisure (RP = 1.8, 95%CI 1.0 - 3.3). In addition, boys reported doing more activities in the streets without guidance from teachers (76.7%), when they lived with a single mother ($p < 0.004$) (data not shown).

In this regard, living with a single mother somehow contributed to the fact that boys were more frequently involved in PA in the streets, especially in contexts of social vulnerability. This was reinforced by the finding that these families had a lower family income. Often, these mothers, heads of families, who take care of their children alone, with low incomes and extensive work routines outside the home and housework. As such, these adolescents have more autonomy over their free time.

Therefore, the positive association between the mother's presence in the household and the boys' practice of PA may be masking a social disparity, in which higher levels of PA are paradoxically related to greater socioeconomic deprivation. The compulsory absence of the mother, the lack of public policies supporting sports and leisure, precarious structural conditions and neighborhood violence are fundamental elements in understanding this relationship. Considering this reality, both boys (although more physically active) and girls living in vulnerable urban contexts are more susceptible to different health risk factors.

Some limitations should be considered in the analysis of the presented results. The cross-sectional design makes it impossible to establish causal relationships. In addition, the study contemplated only two sanitary districts, and may not be representative of adolescents in all of Belo Horizonte, Minas Gerais. PA levels were defined from a self-administered questionnaire, which is subject to information bias. In the present study, some information was not available, such as: the intensity of the activity, the adolescents' relationship with the active adult, the type of social support the adolescent

received to do the PA, and self-efficacy of the adolescents. Nevertheless, it is a population-based study with a well-planned sample design. The family context approach is still not explored enough, especially when assessing the association between the presence of parents in the household with the adolescent's PA.

For a better understanding of the adoption of appropriate practice of PA in adolescents, whether with regard to leisure or transportation, we recommend other studies. They should assess the intensity of activities, taking into account the current WHO recommendation of 60 minutes of intense to moderate activity per day[32], and the use of quantitative and qualitative methods that investigate the influence of socioeconomic factors, family structure, and each family member, especially the parents. Other aspects refer to the places where the adolescents do the PA and the social support offered.

CONCLUSION

The presence of an adult in the household, particularly the mother, seems to influence the practice of PA in boys but not in girls, especially when considering the changes in family composition, with the increase in single-parent structures, and the different socioeconomic profiles of families. Thus, it is important to provide PA to adolescents inserted in contexts of social vulnerability, through policies that include the reformulation of urban spaces and that consider differences between the genders and changes in family structures.

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