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Perceived barriers and physical activity in adolescent students from a Southern Brazilian city

Barreiras percebidas e hábitos de atividade física de adolescentes escolares de uma cidade do sul do Brasil

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Abstract – The purpose of this study was to analyze physical activity (PA) habits and perceived barriers to PA in high school students from the municipality of Santa Maria, state of Rio Grande do Sul, Brazil. A total of 424 students with a mean age of 15.69 (± 0.9) years, 54.72% of them male and 45.28% female, took part in the study. The third part of the COMPAC questionnaire was used to assess physical activity habits, and the questionnaire developed by Martins and Petroski (2000), adapted for this study population, to investigate perceived barriers to physical activity. The main perceived barriers were time devoted to studies, absence of an exercise partner, poor weather and long work hours. Girls perceived more barriers than boys. Nearly one-third of participants (32.35%) were considered insufficiently active. Engagement in moderate to vigorous PA differed significantly ($p<0.05$) between genders, girls being less active. Walking was the most widely practiced activity among girls (76.04%), whereas boys favored soccer (71.90%). There were significant differences in PA between private and public school students; those enrolled in state-run schools were most active. Our results can serve as a reference for specific actions designed to promote physical activity and health.

Key words: Adolescent; Adolescent health; Motor activity.

Resumo – *O objetivo deste estudo foi analisar as barreiras percebidas e os hábitos de atividade física (AF) de escolares da 1ª série do Ensino Médio de Santa Maria – RS, Brasil. Participaram da pesquisa 424 estudantes com idade média de 15,69 (±0,9) anos, sendo 54,72% do sexo masculino e 45,28% do sexo feminino. Para verificar os hábitos de atividade física, foi utilizada a terceira parte do questionário* COMPAC, *e na investigação das barreiras percebidas para a prática de atividades físicas, optou-se pelo questionário proposto por Martins e Petroski (2000), adaptado para a população em estudo. As principais barreiras percebidas foram: tempo dedicado aos estudos, falta de companhia, falta de clima adequado e jornada de trabalho extensa. As meninas percebem mais barreiras que os meninos. Foram considerados insuficientemente ativos 32,35% da amostra e a prática de AF moderada a vigorosa diferiu significativamente ($p<0,05$) entre os sexos, sendo as meninas menos ativas. A caminhada é a atividade mais praticada entre as meninas (76,04%) e o futebol entre meninos (71,90%). Considerando a rede de ensino (federal, estadual e privada), houve diferença significativa na prática de AF entre os escolares, sendo os da rede estadual os mais ativos. Os resultados encontrados podem servir como referência para ações específicas de promoção da atividade física e da saúde.*

Palavras-chave: *Adolescente; Atividade motora; Saúde do adolescente.*

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INTRODUCTION

Physical activity in adolescence can contribute to overall health by several routes. Short-term benefits include improvement in bone health and diseases or conditions of adolescence, maintenance of body weight, and cardiovascular risk reduction, in addition to psychological benefits such as improved self-esteem and reduced anxiety and stress[1-3].

Aside from these contributions, physical activity during adolescence appears to conger long-term benefits on bone health, breast cancer prevention, and discouragement of sedentary behaviors[1]. It also carries the indirect beneficial effect on health provided by physical activity in adulthood, as the evidence suggests physical activity during adolescence is associated with maintenance of active practices in adulthood[1,4]. Adolescence is thus an important period for acquisition of healthy behaviors and lifestyle habits.

Therefore, the physical activity habits of adolescents warrant the attention of researchers, policy-makers and society at large, due to their influence on all dimensions of adolescent health. Within this context, schools can contribute to the development of healthy physical activity habits, and Physical Education classes should deploy their full potential for promotion of healthy living and active lifestyles among students[5].

In the search for factors that may help promote health, some authors and investigators have dedicated themselves to the study of barriers to engagement in physical activity. Barriers are defined as reasons or excuses that act as a negative factor in the decision-making process—specifically, the decision to practice physical activities—and can lead to resistance to and/or quitting these activities[6]. Several studies[5,7-9] carried out in school-age populations have shown that perceived barriers can be a predictor of involvement in physical activities.

Knowledge of the physical activity habits and perceived barriers to physical activity experienced by adolescents may contribute to planning and promotion of interventions designed to increase engagement in and adherence to regular physical activity in this population. Hence, the present study sought to analyze the perceived barriers to physical activity and physical activity habits of first-year students attending secondary schools in the municipality of Santa Maria, state of Rio Grande do Sul, Brazil, and determine potential associations between engagement in physical activity, perceived barriers to said activity, gender, and school system (public vs. private).

METHODS

The study population consisted of male and female adolescents (aged 14 to 18 years) attending the first year of secondary education in public and private schools in the urban areas of the municipality of Santa Maria, Rio Grande do Sul, Brazil. Students attending night classes were excluded from the study universe. The size of this population was reported as 3516 in the 2006 School Census.

Out of this 3516-strong population, the minimal sample size was calculated as 347, according to a formula developed by Lopes et al.[10], taking into account gender representativeness, a sampling error of 5%, and a 95% confidence interval. Each gender was assumed to account for 50% of the population (p=0.5) and the sample was stratified by educational setting (public vs. private schools).

Six public (one federal, five state) schools and five private schools were selected, in an attempt to recruit a sufficient number of participants from each setting. Some schools refused to take part in the study, and others were randomly selected instead. The first-year classes of each school were invited to take part in the study. Interested students were informed of all the study procedures and given an informed consent form to be read and signed by their parents or legal guardians. The sample comprised those students who returned the signed consent forms on the dates set for data collection.

A total of 450 first-year students from the selected secondary schools took part in the study. Participants who failed to complete the study questionnaire were excluded from the sample (n=26, 5.78%). The final sample thus comprised 424 students, 232 male (54.72%) and 192 female (45.28%), with a mean age of 15.69±0.9 years. Of these, 41 (9.67%) studied at a school run by the federal government, 277 (65.33%) attended state-run schools, and 106 (25%) were students at private educational facilities. Data were collected over the course of the school day. Students took 8 to 28 minutes to fill out the questionnaire.

Perceived barriers to physical activity were measured using the instrument proposed by Martins e Petroski[11], which was adapted to the study population with the addition of the following items: "time dedicated to studies", "lack of school incentive" and "lack of encouragement by PE coach". Factors were considered "perceived barriers" when they were quoted by respondents as "always" or "nearly always" posing an obstacle to engagement in physical activities.

Data on physical activity habits were collected with the third part of the COMPAC questionnaire[12], which was used in a previous study[12] of Brazilian high school students. The validation stage of this instrument consisted of its administration to 60 secondary students between the ages of 15 and 19 years and assessment of face and content validity (by three expert investigators), reproducibility (test-retest, in groups, when administered by the same examiner with a 1-week interval) and objectivity (test-retest reproducibility with different examiners)[12].

After analysis of physical activity, participants were considered *sufficiently active* when they had engaged in a minimum of 33 minutes of moderate to vigorous physical activity per week and *insufficiently active* when they failed to reach this goal, as recommended by Prochaska et al.[13].

Descriptive statistics were used to describe study results. The nonparametric Mann-Whitney *U* and Kruskal-Wallis tests were used for between-group comparison of independent variables, due to the non-normal distribution of data (as determined with the Shapiro-Wilk test). The significance level was set at 5%. All statistical analyses were performed in the SPSS 14.0 software environment.

The present study was approved by the Universidade Federal de Santa Maria Research Ethics Committee (Certificate of Application for Ethical Approval no. 0121.0.243.000-08) and was conducted in accordance with National Health Council Resolution 196/96 (on human subject research).

RESULTS

Based on their answers to the Perceived Barriers Questionnaire,[11] participants were grouped according to the number of factors perceived as obstacles to engagement in physical activity. Overall, 30.19% of subjects (n=128) believe there are no barriers that always or nearly always disrupt their engagement in physical activity (number of perceived barriers = 0). This proportion was greater among boys (35.34%; n=82). Girls were more likely to perceive barriers to physical activity, as Figure 1 shows.

Among the 21 factors present in the questionnaire, the top four most often cited as barriers to physical activity were *time devoted to studies, lack of companionship, poor weather* and *long work hours*. The latter factor was most often mentioned by students of the federal school system (51.22%; n=21), as Table 1 shows.

Total minutes of physical activity per week were compared using the Mann-Whitney *U*, which revealed a significant gender difference (p<0.01). Figure 2 shows that the relative number of insufficiently active girls (40.1%; n=77) was higher than the relative number of insufficiently active boys (26.29%; n=61), and that more boys than girls were in the "most physically active" category (30.6% vs. 15.5%, n=71 vs. 29).

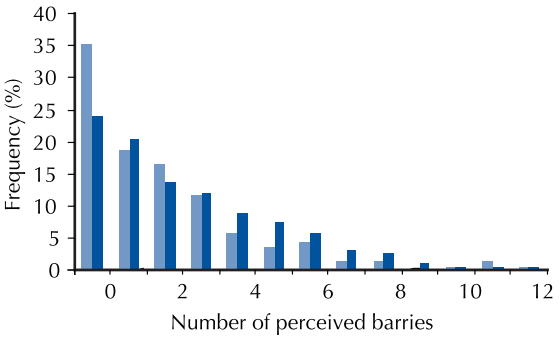

Figure 1. Distribution of perceived barriers by gender

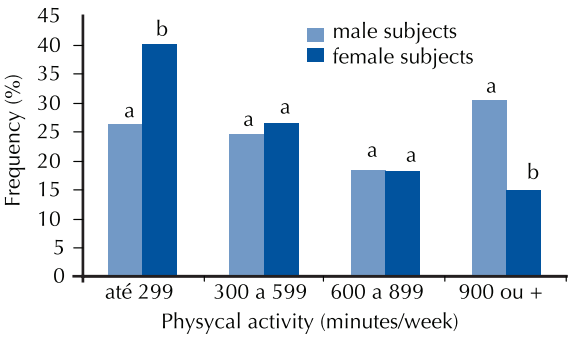

Figure 2. Gender distribution of time devoted to physical activities per week. "b" denotes a significant difference (p > 0.05) (Mann-Whitney U)

The Kruskal-Wallis test showed a significant difference (p<0.05) between school systems in terms of the time devoted to physical activities per week. Most students of the federal-run school included in our sample (51.6%; n=23), who study both mornings and afternoons, are insufficiently active, whereas students of state-run schools predominate among those who are most active (900 minutes or more of physical activity per week), as shown in Figure 3.

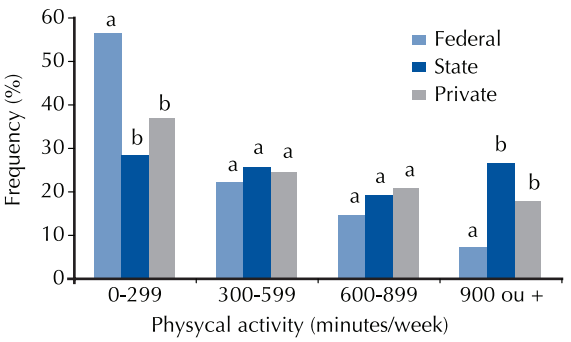

Figure 3. Distribution of time devoted to physical activities per week according to school system. "b" denotes a significant difference (p > 0.05) (Kruskal-Wallis test).

Table 1. Perceived barriers, overall and by school system

Barrier	School system							
	Overall		Federal		State		Private	
	N	%	N	%	N	%	N	%
Long work hours	70	16.51	21	51.22	35	12.64	14	13.21
Family commitments (parents, spouse, children, etc)	44	10.38	1	2.439	35	12.64	8	7.547
Poor weather (too windy, too cold, too hot, etc)	64	15.09	2	4.878	45	16.25	17	16.04
No available equipment	42	9.906	1	2.439	31	11.19	10	9.434
Chores (at home)	53	12.5	2	4.878	44	15.88	7	6.604
No one to work out with	74	17.45	4	9.756	47	16.97	23	21.7
No encouragement from family and/or friends	28	6.604	0	0	18	6.498	10	9.434
Lack of financial resources	16	3.774	0	0	14	5.054	2	1.887
Bad mood	49	11.56	2	4.878	32	11.55	15	14.15
Fear of injury	28	6.604	2	4.878	17	6.137	9	8.491
Physical limitations (e.g. muscle or joint problems)	20	4.717	1	2.439	19	6.859	0	0
Mild aches and pains	14	3.302	1	2.439	10	3.61	3	2.83
No energy (physically tired)	48	11.32	4	9.756	34	12.27	10	9.434
Physically unable	42	9.906	5	12.2	29	10.47	8	7.547
No knowledge of/guidance on PA	15	3.538	0	0	14	5.054	1	0.943
Not safe enough (due to crime)	18	4.245	0	0	14	5.054	4	3.774
Concerned about own looks during PA	49	11.56	4	9.756	36	13	9	8.491
Not interested	53	12.5	4	9.756	34	12.27	15	14.15
Time devoted to studies	122	28.77	12	29.27	80	28.88	30	28.3
No encouragement at school	38	8.962	1	2.439	32	11.55	5	4.717
No encouragement from PE teacher/coach	28	6.604	0	0	25	9.025	3	2.83

A gender difference was also detected in the modalities of physical activity engaged in outside the school environment (Mann-Whitney test). Walking was the most prevalent physical activity among girls (76.04%; n=186), followed by dancing (43.75%; n=84) and volleyball (29.17%; n=56). Boys, in turn, favored soccer (71.90%; n=167), followed by walking (59.91; n=139) and volleyball (32.33%; n=75).

Most participants (55.67%; n=236) had PE at school twice a week; 75.24% (n=319) reported that PE was held in the period opposite to that of all other classes. A total of 37 participants (8.73%) had PE waivers; most were female (64.86%; n=24), and all studied at state-run schools.

DISCUSSION

The study of perceived barriers to physical activity in adolescents is highly relevant, as it enables identification of modifiable factors and can increase the effectiveness of programs designed to promote physical activity as a means of tackling high sedentary lifestyle rates in this population.

In the present study, boys were found to predominate among the subset of participants who perceived no barriers to physical activity, whereas girls perceived more barriers to involvement in exercise or sports. This finding contradicts the results reported by Robbins et al.[14], who found that male adolescents perceived more barriers to physical activity than did females. Conversely, it is consistent with the findings reported by Ceschini et al.[15], Copetti et al.[16], and Santos et al.[8], who studied adolescents in the cities of São Paulo (state of São Paulo), Pelotas (state of Rio Grande do Sul) and Curitiba (state of Paraná) respectively and found that female adolescents perceived a much greater number of barriers to physical exercise than did boys in the same age group. This may be associated with the higher prevalence of sedentary behaviors among adolescent girls, as reported in several studies[7,9,17,18]. Within this context, investigators should take into account the socio-cultural roles that each gender still plays in society, which

often means that, since childhood, boys receive greater encouragement than girls when it comes to involvement in physical activities[8,19,20].

The barriers most often mentioned by respondents were time devoted to studies, lack of exercise partners, poor weather, and long work hours, the latter being mentioned most often by students of the federal school system (51,22%; n=21). It should be stressed that, in the present study, these students attended an industrial vocational school and had classes both in the mornings and afternoons, and may thus have interpreted "long work hours" as including the time devoted to practical studies of their vocational specialty of choice; this may have interfered with responses to this item. The results of other studies on the barriers perceived by adolescents diverge from those reported herein, which suggests that perceived barriers to physical activity vary according to the study population.

In a study by Teixeira et al.[21], the barriers most often mentioned by participants were not deriving entertainment or fun from exercise, not knowing how to exercise properly, not having enough time for physical activity, and lack of adequate exercise equipment. In a study of female adolescents[22], the perceived barriers to physical activity included: involvement in technology-related activities; peer, parent, and teacher influence; personal safety concerns; inaccessibility of exercise facilities or cost of attendance; competitive nature of physical activities; and personal issues. These findings suggest that specific strategies meant to tear down personal, social, environmental and physical barriers to exercise should be used in programs designed to promote physical activity.

Santos et al.[23] found that the main barriers to physical exercise among adolescents in Curitiba, state of Paraná, were laziness, absence of exercise partners and lack of available time. Lack of exercise partners and time (due to studies or long work hours) were also among the most widely reported barriers in the present study. In a Colombian study[24] of 460 subjects, not enough time was also one of the main barriers mentioned, as was unwillingness to exercise. Hammerschmidt et al.[5] found lack of time to be among the most prevalent barriers to exercise in a sample of adolescents from the U.S. state of Michigan. Researchers should bear in mind that, in this age range, adolescents are busy with their preparations for college, and are more intensely involved with technology, which may contribute to the very high prevalence of this barrier.

Lack of an exercise partner has also been reported in other studies[8,14,23] as one of the main barriers to physical activity among adolescents. Santos et al.[8] found that "not having friends come along" and "having no one to take with me" were the main barriers to physical activity in a sample of adolescents from the city of Curitiba, Paraná. These findings suggest that exercising in the company of friends and family encourages an active lifestyle.

"Poor weather (too windy, too cold, too hot, etc)" was one of the main barriers to physical activity reported in our sample. It should be noted that the municipality where the study was conducted is in a humid subtropical climate, with abundant rainfall, warm summers and cold winters, which may have contributed to the perception of weather as a barrier to physical activity in this population. Other studies on perceived barriers to physical activity among adolescents, carried out in the municipalities of Curitiba, Paraná[23], and Pelotas, Rio Grande do Sul[16], which have climates similar to those of Santa Maria, also found that poor weather was one of the most relevant barriers.

Weekly engagement in moderate to vigorous physical activity differed significantly ($p<0.01$) between genders, being greater in males. Girls predominated in the "insufficiently active" group, whereas boys predominated in the "most active" category. Other Brazilian and international studies have also reported that male adolescents are more likely than females to be engaged in physical activities[7,9,17,18,25]. One hypothesis maintains that this difference is due to greater male involvement in sports, such as soccer, which was the preferred physical activity of boys in our sample. The male preference of soccer and female preference of walking as physical activities of choice appears to persist into adulthood, as shown in a study of 3740 subjects between the ages of 20 and 60 years[26].

We also found a significant difference in physical activity levels ($p<0.05$) between students of the three school systems assessed. Most students enrolled in the federal school system (51.6%; n=23) were insufficiently active, which may be justified by the fact that these students have classes in two periods, unlike those of state-run or private schools. Interestingly, one study found that female students who were employed were more likely to be sufficiently active than those who dedicated themselves exclusively to their studies[27]. The population of this study, however, consisted of college students with a mean age of 20 years.

Most participants in the "most active" category attended state-run schools. Silva et al.[28] reported a high rate of sedentary behaviors in a sample of adolescents enrolled in state schools in the city of Aracaju, Sergipe, which is consistent with the findings of the present study. Hammerschmidt et al.[5] also found low levels of physical activity and little encouragement of physical exercise among U.S. public school students, and suggested that, due to increasing budget constraints, public schools tend to prioritize other disciplines to the detriment of Physical Education. We suggest that further studies be conducted to evaluate and discuss differences in the level of physical activity among adolescents enrolled in public and private school systems.

Despite the growing number of studies on the topic of physical activity, comparison of results is still challenging due to the wide range of different methods used. Nevertheless, all studies that seek to characterize the perceived barriers to physical activity and physical activity habits of different populations are relevant, as they can provide a foundation for health-promoting interventions.

Limitations of this study include the use of a questionnaire to quantify engagement in physical activity (as the duration of moderate to vigorous activity is susceptible to overestimation when self-reported) and the fact that no specific, validated questionnaires are available for assessment of perceived barriers to physical activity in adolescents.

Our results may serve as a reference for specific governmental and non-governmental actions meant to promote physical activity and foster healthy living. An example of such an action would be the construction of more public venues for indoor exercise and sports, as poor weather (wind, rain, cold, heat) was one of the main perceived barriers to physical activity in our sample. Another action could be the implementation of community-based physical activity programs, targeting both adolescents and other age groups, as a means of breaking down the perceived barrier of having "no one to work out with".

CONCLUSION

We conclude that male adolescents are more physically active and perceive fewer barriers to physical activity than females of the same age group. Students of state-run schools were more active than those attending federal or private schools. Overall, the barriers to physical activity most often reported by participants were a lack of time (due to studies or work), lack of an exercise partner, and poor weather.

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