

Original Article

Perception of square and park characteristics and physical activity practice among High School students

Percepção das características da praça ou parque e prática de atividade física de escolares do ensino médio

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Abstract

This study aimed to investigate the association between perception of the characteristics of square/parks (infrastructure, conservation, esthetics, safety, distance from residence, and access) and physical activity among high school students from the public network. It is a cross-sectional study with a quantitative approach and a random sample of 168 adolescents (40.3% male adolescents), 14 to 18 years of age, from the city of Passo Fundo, RS, Brazil. Perception of square/park characteristics was assessed through six questions about the characteristics of the neighborhood where students lived. Physical activity was measured by a question adopted in the Youth Risk Behavior Surveillance System, those who answered that performed physical activity five times a week or more were classified as sufficiently active. Data analysis was performed using descriptive statistics, Pearson chi-square test and Poisson regression, with robust covariance matrix. The results of the adjusted analysis indicated that adolescents who answered that the square/park is not far from their home had a prevalence ratio of 2.82 (95% CI: 1.31-11.22). It is concluded that perceiving the presence of a square/park near the place of residence increases the probability of physical activity practicing.

Keywords

Adolescents; Public Health; Physical Activity.

Resumo

O objetivo do presente estudo foi verificar a associação entre a percepção das características da praça/parque (estrutura, conservação, estética, segurança, distância da residência e acesso) e atividade física em escolares do ensino médio da rede pública. Trata-se de um estudo transversal, com abordagem quantitativa, envolvendo amostra aleatória de 168 adolescentes (40,3% adolescentes do sexo masculino), de 14 a 18 anos de idade, do ensino médio da cidade de Passo Fundo, RS, Brasil. A percepção das características da praça/parque foi avaliada através de seis questões referentes ao bairro em que os escolares residiam. A atividade física foi mensurada por meio de uma pergunta adotada no Sistema de Monitoramento de Comportamentos de Risco em Jovens, aqueles que responderam que realizavam atividade física cinco vezes semanais ou mais, foram classificados como suficientemente ativos. Na análise dos dados foram aplicados procedimentos de estatística descritiva, teste de qui-quadrado de Pearson e regressão de Poisson, com matriz de covariância robusta. Os resultados da análise ajustada indicaram que os adolescentes que responderam que a praça/parque não é longe de sua casa apresentaram uma razão de prevalência 2,82 (IC95%: 1,31-11,22). Conclui-se que perceber a presença de praça/parque próximas do local de residência aumenta a probabilidade de prática de atividade física.

Palavras-chave

Adolescente; Saúde pública; Atividade física.

Introduction

Physical activity (PA) is important for several aspects of human development, such as learning, locomotion, and mainly for health-related aspects¹. In addition, non-compliance with PA standards recommended for health (WHO) is related to occurrences of

noncommunicable chronic diseases, like obesity, type 2 diabetes and arterial hypertension²⁻⁴. However, the number of people with low PA levels has been increasing and ranges from 40% to 80% among adolescents⁵.

Awareness-raising about the significant impact of PA on health has been increasing all over the world and has aroused interest in how the characteristics of the environment, like the presence of squares and parks, influence PA practice among adolescents⁶. A re-

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view study has shown that walking or cycling facilities, speed and traffic volume, traffic safety, and access to facilities are issues related to environment perception associated with the reported PA practice among adolescents⁷. In Brazil, only recently has this theme started to be approached by a growing number of studies and the references are still scarce. Even so, they indicate that some environmental characteristics that make the neighborhood become more attractive, besides the distance and number of leisure facilities, interfere in PA practice⁸⁻¹⁰.

Furthermore, regarding these aspects, it is necessary to recognize that the intervening factors are plenty^{11,12}. This is not a phenomenon that can be approached in a simple way. Blaming solely the subjects for not using public spaces and not practicing physical activities is not enough. Likewise, it is not reasonable to blame solely the technological advances. Public policies also play a significant role in this context. They should be made in the perspective of providing ways of promoting PA, and the utilization of public spaces can contribute to achieve this goal¹³. The reason is they are inexpensive spaces that allow the access of people of different socioeconomic levels^{6,14}. In addition, public environments like squares and parks are suitable places for active leisure.

The relevance of this study is justified by the importance of knowing people's perception of the environment where they live, taking into account the specificities of each city. Therefore, our aim is to provide new information about PA and environment perception in a city located in the interior of the state of Rio Grande do Sul, in view of the fact that the most prominent studies in this area were developed in large cities. Based on this, it will be possible to develop public actions aiming to improve the conditions of these environments and to stimulate their utilization, increasing the level of PA practice and, consequently, bringing benefits to the adolescents' health. Thus, the aim of the present study is to investigate the association between perception of the characteristics of squares/parks (infrastructure, conservation, esthetics, safety, distance from residence and access) and physical activity among high school students from the public school network.

Methods

Site and participants

The study was carried out in the city of Passo Fundo, which is located in the Medium Plateau, in the north of the state of Rio Grande do Sul (Southern Brazil). The city has a population of 184,826 inhabitants (year 2010), a territorial area of 783.421 km², and a demographic density of 235.92 inhabitants/km²¹⁵. According to data from the Planning Department of Passo Fundo, the city has approximately 44 leisure public spaces: 43 squares and one public park.

This is an association study with a quantitative approach. The population was composed of approximately 4,599 students (according to the 7th Regional Education Coordinating Body) from a total of 15 public high schools in the city of Passo Fundo.

The sample was randomly selected in the following way: initially, the city was divided into five regions (north, south, east, west, and center). Then, two schools per region were drawn. Thus, ten schools were obtained. Subsequently, one high school class (first, second or third grade) was drawn in each school. All classes of the selected schools participated in the draw. All students who handed in the consent document signed by a parent or guardian were included in the study.

The minimum number of subjects of the sample was calculated through the software *G*Power* version 3.1. For sample calculation, an effect size *F* of 0.15 (medium effect, corresponding to 1.7 in prevalence ratio) was used, as well as level of

significance of 0.05 and statistical power of 0.95. Physical activity level was considered the dependent variable. The Poisson log-linear regression models were used with approximately five predictors and a 20% increase to cover for possible losses and refusals. Based on these criteria, the minimum sample size was six hundred and sixty eight adolescents.

The students from the drawn classes were invited to participate in the study, and the inclusion criteria were: a) belonging to the age group 14 to 18 years; b) handing in the consent document signed by a parent or guardian; and c) signing the assent document manifesting will to participate. The study was approved by the Ethics Committee of Research with Human Beings of the *Universidade Federal do Rio Grande do Sul* under number 888090.

Research instruments

The research instrument that was used was a semi-structured questionnaire. The dependent variable PA was assessed through the question below, translated into Portuguese and adopted in the Youth Risk Behavior Surveillance System¹⁶. This measure presents an acceptable concurrent validity and high reproducibility levels¹⁷. “During the past seven days, on how many days were you physically active for a total of at least 60 minutes per day? (Add up all the time you spent in any kind of physical activity that increased your heart rate and made you breathe hard some of the time.)” The possibility of answer to this question was from zero to seven times per week. The adolescents who answered between zero and four times were classified as insufficiently active and those who answered five times or more were classified as sufficiently active, corresponding to the PA recommendations for youths¹⁸.

The characteristics of the square/park (independent variables) were assessed through six questions referring to the neighborhood in which the students live, based on the items of the instrument *Neighborhood Environment Walkability Scale for Youth* (NEWS-Y)¹⁹. They refer respectively to: infrastructure, conservation, esthetics, safety, distance from residence and access. 1) “Does the square/park nearest your home have infrastructure for you to do what you like?” 2) “Is the square/park nearest your home poorly maintained?” 3) “Is the square/park nearest your home ugly?” 4) “Is the square/park nearest your home dangerous at the time you use it?” 5) “Is the square/park far from your home?” 6) “Is the square/park difficult to reach?” These questions had the dichotomous form (yes/no) as the possibility of answer.

Socioeconomic level was assessed through the number of owned items at the adolescents’ residences and the level of schooling of the parent or guardian. By means of the criteria established by the Brazilian Association of Research Companies²⁰, the ownership of items in the domestic environment and the level of schooling of the head of the family were used to classify subjects as belonging to the following economic classes: A1, A2, B1, B2, C1, C2, D, E. For the analyses, the classes were grouped as: lower (C1+C2+D+E), middle (B1+B2) and upper (A1+A2). Sex and age were assessed in the same questionnaire.

Statistical analysis

The statistical analysis was performed through a description of the sample’s characteristics (age, sex, socioeconomic level and PA practice) and the variables related to subjects’ perception of squares/parks. Then, the association between these variables and PA was investigated in an exploratory way, using Pearson’s chi-square test and spearman correlation. Posteriorly, different Poisson regression models were realized as follows: first (crude model) dependent variable was PA and

independent was the dichotomous answer to “Is the square/park far from your home?”; second model was adjusted for socioeconomic level and sex; third model was adjusted for socioeconomic level and age; fourth model was adjusted for socioeconomic level, sex and age. Different models were tested in order to verify, through the Aikake Information Criterion (AIC) and the Bayesian Information Criterion (BIC), which one was the most adequate. In addition, alpha values and confidence intervals (95%) were presented. All the analyses were performed in the software *IBM SPSS* version 20.0. Alpha <0.05 was adopted in such analyses.

Results

Overall, 176 students aged between 14 and 18 years were evaluated. Table 1 presents the sample’s characteristics, as well as students’ perception of the park/square. It can be observed that the great majority of students have a low and medium socioeconomic level and 23.2% of them were considered sufficiently active. Furthermore, the majority of the adolescents perceive that the squares/parks do not have infrastructure, are poorly maintained, are not ugly, are not dangerous, are not far from their home, and are not difficult to reach.

TABLE 1 – Description of sample characteristics and square/park perception of students from the city of Passo Fundo, state of Rio Grande do Sul, 2014.

	n	% (95%CI)
Sample characteristics		
Sex		
Male	71	40.3 (33.5 – 48.3)
Female	105	59.7 (51.7 – 66.5)
Age (years)		
14	6	3.4 (1.1 – 6.3)
15	59	33.5 (26.7 – 40.3)
16	74	42.0 (34.7 – 48.9)
17	33	18.8 (13.1 – 25.0)
18	4	2.3 (0.6 – 5.1)
Socioeconomic level*		
Low	58	37.2 (30.1 – 44.9)
Medium	90	57.7 (50.0 – 65.4)
High	8	5.1 (1.9 – 9.0)
Physical activity**		
Sufficiently active	35	23.2 (16.2 – 29.8)
Insufficiently active	116	76.8 (70.2 – 83.4)
Environment perception		
It has infrastructure		
Yes	67	48.6 (40.6 – 57.2)
No	71	51.4 (42.8 – 59.4)
It is poorly maintained		
Yes	70	52.6 (44.4 – 60.9)
No	63	47.4 (39.1 – 55.6)
It is ugly		
Yes	58	42.3 (34.3 – 50.4)
No	79	57.7 (49.6 – 65.7)
It is dangerous		
Yes	28	23.1 (15.7 – 30.6)
No	93	76.9 (69.4 – 84.3)

Continue...

... continue

It is far from home		
Yes	56	38.9 (30.6 – 47.2)
No	88	61.1 (52.8 – 69.4)
It is difficult to reach		
Yes	15	10.3 (6.2 – 15.9)
No	130	89.7 (84.1 – 93.8)

n: absolute value; %: relative value; 95%CI: confidence interval of 95%; *Socioeconomic level: Low (C1+C2+D+E), Medium (B1+B2), High (A1+A2); **Physical activity: Sufficiently active (≥ 300 minutes/week) Insufficiently active (< 300 minutes/week).

Table 2 presents the associations between students considered sufficiently active and the variables of perception of the square/park. It is important to highlight that perceiving that the square/park is not far from home increases the likelihood of students being sufficiently active by 2.84 times (95%CI:1.13-7.15).

TABLE 2 – Association between square/park perception and co-variables and students considered sufficiently active from the city of Passo Fundo, state of Rio Grande do Sul, 2014.

Square/park perception	Physical activity		PR (CI:95%)	p-value
	Sufficiently active students n (%)	Insufficiently active students n (%)		
It has infrastructure				
Yes	15 (51.7)	47 (45.6)	1.21	(0.55-2.90)
No	14 (48.3)	56 (54.4)	1	
It is poorly maintained				
Yes	13 (50.0)	55 (53.9)	1	
No	13 (50.0)	47 (46.1)	1.17	(0.49-2.77)
It is ugly				
Yes	14 (46.7)	43 (42.6)	1	
No	16 (53.3)	58 (57.4)	0.84	(0.37-1.92)
It is dangerous				
Yes	4 (16.7)	24 (26.1)	1	
No	20 (83.3)	68 (73.9)	1.76	(0.54-5.60)
It is far from home				
Yes	7 (21.9)	47 (44.3)	1	
No	25 (78.1)	59 (55.7)	2.84	(1.13-7.15)
It is difficult to reach				
Yes	3 (9.4)	12 (11.2)	1	
No	29 (90.6)	95 (88.8)	1.22	(0.32-4.60)
Co-variables				
Socioeconomic level				
High	6 (17.6)	2 (1.7)	12.2	(2.30-63.70)
Medium/Low	28 (82.4)	114 (99.3)	1	
Sex				
Male	17 (48.6)	41 (35.3)	1.72	(0.80-3.70)
Female	18 (51.4)	75 (64.7)	1	
Rho				
Age x PA	151 (100%)		-0.05	0.545

n: absolute value; %: relative value; PA: physical activity; PR: Prevalence ratio; Pearson's chi-square test. Reference group sufficiently active students. Rho: Spearman's association coefficient between a linear variable and a dichotomous variable.

The regression results indicated that students who answered that the square/park is not far from home were between 2.29 (CI:1.06-4.93) and 2.82 (CI:1.31-6.11) times more likely to be sufficiently active, considering the 4 regression models. The best model was the one adjusted for socioeconomic level and sex (PR: 2.82; CI:1.31-6.11).

TABLE 3 – Different regression models between being sufficiently active and perception of the distance between square/park and the home of students from the city of Passo Fundo, state of Rio Grande do Sul, 2014.

	Being sufficiently active			
	PR	95%CI		p
Model 1*				
Is the square/park far from your home?				
Yes	1			
No	2.29	1.06	4.93	0.033
Model 2**				
Is the square/park far from your home?				
Yes	1			
No	2.82	1.31	6.11	0.008
Model 3***				
Is the square/park far from your home?				
Yes	1			
No	2.46	1.10	5.53	0.028
Model 4****				
Is the square/park far from your home?				
Yes	1			
No	2.74	1.25	6.02	0.012

Model 1*: crude value, AIC: 157.2 BIC: 163.05; Model 2**: adjusted for socioeconomic level and sex, AIC: 148.4 BIC: 160.13; Model 3***: adjusted for socioeconomic level and age, AIC: 150.3 BIC: 162.0; Model 4****: adjusted for socioeconomic level, sex and age, AIC: 149.6 BIC: 164.2; PR: Prevalence ratio.

Discussion

The most relevant result of this study was that the adolescent's perception of the distance between the park or square and the home was associated with PA. This means that the individuals who do not perceive the square/park as being far from their home presented a mean likelihood of 2.29 (CI:1.06-4.93) times of being sufficiently active compared to the adolescents who reported perceiving the square/park as far from their home. Furthermore, when adjusted for sex and socioeconomic level, the likelihood of being sufficiently active increased, on average, 2.82 (CI:1.31-6.11) times.

Thus, the adolescent who notes the availability of squares/parks near his/her home can achieve higher levels of PA. In this perspective, a research carried out in the United States corroborated the results of the present study, indicating that girls who perceived their home's proximity to a park, walking or running trail or recreational center were associated with the recent utilization of these resources²¹. Another study conducted in the Netherlands has found that adolescents who perceive the existence of a park in their neighborhood were associated with sports practice and leisure PA²². In Brazil, data available about this matter are scarce; however, some investigations along this line in the state of Paraná have shown that, in addition to squares, the distance to other facilities such as gymnasiums and bicycle paths are associated with PA practice⁸.

On the other hand, research developed in Canada²³ and Portugal²⁴ has not found an association between the distance from public spaces to the adolescents' home and PA. These discrepancies may derive from the different assessment methods that were used and the countries' different characteristics. However, it is important to highlight that our investigation corroborated the results of the only Brazilian study we are aware of, and both studies have similar characteristics in terms of culture and subject assessment⁸.

The best regression model that we found, adjusted for sex and socioeconomic level, increased the association between distance from residence and PA practice. In fact, the literature seems to show that boys are more active than girls and that adolescents of higher socioeconomic level are more active²⁵. Additionally, our study shows that students of high socioeconomic level have a prevalence ratio of 12.2 (CI:2.30-63.70) times of being in the sufficiently active category. It is important to mention that only six students were in this category and the great majority of students had a medium/low socioeconomic level; therefore, the prevalence ratio may have been overestimated. However, a study has shown that children (10 to 15 years old) of high socioeconomic level reported finding a lower number of barriers in relation to participation in sports²⁶, a fact that corroborates our research.

Moreover, we found that the other forms of perception of the evaluated environments (esthetics, infrastructure, safety and access) were not associated with PA. However, some studies have shown the influence of these aspects on PA⁷. An association has been found between positive perception of the neighborhood's environment and the PA of English adolescents when the following aspects are considered: the places' facilities, the neighborhood's esthetics, traffic, crime, accessibility for walking and cycling, and housing types²⁷. In addition, the adolescents' positive perception of the environment was associated with a higher level of PA¹⁰. According to Janssen et al.²⁸, adolescents who perceived greater unsafety in the neighborhood's environment were less likely to practice PA. Other studies also concluded that the perception of unsafety is an intervening factor for PA practice in public spaces^{29,30}.

The explanation for these divergences is that the majority of the evaluated students reported the public spaces are not dangerous, possibly because it is a city located in the interior of the state, with lower criminality indexes, which is different from an international research²⁸. In addition to the discrepancies, ethnical and regional differences can also interfere in the studied issues, such as esthetics, infrastructure, safety and access, as each place has its specificities and people perceive the evaluated characteristics differently.

Thus, the main contribution of this study is it highlights the association between perception of the square's/park's distance and its utilization for PA practice, as proximity increases the likelihood of being physically active by approximately three times, when adjusted for sex and socioeconomic level. Based on this, as practical applications, public managers will have access to concrete data that strengthen the importance of these aspects, and they will be able to allocate resources to invest in these places. Thus, adolescents will have the opportunity of using pleasant and high-quality environments that provide better conditions for PA practice, and this will contribute to their health. Another study has highlighted the relevance of evaluating the impact of PA policies: they are extremely important because they can contribute to or improve PA interventions in Brazil¹³. In addition, PA practice depends on other variables besides the subject's will¹². Due to this, there must be previous planning and further studies that investigate the adolescents' relation-

ship with the places in which they live. The objective is to develop strategies that aim not only to build structures for PA practice, but also to attribute characteristics to these environments so that the individuals identify with them and use squares and parks, particularly if they are located near their homes.

Despite the pertinence of these results, some limitations must be mentioned here. The study's cross-sectional design does not allow to determine cause and effect. Physical activity was assessed in an indirect way and intensity was not measured; furthermore, PA domains were not taken into account. In addition, the method that was used to assess perception concerning the square/park was a questionnaire, which is a subjective measure. However, it was the best way we found to answer the research question. Finally, size limitations and sample characteristics hamper the extrapolation of the results to other populations, as only students from the public school network were analyzed.

We conclude that the adolescents' perception of the distance between squares/parks and their home influences PA practice, and those who reported that the square/park was not far from their home were more likely to be sufficiently active. No association was found between the square's/park's characteristics of infrastructure, conservation, esthetics and access and adolescents' PA.

Conflict of interest statement

Nothing to state.

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Authors' contribution

AFD (0000-0001-6648-8799) participated in the project's creation, data collection, data analysis, interpretation of the results, and in the writing of the article; CB (0000-0002-0544-0449) participated in data analysis, interpretation of the results, and in the writing of the article; VBL (0000-0003-3298-4449) participated in data analysis, interpretation of the results, and in the writing of the article; ARG (0000-0002-8335-6947) participated in data analysis, interpretation of the results, writing of the article, and in the review of the final version; ACAG (0000-0002-5941-5089) participated in the project's creation, interpretation of the results, epistemological and methodological analysis of the article, and in the review of the final version.

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