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original article

Individual and environmental factors associated with park and plaza use in adults from Curitiba, Brazil.

Fatores individuais e ambientais associados ao uso de parques e praças por adultos de Curitiba-PR, Brasil.

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Abstract – The aim of this study was to identify individual and environmental factors associated with park and plaza use in adults from Curitiba, state of Paraná, Brazil. A cross-sectional study was conducted in 2008 with 749 participants (59.9% men) selected in areas for physical activity (PA) in four parks and four plazas. Poisson regression was used to examine the associations of sociodemographic (sex, age, education) and health (body mass index, perceived health) variables, company for park/plaza use, access (perception of distance, access and commuting to the places), and leisure time PA (walking and moderate/vigorous PA - MVPA) with frequent use of parks and plazas (≥1 time/wk). The percentage of park and plaza use was 68%, and company (PR: 0.74; $CI_{95\%}$: 0.62-0.89) and higher levels of walking (PR: 1.30; $CI_{95\%}$: 1.03-1.64) and MVPA (PR: 1.39, $CI_{95\%}$: 1.07-1.80) were associated with the use of the places. These results can be used to guide interventions aimed at providing services and facilities for PA practice in parks and plazas.

Key words: Green areas; Motor activity. Epidemiological studies; Health promotion.

Resumo – *O objetivo deste estudo foi identificar os fatores individuais e ambientais associados ao uso de parques e praças por adultos de Curitiba-PR. Estudo transversal realizado em 2008, no qual 749 participantes (59,9% homens) foram intencionalmente selecionados em áreas destinadas para a prática de atividade física (AF) em quatro parques e quatro praças. A regressão de Poisson foi utilizada para verificar a associação entre variáveis sociodemográficas (sexo, idade, escolaridade), de saúde (índice de massa corporal, percepção de saúde), companhia para uso do parque/praça, acesso (percepção de distância, acesso e deslocamento até o local) e prática de AF de lazer (caminhada e AF moderada/vigorosa - AFMV) com a frequência habitual aos locais (≥1 vez/sem). O uso de parques e praças foi de 68% e fatores como a companhia (RP: 0,74; $IC_{95\%}$: 0,62-0,89) e maiores níveis de caminhada (RP: 1,30; $IC_{95\%}$: 1,03-1,64) e AFMV (RP: 1,39; $IC_{95\%}$: 1,07-1,80) apresentaram associação com o uso dos locais. Estes resultados devem guiar intervenções para disponibilizar serviços e estruturas para a prática de AF em parques e praças.*

Palavras-chave: *Estudos epidemiológicos; Áreas verdes; Atividade motora; Promoção da saúde.*

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INTRODUCTION

Regular physical activity (PA) may reduce the risk of non-communicable chronic diseases and increase population's physical fitness and quality of life[1,2]. Due to this fact, there is an increasing concern with the development of strategies for encouraging an active lifestyle in the community[3]. The most effective interventions to promote PA are those that act on several levels to change psychological, social, political and environmental variables[3,4]; among those, the last two are the most promising[5]. Environmental characteristics like the presence of and access to high quality recreational areas in the neighborhood, such as parks and plazas, can facilitate PA[3,6].

In this sense, parks are considered adequate and valued places for leisure and PA practices[7,8]. Additionally, their use is associated with a better physical, psychological and social well-being, as well as higher PA levels among their users[6,8]. In Brazil, the proximity and diversity of recreational facilities in the neighborhood are associated with population's PA practice[9-11]. Therefore, it is important to invest in and provide facilities in parks to promote PA at the community level[12].

In the United States, around 50% of the population use parks on a weekly basis and 1/3 regularly exercise in these places[13,14]. Individual (sex and age) and environmental factors (proximity to residence, esthetics, and safety) are associated with PA in parks[8,15]. The few studies on park use in Brazil are limited to intentionally selected places in few cities, which hampers the extrapolation of the results. In general, these places are used by male and physically active adults and factors such as friends' support, location, esthetics, and the facilities provided stimulate PA in parks[7,16-18].

Curitiba is internationally recognized by adopting urban planning strategies that give priority to the construction of and access to recreational spaces such as parks, plazas, walking trails, and bicycle paths[19,20]. Among the facilities available, parks and plazas are the most used[21]. Plazas differ from parks due to their central location, smaller total area and a higher number of areas for PA[22]. Some characteristics may explain the greater use of these places by men, besides the differences in the pattern of the PA performed in the places[22]. For example, the greater use by men can be explained by the availability of areas for structured sports (≥51%); similarly, the practice of walking in parks can be explained by the higher availability of trails when both places are compared (parks: 13% *vs.* plazas: 6%)[22].

Although there is no evidence on individual and environmental factors associated with park or plaza use, these factors are believed to be differentially associated with this behavior. Such information is important to guide interventions designed to increase the use of these places. The aim of this study was to identify the individual and environmental factors associated with park and plaza use among adults from Curitiba, Brazil.

METHODS

Curitiba, the capital of Paraná state, is located in the southern region of Brazil, has a population of 1,746,896 inhabitants (52.3% women), and is the 8th most populated city in the country (100% urban). Currently, 17 urban forests, 22 parks, 16 recreational axes (linear parks) (*eixos de animação*), 31 environmental preservation areas, 454 plazas, and 114 km of bicycle paths are dispersed in the 75 neighborhoods and help the city to reach the index of 64.5 m^2 of green area per inhabitant, one of the highest in the country. In addition, 29 sports and recreational centers offer structured activities to the community. The interventions in PA and another healthy habits are coordinated by the Municipal Secretary of Sports, Leisure and Youth (MSSLY) and the Municipal Health Secretary (MHS), and part of the actions occurs in some of the abovementioned places[19].

Selection of parks and plazas

Despite the high number of parks and plazas, some places are not designed for PA. Places with potential for PA practice were selected in neighborhoods with different environmental and economical conditions, in order to better represent the population. As a first step, the 75 neighborhoods were classified in nine strata based on the socioeconomic status (SES) and on a built and social environment score (ENV) for PA[19,22]. Neighborhoods from the four extreme clusters (high ENV and high SES; high ENV and low SES; low ENV and high SES; low ENV and low SES) were selected. The parks and plazas from these neighborhoods were listed, and the list was sent to coordinators from the MSSLY and the MHS, who should indicate a park and a plaza in each neighborhood where there were interventions of their secretaries. After three rounds of consulting, four parks and four plazas were selected for evaluation, through the consensus obtained in the consultation.

Participants

Data collection took place in 2008, in two phases with similar climates (March-April and October-November). In the first stage, interviews were conducted during two weeks, on six days of the week (except Fridays), in three periods of the day (7.00-8.00 a.m., 11.00 a.m.-12.00 p.m., 5.00-6.00 p.m.), with adults who were in the target areas for PA[22]. Participants were intentionally selected and interviewers should perform two interviews per period of the day. In case there were no people in the areas, interviewers stayed 30 minutes in the place trying to perform the interview.

Based on the information from the first stage, it was possible to calculate the sample size for the second phase. In places with high ENV and high SES, 75.7% of respondents were classified as "*frequent users*" (≥ 1 times/wk). On the other hand, in places with low ENV and low SES, this proportion was of 58.9%. Thus, the hypothesis that places with better environmental conditions for PA are more used is established.

Sample size calculation was performed with the equation below, considering a standard error of 3%, α=0.05, and power of 80%[23]. The proportions of frequent users included in the equation were those obtained in the first study phase (P_a =75.7% and P_0=58.9%).

$$n = \frac{\left[z_\alpha \sqrt{P_0(1-P_0)} + z_\beta \sqrt{P_a(1-P_a)}\right]^2}{(1-P_a)}$$

In which: Z_α=1.96; Z_β=1.26; P_0=0.59; P_a =0.76

The equation allowed estimating the minimum sample size of 28 individuals to be interviewed in each place. Ten percent were added to compensate for possible losses and 15% to increase the power of the multivariable analyses; thus, 35 individuals were needed in each place. We opted to interview 40 individuals, in order to increase the power of the sample (parks: n=303; P=0.59; RP=1.2; Beta=0.8 / plaza n=446; P=0.74; RP=1.15; Beta=0.8).

As a strategy to guarantee users' representativeness, 10 subjects were interviewed in the morning and 10 in the afternoon on Saturdays and Sundays, on two consecutive weekends.

Instrument

The instrument was based on a questionnaire translated from the original and adapted to the Brazilian context[13]. There were questions on the use of the places, distance from residence, access, company, and reasons for use. Sociodemographic information and questions on leisure time PA were added. Twelve interviewers received theoretical and practical training on selection and inclusion criteria, approach to participants, conduction of the interview, and completion of the forms. The number of people approached and the refusal rate were computed.

Outcome variable

The use of the places was assessed with the question: *How often do you come to this park/plaza?* The scale had seven answer choices: "first time", "few times/year", "1 time/month", "a couple of times/month", "1-2 times/wk", "3-4 times/wk", and "daily". The last three answer choices were grouped to characterize the variable "frequent use" (≥1 times/wk).

Independent variables

- Sociodemographic variables

Age was divided into three age groups (18-39, 40-59, and ≥60 years), and education, obtained in a question on personal education level, grouped in three categories ("elementary school", "high school degree", and "university degree").

- Health variables

Body mass index (BMI) was calculated from self-reported data on body

mass and height, and classified into "<24.9 kg/m^2" and "≥25 kg/m^2"[24]. Health perception was assessed with the question: *"How do you consider your health?"*, having as an answer choice a five-point *Likert* scale ("very poor", "poor", "good", "very good", and "excellent")[25]. The answer choices "poor" and "very poor", as well as the choices "very good" and "excellent", were grouped for analysis.

- Company

Company for the use of the places was assessed by a dichotomous answer (yes/no) for the question: *"When do you come to this park/plaza, do you usually come with a companion?"*.

- Access

The perceived distance from residence to the place was assessed with the question: *"What is the distance from your residence to this park/plaza?"*, in which individuals could choose between four options ("<500 m", "500 m-1 km", "1-2 km", and ">2 km"). The answers "1-2 km" and ">2 km" were grouped for analysis.

The facility of access to the place was assessed with the question: *"How easy is for you to get to this park/plaza?"*, which had five answer choices ("very easy", "easy", "difficult", "very difficult", and "impossible"). The options "difficult", "very difficult", and "impossible" were grouped for analysis.

The means of transportation to the place was assessed with the question: *"How do you usually get to the park/plaza?"*, and individuals could choose between four answer options ("bus or other public transport", "car", "bicycle", and "walk"). The options "bicycle" and "walk" were grouped to characterize active transportation to the place.

Leisure time physical activity

PA level was assessed with the leisure domain of the *International Physical Activity Questionnaire*, long version, translated and validated to the Brazilian population[26]. Individuals reported their weekly frequency and the time spent walking and engaging in moderate and vigorous activities on a typical week. Moderate/vigorous PA (MVPA) was computed adding the minutes of walking, moderate PA and vigorous PA (*2) per week[19]. The engagement in walking and MVPA was assessed on three levels: "0 min/wk, "1-149 min/wk" and "≥150 min/wk"[1]. It is believed that different PA patterns may be associated with the use of the places. For example, parks have a higher number of walking trails, while the number of areas for structured sports like soccer, basketball, and volleyball is higher in plazas. Therefore, we chose to analyze the engagement in walking and MVPA independently.

Statistical analysis

Analyses were performed specifically for facility evaluated (park *vs.* plaza) and grouped for both places (parks+plazas). Absolute and relative frequency distributions were used, as well as the proportion between the categories

compared with the chi-square test (χ^2) for heterogeneity and linear trend. The association between the independent variables and the outcome variable was tested with Poisson regression. A bivariate analysis was performed and the variables with $p<0.20$ were selected for adjustment in the multivariate model as possible confounding factors. The multivariate analysis used a multiple model generated from a hierarchical structure with the following levels and variables: level 1 – sociodemographic variables; level 2 – health variables; level 3 – company; level 4 – access; and level 5 – PA. Analyses were carried out on STATA 11 software and the significance level was set up at 5%.

The study was approved by the Research Ethics Committee of Pontifícia Universidade Católica do Paraná, process number 1762/08, and the protocols followed the recommendations of the Brazilian System of Research Ethics (Sistema Nacional de Ética em Pesquisa).

RESULTS

A total of 749 individuals (59.9% men) were interviewed and the refusal rate was 9.5%. The majority of participants was aged between 18-39 years, had completed high school, and had normal BMI and positive health perception (table 1). Overall, seven out of 10 participants referred to visit the places on a regular basis. Three and six out of 10 respondents practiced ≥150 min/wk of walking and MVPA respectively. The population interviewed in the parks showed a higher proportion of men and of people aged 18-39 years, with "very good/excellent" health perception, and who visit the places with a companion ($p<0.05$). Plaza users reported greater proximity from residence, facility of access, active commuting, and frequent use of places compared with park users ($p<0.05$).

In the bivariate analysis (table 2), frequent use of parks and plazas was inversely associated with reported distance from residence and facility of access to the places, but showed a positive association with active commuting and higher levels of leisure time walking and MVPA. Company was inversely associated with frequent park use in the grouped analysis of both places ($p<0.05$).

After adjustment for possible confounding variables (table 3), company remained inversely associated as it was in the bivariate analysis ($p<0.05$). Walking between 1-149 min/wk and MVPA ≥150 min/wk were associated with the use of parks and plazas respectively ($p<0.05$). Higher levels of walking and MVPA were also associated with frequent use of the places in the grouped analysis ($p<0.05$).

Table 1. Characteristics of park and plaza users. Curitiba, Brazil, 2008 (n=749).

Variable	Category	Parks (n=303)		Plazas (n=446)		χ^2	p	Total (n=749)	
		n	%	n	%			n	%
Sociodemographic variables									
Sex	Female	104	34.3	196	43.9	7.0[h]	0.008	300	41.1
	Male	199	65.7	250	56.1			449	59.9
Age (years)	18-39	188	62.3	250	56.2	3.9[t]	0.048	438	58.6
	40-59	86	28.5	185	30.3			221	29.6
	≥60	28	9.3	60	13.5			88	11.8
Education level	Elementary school	66	21.9	57	12.9	5.3[t]	0.022	123	16.6
	High school degree	127	42.2	213	48.2			340	45.8
	University degree	108	35.9	172	38.9			280	37.7
Health variables									
BMI (kg/m^2)	<24.9	175	58.1	282	63.8	2.4[h]	0.119	457	61.5
	>25.0	126	41.9	160	36.2			286	38.5
Health perception	Very good/excellent	158	52.5	175	39.5	12,7[t]	0.002	333	44.8
	Good	130	43.2	249	56.2			379	50.9
	Poor/very poor	13	4.3	19	4.3			32	4.3
Company									
Visits the place with a companion	No	65	21.5	190	42.7	36.2[h]	<0.001	255	34.1
	Yes	238	78.5	255	57.3			493	65.9
Access									
Distance from residence	<1 km	77	26.2	264	59.6	79.3[h]	<0.001	341	46.3
	≥1 km	217	73.8	179	40.4			396	53.7
Facility of access	Easy/very easy	263	87.7	414	93.0	6.2[h]	0.013	677	90.9
	Difficult/very difficult	37	12.3	31	7.0			68	9.1
Means of transportation	Car/bus	186	61.4	130	29.1	76.9[h]	<0.001	316	42.2
	Walking/bicycle	117	38.6	316	70.9			433	57.8
Leisure time PA									
Walking	0 min/wk	152	50.2	173	38.8	14.5[t]	0.001	325	43.4
	1-149 min/wk	61	20.1	142	31.8			203	27.1
	≥150 min/wk	90	29.7	131	29.4			221	29.5
MVPA	0 min/wk	71	23.4	98	22.0	4.9[t]	0.086	164	22.6
	1-149 min/wk	38	12.5	83	18.6			121	16.2
	≥150 min/wk	194	64.0	265	59.4			459	61.3
Frequency in the places	<1 time/wk	125	41.3	114	25.6	20.5[h]	<0.001	239	31.9
	≥1 times/wk	178	58.7	332	74.4			510	68.1

[h] heterogeneity χ^2; [t] trend χ^2; BMI: body mass index; MVPA: moderate and vigorous physical activity.

Table 2. Bivariate analysis of individual and environment factors associated with frequent use* of parks and plazas. Curitiba, Brazil, 2008 (n=749)

Variables	Category	Parks (n=303)			Plazas (n=446)			Total (n=749)		
		%	PR	$CI_{95\%}$	%	PR	$CI_{95\%}$	%	PR	$CI_{95\%}$
Sociodemographic variables										
Sex	Female	55.8	1		76.5	1		67.3	1	
	Male	60.3	1.8	0.79-1.48	72.8	0.95	0.76-1.18	69.3	0.97	0.81-1.16
Age (years)	18-39	54.3	1		71.6	1		64.2	1	
	40-59	66.3	1.22	0.88-1.69	74.1	1.03	0.81-1.32	71.0	1.11	0.91-1.35
	≥60	67.9	1.25	0.77-2.04	86.7	1.21	0.89-1.65	80.7	1.26	0.97-1.63
Education level	Elementary school	53.0	1		75.4	1		63.4	1	
	High school degree	55.1	1.04	0.69-1.56	73.7	0.98	0.70-1.37	66.8	1.05	0.81-1.36
	University degree	66.7	1.26	0.84-1.88	74.4	0.99	0.70-1.39	71.4	1.12	0.87-1.46
Health variables										
BMI (kg/m²)	<24.9	60.6	1		74.8	1		69.4	1	
	≥25.0	55.6	0.92	0.68-1.24	73.8	0.99	0.79-1.24	65.7	0,95	0,79-1,14
Health perception	Very good/excellent	66.5	1		76.0	1		71.5	1	
	Good	50.0	0.75	0.55-1.03	75.1	0.99	0.79-1.23	66.5	0.93	0.78-1.11
	Poor/very poor	53.8	0.81	0.38-1.74	47.4	0.62	0.32-1.22	50.0	0.70	0.42-1.16
Company										
Visits the place with a companion	No	83.1	1		83.2	1		83.1	1	
	Yes	52.1	0.62	0.46-0.86	67.8	0.82	0.66-1.01	60.2	0.73	0.61-0.86
Access										
Distance from residence	<1 km	80.5	1		83.3	1		82.7	1	
	≥1 km	50.7	0.63	0.46-0.86	60.9	0.73	0.58-0.92	55.3	0.67	0.56-0.80
Facility of access	Easy/very easy	62.4	1		76.8	1		71.2	1	
	Difficult/very difficult	35.1	0.56	0.32-0.99	41.9	0.55	0.31-0.95	38.2	0.54	0.36-0.80
Means of transportation	Car/bus	49.5	1		56.9	1		52.5	1	
	Walking/bicycle	73.5	1.48	1.11-1.99	81.6	1.43	1.11-1.85	79.4	1.51	1.26-1.82
Leisure time PA										
Walking	0 min/wk	47.4	1		61.3	1		54.8	1	
	1-149 min/wk	73.8	1.56	1.07-2.26	76.1	1.24	0.95-1.62	75.4	1.38	1.11-1.71
	≥150 min/wk	67.8	1.43	1.01-2.01	90.1	1.47	1.13-1.91	81.0	1.48	1.20-1.82
MVPA	0 min/wk	43.7	1		55.1	1		50.3	1	
	1-149 min/wk	52.6	1.21	0.69-2.11	67.5	1.22	0.84-1.78	62.8	1.25	0.92-1.70
	≥150 min/wk	65.6	1.49	1.01-2.22	83.8	1.52	1.13-2.08	68.4	1.51	1.19-1.92

*≥ 1 times/wk; PR: prevalence ratio; $CI_{95\%}$: 95% confidence interval; BMI: body mass index; MVPA: moderate and vigorous physical activity

Table 3. Multivariable analysis of individual and environmental factors associated with frequent use of parks and plazas†. Curitiba, Brazil, 2008 (n=749)

Variables	Category	Parks (n=303)		Plazas (n=446)		Total (n=749)	
		PR	$CI_{95\%}$	PR	$CI_{95\%}$	PR	$CI_{95\%}$
Level 1 – Sociodemographic variables							
Sex	Female	1		1		1	
	Male	1.12	0.82-1.54	0.95	0.76-1.18	0.98	0.82-1.17
Age (years)	18-39	1		1		1	
	40-59	1.18	0.85-1.65	1.03	0.80-1.33	1.09	0.90-1.34
	≥60	1.30	0.79-2.14	1.21	0.89-1.66	1.27	0.97-1.65
Education level	Elementary school	1		1		1	
	High school degree	1.07	0.71-1.61	1.0	0.71-1.40	1.07	0.83-1.39
	University degree	1.26	0.83-1.91	1.0	0.70-1.41	1.13	0.86-1.46
Level 2 – Health variables							
IMC (kg/m^2)	<24.9	1		1		1	
	≥25.0	0.81	0.58-1.12	0.98	0.76-1.25	0.90	0.74-1.10
Health perception	Very good/excellent	1		1		1	
	Good	0.75	0.54-1.03	0.98	0.79-1.23	0.93	0.77-1.11
	Poor/very poor	0.87	0.40-1.88	0.61	0.31-1.21	0.72	0.43-1.20
Level 3 – Company							
Visits the place with a companion	No	1		1		1	
	Yes	0.66	0.49-0.92	0.82	0.65-1.02	0.74	0.62-0.89
Level 4 – Access							
Distance from residence	<1 km	1		1		1	
	≥1 km	0.69	0.45-1.05	0.87	0.64-1.18	0.82	0.64-1.04
Facility of access	Easy/very easy	1		1		1	
	Difficult/very difficult	0.72	0.40-1.30	0.65	0.35-1.20	0.66	0.44-1.01
Means of transportation	Car/bus	1		1		1	
	Walking/bicycle	1.12	0.74-1.70	1.18	0.84-1.68	1.16	0.89-1.51
Level 5 – Leisure time PA							
Walking	0 min/wk	1		1		1	
	1-149 min/wk	1.61	1.06-2.45	1.18	0.88-1.57	1.28	1.02-1.61
	≥150 min/wk	1.18	0.81-1.72	1.35	0.99-1.84	1.30	1.03-1.64
MVPA	0 min/wk	1		1		1	
	1-149 min/wk	1.14	0.64-2.03	1.21	0.81-1.79	1.17	0.85-1.62
	≥150 min/wk	1.16	0.75-1.79	1.47	1.05-2.04	1.39	1.07-1.80

†values adjusted for the variables with p<0.20 in the bivariate analysis; $CI_{95\%}$: 95% confidence interval; BMI: body mass index; MVPA: moderate and vigorous physical activity

DISCUSSION

This is one of the first studies to analyze the association of individual and environmental factors with park and plaza use in Brazil. The methodology used allowed to represent the places considering the social and environmental attributes of the communities, which was one of the strengths of the research. The results show that company and PA are associated with the use of the places. Frequent use reached 68%, which can be partially attributed to PA promotion programs developed in the city, characterized by actions taking place in parks and plazas[19,21].

The support of friends and family may favor PA practice[16,18,27]. However, some authors highlighted the inconsistency of the association of variables related to social environment with park use and PA practice in these places[28]. Although 65.9% of participants reported having company when visiting parks and plazas, this variable was inversely associated with a higher frequency to these places. The inverse association may be explained by the need and/or dependence of a companion to visit the park/plaza. Among those who visited the places with a companion, 70% reported the company of a friend or spouse (data not shown). A population-based study carried out in Pelotas-RS, Brazil, demonstrated that lack of company was one of the main barriers associated with PA[29]. Besides that, barriers such as lack of time and feeling too tired were usually reported and associated with PA[29]. These reasons, among others, can hamper the availability of the companion to visit parks and engage in PA in these places and in other public recreational spaces.

Higher PA levels were associated with frequent use of the places in the grouped analysis. In fact, review studies demonstrated a positive association between these variables[6,8,28]. In the present study, the proportion of individuals who reached ≥150 min/wk of walking and MVPA was higher than that found in a representative sample from Curitiba[9] (walking: 29.5% *vs.* 16.3%; MVPA: 61.3% *vs.* 32.7%). The greater availability of parks, plazas, walking trails and another recreational spaces in the neighborhood is associated with a higher MVPA level in the population from Curitiba[9,10]. Previous investigations have already identified that the public recreational spaces of the city are commonly used by the community for PA[21,22], and that most users were active[7].

A specific association of walking between 1-149 min/wk with park use was observed, as well as of MVPA ≥150 min/wk with plaza use. This difference can be partially explained by the infrastructure of the places. For example, walking trails represent 13% of the area available for PA in parks, while this proportion is of only 6% in plazas[22]. In addition, the plazas evaluated show a higher number of areas designed for structured sports like soccer, volleyball, and basketball (plazas: mean of 9 places *vs.* parks: mean of 5 places)[22]. These activities are more intense than walking and may have favored the association found between MVPA and frequent plaza use.

Although the literature demonstrated an association between sex, age

and proximity from residence with park use[15,28], this hypothesis was not confirmed in the present study. These results indicate the need of further research for a better understanding of this behavior. In Curitiba, because of the high number of public recreational spaces, 77% of the population report the existence of a place for PA near their residence[30]. This characteristic can partially explain the absence of association between proximity, access and use of the places.

The results of the present study should be analyzed taking some limitations into account. The intentional selection of adults in areas specific for PA does not allow the extrapolation of the results to the youth population or to adults who use parks and plazas for contemplative activities such as reading and picnicking. Data collection was performed in the months of mild weather, which makes it difficult to generalize the results to others periods of the year. Finally, the cross-sectional design does not allow to establish the causal relationship between the variables.

CONCLUSION

Company and PA are associated with frequent use of parks and plazas. Policy-makers should invest in interventions to enhance social networking in these places, and also encourage the use of the infrastructure for PA of different intensities. Providing group activities that take advantage of the existing facilities could be an important strategy to increase the use of the places, besides increasing population's PA level. Future studies should analyze the association of quality and use of parks and plazas with population's engagement in PA.

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